Journal of Educational Planning and Administration

Volume XIX Number 2 April 2005

National Institute of Educational Planning and Administration
17-B, Sri Aurobindo Marg
New Delhi 110016

ISSN 0971-3859

Annual Subscription

	Within India	*Outside India* (By Airmail)
Individuals	Rs. 150	US $ 60
Institutions	Rs. 350	US $ 85

Annual Subscription commences with January and ends with October every year.

Advertisement Tariff (For one issue)

Full Page	Rs. 2000	US $ 100
Half Page	Rs. 1100	US $ 55

Bank draft may be sent to the Director, NIEPA in the name of the *National Institute of Educational Planning and Administration* payable at *New Delhi*

Very few copies of some back issues are also available.

Published by the Registrar, National Institute of Educational Planning and Administration, 17-B, Sri Aurobindo Marg, New Delhi - 110016 and printed by the Publication Unit, NIEPA at M/s. Prabhat Offset Press, 2622, Kucha Chellan, Darya Ganj, New Delhi - 110002.

JOURNAL OF EDUCATIONAL PLANNING AND ADMINISTRATION
Vol. XIX No.2 (April 2005)

CONTENTS

BOOK REVIEWS

Journal of Educational Planning and Administration
Volume XIX No. 2, April 2005, pp. 175-198

National Research Policy and Higher Education Reforms in the Case of Japan*

Akira Arimoto#

Abstract

This paper attempts to discuss the national research policy and higher education reforms and related issues with a focus on the Japanese case at the present time, although it is noteworthy that three distinctive stages are recognizable in terms of relevant developmental stages related to the theme. As far as the national policy of science and technology is concerned, current higher education reforms include some trends as follows: great impact of science and technology on university reforms; globalization and knowledge economy with demand of international competition toward institutions; effects of knowledge-based society on university reforms ;and effects of importance of knowledge development and construction of intelligence on expectation of higher education and development of human resources.

Introduction

Three stages of development are distinguished in the relationship between the national science and technology policy and the higher education reforms, especially university reforms. Among these stages, consideration is focused on the present time in three stages of historical development with regards to university reforms from the birth of the university to today: the pre-war time; the post-war time; and the present time.

Brief consideration is made regarding the pre-war time because some characteristics are remarked in relation to describing university reforms.

Firstly, science and technology were introduced from the advanced countries in the West to Japan, the developing country, which intended to catch up with the Western countries so as to modernize her as swiftly as possible by introducing the advanced models of higher education.

Secondly, the national government invited foreign scholars from the advanced countries to the newly built universities, sending their best and brightest students to these

---

* Revised version of the paper presented in the First Research Seminar for Asia and the Pacific – Changing Research Policy in the Higher Education System of the Asia-Pacific Region, organized by Unesco Forum on Higher Education, Research and Knowledge, Tokyo: United Nations University (13-14 May 2004).

Professor and Director, Research Institute for Higher Education, Hiroshima University, Japan
E-mail: arimoto@hiroshima-u.ac.jp

level of higher education and, in addition to it, the first national policy of internationalization of higher education in relation to the national policy of science and technology. Such policy of internationalization was realized to a considerable degree, sooner or later, through some years and henceforth, this policy was changed somewhat to the self-training of scholars and students within the domestic institutions by themselves.

Thirdly, related to the first and second trends, it is also said that Japan tried to search for creation of her own model of higher education in the process of plantation of the Western advanced models to her system to the extent she was confronted with a lot of conflicts among the imported models. Especially, this is truer in the post-war time. It is pointed out that a new higher education system was started in the post-war time by great transition from German mode prevailing during the pre-war time to the American mode introduced by the Ministry of Education based on the Occupation's policy. In more than sixty years' span in the post-war period, a sort of identity, or Japanese model of higher education system was intently and constantly searched amid the conflicts among models, particularly between two models: the German model and the American model of higher education.

Through this process, Americanization of higher education system progressed to a great extent in the university reforms for approximately sixty years until today, while it is not necessarily realized successfully. Some of the present higher education reforms are being conducted mostly based on the American model of higher education which was initially introduced into this country immediately after the war. In this sense, it is clear to say that Americanization has failed to a great degree in spite of a successive endeavour in attempt to institutionalize the model for as long as half a century.

Fourthly, in general, Japan was successful to catch up the advanced model and reached at the level of the center of learning, or COE (Center of Excellence) by the exodus of periphery in the sense as described by Ben-David in the 1970's (Ben-David, 1977). This is actually true in the field of natural sciences and engineering but many problems still seem to be left to resolve in the field of humanities and social sciences so as to become an established member of COE club in the World. At the background of this gap between two sector groups consisting of the sector of sciences and engineering and the sector of humanities and social sciences, probably some conflicts are working between the imported culture and the native culture.

Fifthly, the hierarchy in higher education system, which was originally made politically at the beginning of the modern higher education system in the country (Amano, 1993), has been constantly maintained through the post-war time even in the process of massification of higher education. Especially, the national government's strong intention has consistently kept the separation often accompanying the status gaps between two sectors of national and private sector. In addition, research universities intending to conform to German model from the pre-war period have had an advantageous status by the government's constant and intensive allocation of resources to these institutions, especially some of the prestigious national institutions established in the pre-war time as the key institutions. Other institutions attempted to catch up with

these elite institutions, or research universities, and as a result while quite a few institutions have paid much attention to research function of university, they paid less attention to teaching function. This outcome brought a lot of gap between institution's research orientation and lack of teaching orientation for mass and diversified students (Altbach, 1996; Arimoto & Ehara, 1996).

As previously described briefly, the relation between the national policy of science and technology and the national policy of higher education system and its reforms has been ceaselessly continued for more than a century and it is also adaptable to the present relation between two factors under the new pressure of emerging social changes. Related to the national policy of science and technology, current university reforms include some trends as follows: great impact of science and technology to university reforms; globalization and knowledge economy with demand of international competition toward institutions; effects of knowledge-based society to university reforms; effects of importance of knowledge development and construction of intelligence to expectation of higher education and development of human resources, etc.

Social Change, Scientific Policy and the University

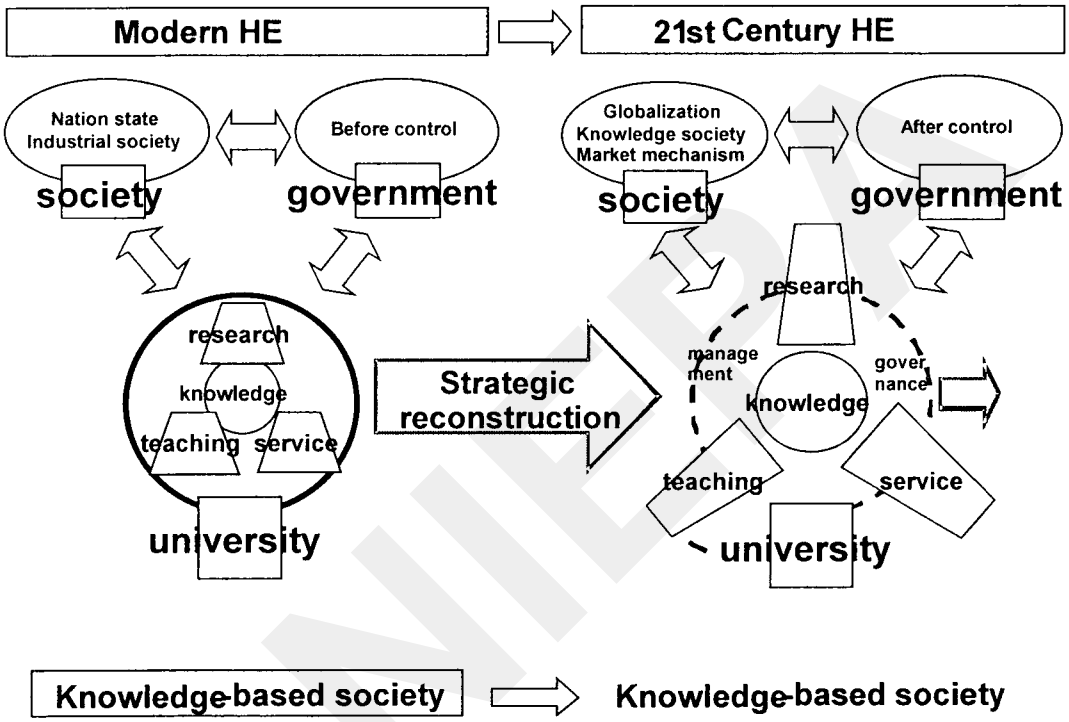
Observing the problem of reconstruction of higher education system with focus on university, it is better to start analyzing the objective situation in which university is situated. In this analysis, it is necessary to make consideration of the situation related to the past, the present, and the future from a vertical perspective and also to make consideration of situation related to various differences between Japanese system and other systems from a horizontal perspective. The former is a perspective of observing the current social changes, their impacts and pressures on university and the directions of reforms. The latter is a perspective of inquiring the problems of Japanese higher education system compared to other systems in some countries, particularly that in the USA.

As you see in Figure 1, the relationship between knowledge, society and university in the 21st century higher education system is changing with effects of the social changes and the market mechanism and also the relationship between knowledge, government, society and university.

Social Changes: External Pressure

Three factors such as globalization, knowledge-based society and market mechanism are thought to be as the main current social changes.

Figure 1 Knowledge, Society and University



Globalization

Globalization is manifestly going in accordance with knowledge economy toward stressing the viewpoints pointed out by WTO and GATS that intend to think education as a kind of currency. Encouraged by this trend, international competition of higher education systems is likely to become stronger to the extent that the differences between center of learning and periphery are more increasingly and clearly distinguished (Gumport, 2002; Altbach, 2002). Accordingly, the effect of US that is perhaps locating at the top of this kind of hierarchy will be strengthened as a main actor of Americanization.

At the same time, as shown in the example of JABEE (Japan Accreditation Board for Engineering Education), the reinforcement of system arrangement is clearly stressed sooner or later in order to meet with the global standardization and quality assurance of higher education.

Knowledge-based Society

It is manifest to say that the development of system, institutions and organization, which can develop effectively knowledge function, is likely to become more important since

knowledge society i. appearance of society stressing importance of knowledge function. In this context, the problems to be dealt with are the research development in research, the human resources development in education, and the university and society nexus in social service.

Market Mechanism

Market mechanism means a sort of invasion of economic logic into the field of education to a great degree, in which market related to education is strongly manipulated by supply and demand relationship. The key concept underlying there is accountability where outcome of research and education is to be satisfied so as to meet with the expectation of economic investment by the national government, local bodies, foundations, firms, consumers, etc., all of whom are thought to be sponsors of the university. Creditability of activity related to research, teaching and service is demanded for academic staff to supply sponsors with a certain message concerning the outcome of achievements to ask their external evaluation. Such demand from accountability will be more strengthened in future, because responding sufficiently to the demand and expectation of sponsors is indispensable as far as university is an enterprise based on the economic investment and support from the outside society.

On the other hand, it is also asked how far accountability is integrated to the tradition and concept of academic autonomy which has been gradually developed for as many as eight hundred years since the establishment of the prototype university.

Development of Human Resources

If we think about the Japanese situation with regard to the theme of relationship between the national policy of science and technology and the higher education reforms, some additional trends of the social changes are needed to make consideration. For example, the development of human resources result in the important expectation of the national government to higher education. Education that is committed to whole lifecycle stages, from cradle to tomb, engages in all education including pre-compulsory education, elementary education, secondary education, higher education and lifelong education. In the level of higher education, it is directly committed to the function of university education facing to the massification stage of higher education development. In relation to globalization and knowledge economy, relationship between competition among nations for allocation of limited resources on earth and development of human resources is related together to a considerable degree. In the knowledge-based society, weight of knowledge is high in terms of development and training of human resources in the higher education system. Accordingly, teaching and learning are likely to have advantage for social development. Distinguished human resources to be developed in such systems will be used for those in the emerging knowledge-based society.

Centers of learning with accumulation of competitive functions of research, education and learning are necessarily taking role of a magnet attracting prominent

human resources worldwide so that the accumulation of such precious human resources is naturally recognizable in such centers. As a result, North-South problem is induced in the development and allocation of human resources to the extent that brain-drain and brain-gain often occur around centers of learning (Altbach, 2002; Arimoto, 2004).

This kind of Center of learning is usually situated at the center even in the realm of higher education system. Naturally, competitiveness and reputation of every system is internationally examined and screened more or less and henceforth, every nation state is compelled to pay much more attention to the formation mechanism of center of learning as well as the higher education system.

Of course, it is not exceptional to Japan where dependence of the development of human resources is extraordinarily high mostly due to few material resources: in reality, it is not necessarily oversimplification to note that how to construct the higher education system in not only short length but also middle and long length is keenly related to the future of nation's development. It may be said that this standpoint has been reflected in the science and technology policy as well as the higher education policy ceaselessly for about 130 years since Meiji era when the modern higher education system was introduced into the country.

Financial Crisis

Japan's economic situation is confronted with a great pinch as is typically shown in the amount of as many as more than 700 trillion Yen debts. As a matter of course, economic rationalization is demanded to budget and finance in relation to many fields including education. In general, high quality productivity of research and education with less budget expenditure is an imperative to be realized. At the same time, social demand for university vitality as one of the substantial forces for social development is increasingly expected to be realized by way of university and society nexus.

Population Decrease

Population is estimated to decrease in long length simulation from 1.5 million to 1.1 million at the age of eighteen, the age for getting into universities and colleges. This kind of long span's decrease is caused by the going down of the birth rate as is shown in the fact that as low as around 1.3 specific birth indicator was recorded recently. Simulation on the basis of this trend, population is to be decreased at the end of 21st Century to more or less than 80 million from current 1.27 million (National Institute of Population and Social Security Research, 2004). Probably this trend will bring about great deal of effects upon the future of the country in terms of number and quality of workers and hence education for these workers. As far as the problem of higher education is concerned, development of human resources is thought to have become a more important problem, especially enhancement of quality education to less human resources.

Lifelong Learning Society

At the same time, high quality education may be needed to decreasing number of people, lifelong learning is also needed to many people at the emerging of knowledge-based society and lifelong learning society. Lifelong learning society has developed in accordance with some movements such as UNESCO's lifelong education plan, OECD's recurrent education plan, Carnegie Council of Education's learning society plan, etc. In Japan, conceptual transition was made from lifelong education to lifelong learning, and corresponding to this trend, the rearrangement of the Bureau from lifelong education to lifelong learning was also made in the MEXT (Ministry of Education, Culture, Sports, and Technology) around 1980. The trend of stressing lifelong learning is a kind of barometer of a nation responsible for the future education planning.

When higher education shift from massification stage to universal access stage, according to Martin Trow's theory (Trow,1974), university education is to be changed to meet with a perspective of lifelong learning: at this stage university engages in not only traditional students but also new students including adult students from age of eighteen to ninety. In this context, transition and particularly continuity between school, university and society is questioned and the articulation of university and school and also of university and work is under consideration.

Logic of Science and Scholarship in the Knowledge-based Society

Such large social changes necessarily give effect to the national government's higher education policy, planning, and especially to science and technology policy. Knowledge-based society which is recognized to be the most important of these social changes, necessarily leaves effect on higher education reforms by means of the national policies. University's response to the demand from science and scholarship means the demand deriving from the emerging knowledge-based society and especially the development of knowledge on which university's activity is substantially based for many years since its origin until today. Accordingly, this is a very natural demand, proper within academia as a place of inquiry on the basis of the logic of science and scholarship. If university wants to be a place of inquiry for scholarship still more in future, its *raison d' etre* is surely broken down by itself without respecting the function and logic of knowledge.

When knowledge is changing in nature from mode 1 to mode 2 (Gibbons, et.al., 1994), for example, and society is changing due to the emerging knowledge-based society, the university cannot exist without ignoring the functions of knowledge forming the basis of university's existence in society. When knowledge itself is transforming mainly through research, the university is expected to trace "reconstruction of intelligence"(University Council, 1998) teaching, service, and administration and management to which knowledge function such as discovery, dissemination, application, control is related.

Basic trait of knowledge-based society is that knowledge function is changing to the extent that transformation of old knowledge-based society to new knowledge-based society is occurring.

Function of Knowledge

Function of knowledge mainly consists of discovery, dissemination, application, control, and each of them corresponds with research, teaching, service, administration and management. Knowledge society or knowledge-based society means society in which knowledge is mainly a driving force or vehicle for changing society. University is a knowledge-based society from the day of its origin in the sense that it had tight relationship with knowledge by including function of knowledge within university. It is easily understandable that university imbedded inside itself the stuff of knowledge as the basis of its various activities (Clark, 1983) and tried to arrange organization so as to meet with function of knowledge. Middle Age University, for example, engaged in teaching as dissemination function of knowledge, Modern University added *research* there as discovery function of knowledge and *service* as application function of knowledge. As a result university today is including these kinds of variously accumulated functions, accompanying a lot of competition and conflict among them, caused by accumulation of these functions. (Arimoto and Yamamoto, 2003).

Knowledge-based Society

University is considered to be a knowledge-based society, consisting of knowledge function, but it is different from the emerging knowledge-based society in the total society worldwide today. If we retrospectively consider the past history of higher education, separation of four developmental stages may be possible: Middle Age University; Modern University; University Today: emerging Future University. If we consider in more details the relation between characteristics of knowledge and types of university, the Middle Age University where institutionalization of science into university was not realized yet belonged to the pre-knowledge-based society, and the modern university where institutionalization of science was realized belonged to the knowledge-based society 1 (KBS1), and finally, the university today, where science is institutionalized into not only the university but also the total society, is belonging to the knowledge-based society 2 (KBS2) (Arimoto, 2002).

These types of university such as pre-knowledge, knowledge 1, knowledge 2, have transformed in relation to the changing characteristic of knowledge. The pre-knowledge society has a characteristic in the point that it is related to the teaching-oriented university. This type has continually succeeded up to the collegiate university today.

KBS1 is adaptable to the stage from the age of scientific revolution, where scientific society, or scientific community, was established in university to the age of German-type university, where the institutionalization of science was realized within university as an academic science (Merton, 1973). University today derived from this type of university is

thought to be "Research University" (Geiger, 1993; Clark, 1995). On the other hand, KBS2 is adaptable to the appearance of total knowledge-based society where knowledge is differentiated from mode 1 to mode 2 (Gibbons, Nowotny, et. als, 1994) and distinction of both the university and the total society both of which are related to these two modes is becoming borderless. University image at this stage has not been clearly established thus far. Just like university today which is forming a mixture form of the collegiate university, the research university, and the service university as reflection of the past and traditional university models, the future university intends to create new university image out of the existing various mixture forms including the virtual university.

Structure of Science and Technology Policy

As previously discussed, national science and technology policy and relevant higher education reforms are necessary to cope with the social changes and knowledge functions. The preceding research which was conducted with regard to formation of centers of learning discussed the following important factors (Arimoto, 1994, pp. 216-217): social system; culture and climate sustaining science and technology; higher education system, government policy of science and technology, tradition and characteristics of scientific and academic community. Totally speaking, the weight of social system and the relevant conditions for promoting scientific and academic productivity are highly recognized. In this context, we should pay much more attention to the government policy.

Recently, Japanese government introduced the science and technology basic law and plan and on the basis of the plan introduced the higher education reform plans such as the 21st Century COE program, COL program, the incorporation of national universities, etc.

The Science and Technology Basic Law

A policy of creative country with the intensive promotion of scientific and technological productivity (Kagaku Gijutsu Souzou Rikkoku) was introduced with accompanying of Kagakugijutsu Kihon-hou, or the Basic Law of Science and Technology, which was established in 1995. Based on this law, the Science and Technology Basic Plan (Aiming at nation based on the creativity of science and technology) was set up in 1996.

"This plan was formed under the Science and Technology Basic Law (Act 130, Nov, 15, 1995) which was enacted to aim at a nation based on the creativity of science and technology. In order to encourage comprehensive and systematic policies for the promotion of science and technology, such as the promotion of scientific research activities at universities, the plan is formulated to materialize the science and technology five-year policy (from the fiscal year 1996 to 2000) with the following ten years in view."

This plan is involved in the development of research and education in higher education institutions (Osaki, 1999, pp.334-338.) including (1) Stress of competition and evaluation in the higher education institution; Nation's investment is to be increased and its allocation to institutions is to be based on competition and evaluation; and (2) Stress

of young generation researchers with focus on post-doctors and graduate students at doctoral course.

These law and plan clearly state the conversion to a principle of demand and supply reflecting market mechanism from that of egalitarianism that lasted for about half a century after the post-war reform of higher education system. Intensive investment of resources into institutions on the basis of merit and competition is thought to be rational, efficient and useful in order to improve academic productivity in Japanese higher education system up to an international level.

The basic plan consists of the several chapters and sections. For example, Chapter 1 (Basic Idea) consists of the following sections:

- Situations about Science and Technology (Retrospection of 20th Century/ Perspective of 21st Century);
- Japan's National Image and Ideal of Science and Technology Policy (Toward Realization of Nation which can contribute to the World by Creation and Application of Knowledge: Creation of New Knowledge/ Toward Realization of Nation with International Competitiveness and Sustainable Development: Creation of Vitality by Knowledge/Toward Realization of Nation with High Quality Life of Relief and Safety);
- Comprehensiveness and Strategy of Science and Technology Policy;
- Construction of New Relationship between Science and Technology and Society (Communication between Science and Technology and Society/ Return to Society of Science and Technology related with Outcome by Industry);
- Outcome and Problems of the First Stage of the Science and Technology Basic Plan;
- Basic Conception for Promotion of Science and Technology (Basic Aim/ Extension of Government Investment and Effective and Efficient Resource Allocation).

A Vision for Universities in the 21st Century and Reform Measures: To Be Distinctive to Universities in a Competitive Environment

The report was released in 1998 by University Council with focus on the following main contents (University Council, 1998).

Chapter One: The Society at the Beginning of the 21st Century and a Vision for Universities; Prospects for the Society in the Beginning of 21st Century and Higher Education; Progress in Higher Education Reform and Current Issues; A Vision for Universities at the Beginning of the 21st Century.

Chapter Two: Reform Measures for Universities' Individualization: Cultivation of Ability to Pursue One's Own Ends – Quality Improvement of Education and Research; More Flexibility in the Systems of Education and Research; Responsible Decision-Making and Implementation; Establishment of a Plural Evaluation System-Individualization of Universities and Continuous Improvement of Education and

Research: Establishment of a Firm Basis to Advance Higher Education Reform.

Policies to Promote Scientific Research

MEXT has shown the direction to be followed for the future of scientific research by indicating three goals: "promotion of the world's highest levels of research," "creation of new scholarship" and "contribution to the society." Based on the Science and Technology Basic Plan approved by the Cabinet Meeting in March 2001 and the discussions in the Council for Science and Technology (Cf. 2003), MEXT has been pushing ahead comprehensive science promotion measures under the basic policies that include: respect for the independence of researchers; evolution across a wide spectrum of disciplines, from the humanities and social sciences to natural sciences; and promotion of education and research in more unified ways.

Specifically. measures taken by MEXT include:

- Increase in Grants-in-aid for scientific research: to increase the amount of the grants-in-aid for scientific research with the aim of facilitating the significant development of scientific research based on liberal and open ideas.
- Fostering and securing of young researchers: to foster and secure young researchers through various support measures such as the Fellowship Program implemented by the Japan Society for the Promotion of Science.
- Improvement of research organizations: to improve research organizations, including university faculties and graduate schools, research institutes attached to universities and Inter-University Research Institutes.
- Improvement of research infrastructure: to implement more advanced high-speed networks and more improved and expanded database in universities.
- Emphasis on the world's highest levels of research: to put emphasis on basic research in the field of astronomical research, neutrino research, accelerator science, space science, fusion research, informatics, global environmental research, Antarctic research, life sciences and area studies.
- Promotion of partnership between industry, academia and the public sector: to develop a system that promotes joint research between universities and industry as well as commissioned research from private corporations, and centers for cooperative research.
- Promotion of international scientific cooperation and exchanges; to promote researcher exchanges through the Japan Society for the Promotion of Science (JSPS).

Incorporation of National Universities

Based on legislation of "the National University Corporation Law" issued in 2003, directions of the reform are made with the following traits. A dramatic reform of university since the era of Meiji ; Universities will be expected to develop their distinctive educational and research functions on the basis of their management

autonomy and independence; the government will have a responsibility to support national universities in terms of promoting academic research and producing professionals with the highest capabilities.

Several traits of this new system as pointed out by the MEXT are as follows: incorporation respectively of each national university; Introduce management techniques based on private-sector concepts; people from outside the university participating management of universities; improvement of process of selection of the president; selection of non–civil servant type as the status of personnel; thorough disclosure of information and evaluation.

Knowledge and Higher Education: Relationship between Social Condition, Function, and Structure of Knowledge and Higher Education

Today is the time when a nation state as well as society pays much attention to knowledge, while scientific attention to knowledge was started about one century ago and various kinds of sciences were engaged in research of knowledge. For example, such academic disciplines as philosophy of science, history of science, sociology of science, politics of science, economics of science, psychology of science are relevant cases. Based on this, the problem of scientific policy and higher education reform intends to focus on the relationship between knowledge and university by using some concepts and approaches developed in the sociology of science, such as conditions of knowledge, functions of knowledge and structure of knowledge that seem to be useful for analysis of the given theme.

Social Condition of Knowledge

Social condition of knowledge is related to the side in which knowledge is defined by social change or social expectation: the side in which knowledge is defined by social institutions including the times, social groups, social forces, politics, economy, religion, etc. and culture. For example, the Middle Ages University was developed from church attached to schools where university level education was to be conducted. In modern society, scientific knowledge was introduced in university to the extent that the institutionalization of science was realized in German universities including University of Berlin for the first time in the higher education history. In addition to the function of teaching proper to the traditional university that was involved in it so as to realize ideal such as "osmosis process" and "pastoral care of students", the modern university adopted functions of research and service.

Especially, it tried to integrate emerging research with teaching from a perspective of strengthening research. In spite of introducing Humbordtian ideal, discrepancy between ideal and reality was enlarged to the extent that research paradigm prevailed to a great degree. As a result, a category of "Research University" was gradually developed in the 21st century as a new ideal image of university (Geiger, 1986; 1993).

Today's university, which basically situates at the extension of modern university and comprehends various functions on the accumulation of various knowledge functions, is apparently facing conflicts of functions and increasingly difficulties of their coordination. In other words, various pressures caused by environmental changes from inside and outside university are working together in the university today. Four factors are distinguished in a basic framework: (a) social change; (b) national government; (c) society-market; and (d) university. Corresponding to these changes, all of (b), (c) and (d) are enforced to change by themselves. At the same time, university is considered to be important in terms of a triangle with (b), (c).

If we use Burton Clark's triangle model of relationship between government, society, and university (academic guild) (Clark, 1983), there are some structurally observable relationships: pressure from national government to university and reversal reaction from university to national government; pressure from society-market to university, and reversely from university to society-market. Of course, relationship between (b) and (c) is also useful.

Accordingly, the pressure of social changes is working directly to university and at the same time working through the pressures of national government, market, and within sciences (reconstruction of intelligence). On the basis of such pressure and expectation, exists expectation toward knowledge function since university is an enterprise, based on knowledge functions, and through it university is expected to make coordination of the conflicts caused manifestly and latently from various functions. There are various kinds of coordination including political coordination, bureaucratic coordination, professional coordination, and market coordination (Clark, 1983). In the present days when political, bureaucratic, professional and market coordination are strongly working, professional coordination from the inside of university is desired to work as a counter-power.

Social Function of Knowledge

Social function of knowledge indicates the university's social function including research, teaching and social service. These functions are thought to be important because they are continually succeeding all over the years from the past university to the present university. Actually, however, as a result, the prevailing research conflicts among functions increased so much that it has become a great problem inside academia how to resolve the conflicts. In the old type of KBS1 developed sorely within university, research was considered to be so important a function that the functions of teaching and service, having deep relationship with society, were inclined to be ignored. Especially, in the age like today, when KBS1 is emerging at the total society level, the nexus and integration of research and teaching is facing so much difficulty that the possibility of realization of the nexus and integration is to be made by way of its coordination.

As a concrete coordination between research and teaching, there are theoretically three types as follows: (1) integration; (2) separation; and (3) separation and integration. Among these, type (1) has not been successful thus far since the establishment of modern

university, even if it is ideal. On the other hand, type (2) is real type now undergoing, while type (3) is an innovative type to be realized in future in the sense that it is looking for integration of two functions.

Social Structure of Knowledge

Social structure indicates the side that knowledge functions at the group and organization in the university, society, or enterprise. Reconsideration of knowledge means reconsideration of institution, organization, and group in university in KBS2, going to the problems including reconsideration of chair, department, institute, faculty, and going to the problems including norm of organization, role expectation, role taking, and role playing of teachers, internalization of role, socialization (scientific socialization, teaching socialization, service socialization, etc.). Furthermore, the control of knowledge in the enterprise means the control process of knowledge by governance, administration and management. There are mainly two control types such as top-down and bottom-up.

Through such control process, norm, aim, goal of group, organization, institution on the basis of knowledge are gradually formed and internalized into the members of enterprise. They are embodied in their consciousness and behavior. Through the institutionalization of the norm into the groups and members of the enterprise in the forms of ethos, ideal, value, role, etc., occurs series of behaviors of conformity and deviation among members including, for example, conformity to norm, non-conformity to norm, deviation from norm (Becher, 1989). If the allocation of new knowledge means the reforms of realization of norm and value, success and failure of this kind of reform are necessarily affected by the ways of governance and administration. In this sense, the reconstruction of knowledge necessarily needs the reform of enterprise and cannot lack the reconstruction of discipline-oriented groups like faculties, departments, chairs, institutions, etc., which are usually formed around knowledge. Nevertheless, it is not necessarily realized easily owing to the traditional social structure and climate, intrinsic to KBS1.

Relation between Condition, Function, and Structure

As described above, the social condition, function and structure engage in mutual relationship and mutual interaction among them. Today's university is forced to make reform under the influence of the structural conversion as a paradigm conversion of social change. It is also demanded to make reconsideration of its function and structure so as to make construction of the new university image.

Accordingly, we should make higher education image which is integrated by system, institution, organization and group by making examination of the relationship between their condition, function and structure. In this process, we will need a viewpoint of making university reform including policy, planning, practice, evaluation, and we will also need a viewpoint of re-valuating adequately its outcome, e.g. meta-evaluation. It is to make a grand design of higher education system from a perspective of comprehensive policy regarding knowledge as follows: to clarify the national government higher

education policy and plan through various proposals of higher education reforms inside and outside the academia.; to practice them through functions of governance, administration, management, etc.; to examine them through such evaluation categories as self-evaluation, mutual evaluation, third party evaluation in the evaluation system; to make reconsideration of the given policy planning and practice by feedback process.

Construction of Higher Education System

As discussed previously in the part of Figure 1, the present social change is considered to contain internationally same kinds of phenomena such as knowledge-based society, globalization, market mechanism, in addition of it, in Japan, to contain economic recession, population decline, lifelong learning, etc. In a macro perspective, it is indispensable that the higher education system responding to the industrial society should shift to the system responding to knowledge-based society. That is transition from KBS1 to KBS2.

Higher education system developed in the age of KBS1 is to be changed to that responding to KBS2. In other words, the higher education system developed in the KBS1 which put much weight to research is to be shifted to that developing in the KBS2 which put weight on teaching though stressing research as a basic function.

In the framework of both the pressures working from the social change and those from the scientific change, we can notify that a triangle relationship between national government, society (or market), and university is working around expectation, pressure and control of knowledge. Some considerations are made in the following parts.

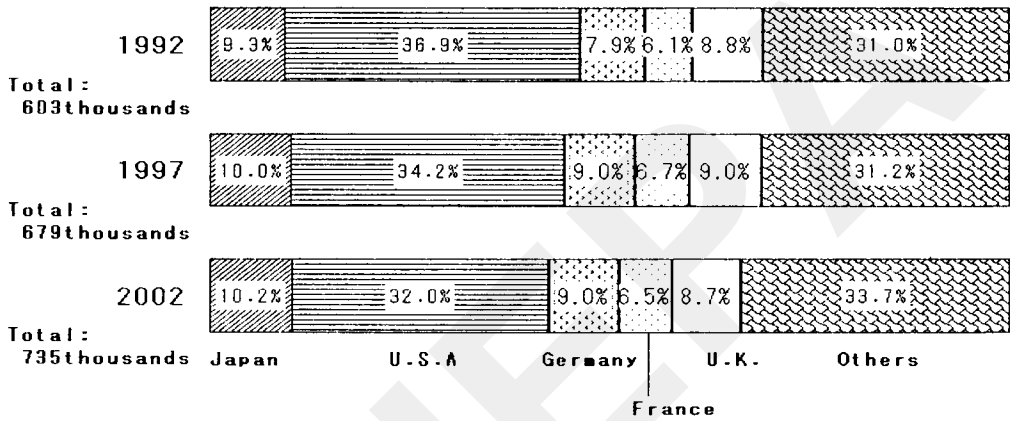
Firstly, there are the expectations and pressures from the national government. It is not denied that some 200 advanced and developing nation states in the world are increasingly paying high expectation to higher education. Japan has attained the world standardization in quantitative development of higher education by successfully catching up the advanced countries in terms of importing their models (Arimoto, 1994). It is not oversimplification to say that she is now looking for new models after getting into modelless stage. This situation is adaptable to both research and teaching.

At first, it is understandable that research is going well as far as the factor related to the number of researchers and research productivity is concerned, because the research university cluster has progressed to a considerable degree in an international perspective. At the same time, there exist quite a few problems to be resolved as soon as possible. Especially, how to enhance "scientific productivity", or "academic productivity" (Merton, 1973; Shinbori, 1973) is a traditionally important problem in the scientific community and also in the academic scientific community. In this context, it is noticeable that, in Japan, "research productivity", one of academic productivity, as well as the research level has not attained to the US's level, though it has attained internationally high standard in a short period after the establishment of the modern university system.

As is shown in the Figures 2 and 3, which deal with indicators related to the number of published papers and number of citations of papers among scientists worldwide, Japan is competing with three countries such as UK, Germany and France and is still staying far

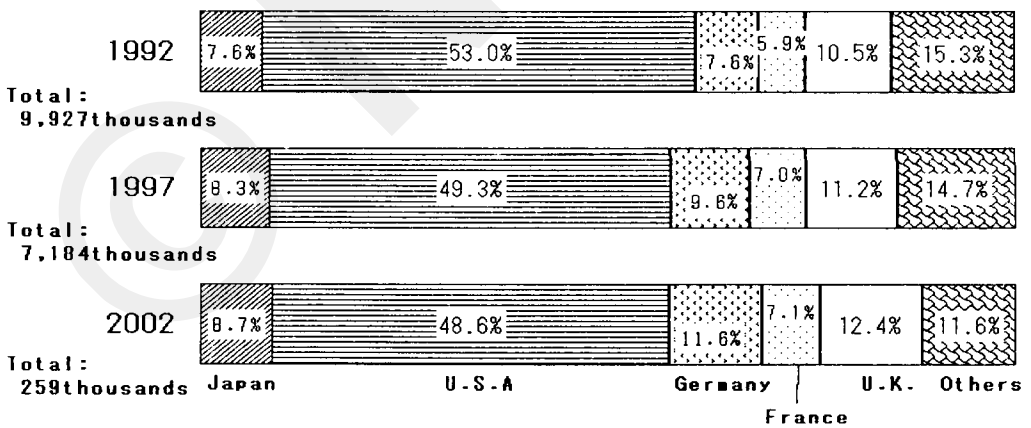
behind US when we use these indicators. As for the shares of citations in the Figure 3, for example, Japan's shares are 8.7% of 259 thousands papers in 2002, while US's shares are 48.6% with possessing almost five times gaps between two countries.

Figure 2 Selected Countries' Shares of Published Papers (Percentage)



Source: Institute for Scientific Information National Science Indicators, 1981-2002

Figure 3 Selected Countries' Shares of Citations (Percentage)



Notes: This figure summarizes the total number of citations for the year 2002 by year of every publication, and the share according to selected countries.

Source: Institute for Scientific Information National Science Indicators, 1981-2002

How to fill this gap will become one of the issues to be confronted by the Japanese higher education policy and reform. Based on the fist plan as discussed above, the second, science and technology basic plan (March 2001) pointed out in its proposal, "(1) training of researchers and engineers and university reform, and (2) training and security of engineers". Expectation for development of research including training of researchers and engineers is stressed in order to resolve the present difficult situation.

So as to meet with this direction, the recent national government's policy is involved in the intensive construction of a series of policies as follows: the reinforcement of graduate school; the 21st Century COE (Center of Excellence) program for research (2002) and COL (Center of Learning) program for education (2003); the introduction of national university corporation (2004); the establishment of the national university corporation evaluation committee for the assessment of new national university corporation's achievement (2004) and the allocation of resources among them on the basis of its assessment; the intensive construction of COE institutions by introduction of the 21st Century COE program as well as COL program. The pressure for this direction is to be increased from now on.

Next, the side of teaching also expected in the plan for science and technology relevant questions whether university's teaching function is effective or not by its process and outcome. For example, if we see graduate rate as an indicator of human power training, it has already developed to an international standard and so it has been successful in terms of quantity. However, it is not deniable that severe problems have appeared in terms of quality. For example, if we pay attention to undergraduate education, student diversification and decline in scholastic achievement and learning ability are observable not only in international level but also in domestic level to a considerable degree, and especially in the latter to a great degree (Altbach, 1996; Arimoto & Ehara, 1996). This is testimony of higher education policy bringing about insufficient qualitative outcome in spite of bringing about sufficient quantitative outcome.

Problem is worsening not only in the undergraduate education level but also in the graduate education level when we make comparison of it with US, which has attained the place of center of learning in the World, it is proud of the first class research and teaching function in all higher education systems worldwide (Clark, 1995), even accelerating brain-drain of distinguished scientists, scholars, researchers and students from all over the World. Brain drain from Japan to USA is not exceptional (National Science Foundation, 2002; Arimoto, 2003).

Problems of Present System with focusing on Graduate School

Institutionalization of graduate school in US

Our preceding research mentioned above obtained some findings regarding the promoting conditions of "research university" as follows: climate of department; reward system; graduate education; communication network among researchers. (Arimoto, 1994, pp.230-231). In this context, graduate education is set as a focal point here among these factors,

because the COE in the World has a strong graduate education system to be studied by other counties including Japan.

Burton Clark, who made an international comparative study on graduate schools in Germany, France, England, US and Japan observed US's early discovery of graduate school compared with other countries worldwide (Clark, 1995). He pointed out characteristics of these systems: German Institute University; French Academy University; English Collegiate University; American Department Graduate University; Japanese Applied University paying attention to the connection of the department and the graduate school in US higher education system as a remarkable distinction among these systems.

If we make retrospective consideration to US's historical invention, it could be successful in introducing the graduate school based on the modified German model with focus on its strength of research. Johns Hopkins University, which was probably obliged to President Gilman's unusual individual efforts, could successfully build the fundamental system as follows (Clark, 1995; Pierson, 1952; Arimoto, 1981) (1) Maintaining the department system instead of introducing the chair system and apprenticeship; (2) Institutionalization of two-tier system with undergraduate and graduate course; (3) Introducing schooling in the degree system; (4) Seeking nexus of research and teaching; (5) Introducing decentralization and competitiveness or diversification of the higher education system; and (6) Controlling inbreeding in the organization of faculty members.

As a result, US became the center of learning in place of Germany. In fact, various kinds of surveys testified that US replaced France, UK and Germany by 19th century and early 20th century and finally stood on the summit of social stratification (Ben-David, 1977).

Institutionalization of Graduate School in Japanese University

Introduction of the German university model into Japanese university was not well realized because of the lack of the matured climate and atmosphere, though the same kind of intention was carried out at Kyoto University (Ushiogi, 1984). Of course, some factors related to German model were introduced into Japanese universities as follows: (1) chair system; (2) apprenticeship; (3) single-tier system; (4) degree system; (5) research orientation; and (6) bureaucracy. However, some of important factors were intentionally neglected and not institutionalized into Japanese universities as follows: (1) competition among institutions; (2) "Privat Dozent" system; (3) "Habilitation" system; (4) control of lifelong employment system; (5) academic freedom in teaching and learning; (6) state university.

Japan conducted the graduate school reforms at the time of post-war school system reforms, introducing American model. This reform was fairly effective with regard to promoting academic productivity among faculty members especially in the field of natural sciences. Faculty of engineering, which is thought to be the core part of "applied university", as pointed out by Burton Clark (1995), has increasingly developed among

various kinds of fields. Japan has shifted in terms of academic productivity from the peripheral place, as pointed out by Ben-David at the 1970's (Ben-David, 1977), to one of the centers of learning as shown in the recent statistics.

However, the present situation is still desired to be improved if we compare the counterpart situation in US.

The difference between two countries is likely to be caused by the following factors related to the insufficient introduction of American model: insufficient shift from the chair system to the department system; maintaining apprenticeship in training researchers (especially in the fields of humanities and social sciences); insufficient institutionalization of the graduate school system especially in the fields of humanities and social sciences as shown in the low graduate number of doctoral degrees; insufficient practice of schooling in relation to degree system (probably owing to deep relationship with apprenticeship); insufficient separation between the undergraduate course and the graduate course (it may be said that the single-tier system is still substantially working); keeping of research orientation in relation to the concept of scholarship (Boyer, 1991); failure of controlling of inbreeding in reflection of a university version of lifelong employment system and seniority system; lack of decentralization and diversification of higher education in the national sector mostly due to the national governmental control of higher education system so as to make unification of institutions and organizations.

We can observe international trend paying much attention to the construction and development of graduate education. As far as Japanese case is concerned, it is said that the gap between Japan and US in terms of graduate education's academic productivity is still large even if we are trying to fulfil the gap as possible as we can.

Problems of Japanese Graduate Education in Comparative Perspective

As discussed above, US's introduction of two-tier system preceded about as long as one century compared with other countries worldwide, although it was product of accidental discovery. But it is true to say that this discovery eventually promoted academic productivity leading to making the center of learning in international perspective.

There are some differences between two countries in addition to the differences previously discussed (Arimoto, 1994; 2003; Arimoto and Yamamoto, 2003).

Separation vs. Integration of organization of research and teaching

Separation between research organization and teaching organization has been made in US, while integration of two organizations has been sought in Japan.

The differences lying in both systems are likely to give effect on how to integrate functions of research and teaching. In US, professors who belong to department teach in Faculty at undergraduate and graduate level, while in Japan professors who belong to Faculty (or School) responsible for both undergraduate and graduate levels conduct research and teaching function together in the same unit.

Research and teaching orientation vs. research orientation

Stressing evenly research and teaching functions is seen in the US system in the separate units, while stressing research more than teaching is seen in Japanese system in the same unit. According to Carnegie international comparative survey on academic profession, US and UK are classified to fifty and fifty oriented type with regard to orientation to research and teaching, while Japan as well as Germany, the Netherlands, Sweden, South Korea, are classified to research oriented type (Altbach, 1966; Arimoto & Ehara, 1996). If we make consideration of two trends discussed above and now, it is interesting to see the fact that a separation type of research organization is inclined to become integration of two functions of research and teaching, and integration type of both organizations is apt to become separation of two functions.

Department system vs. chair system

Separation of two systems is also a remarkable difference between two systems. The former is a framework working well for integrating specialty, while the latter is a framework working well for separating specialty. For example, education department includes such specialties as sociology of education; economics of education; history of education, etc. Individual chair is usually composed of each of specialty such as sociology of education, economics of education, history of education, etc.

As for the chair of sociology of education, for example, whenever a chair holder retire from the position a new staff specializing in sociology of education is recruited to this position or a junior position in the same chair in the organization. It is very difficult to recruit a researcher into this position from other fields of specialty even if the candidate specializes one of specialties in the field of education.

This principle works well in keeping traditional disciplinary realm and training the researchers who are considered to succeed to the chair but at that time usually lacks flexibility for reconstructing the knowledge framework from an inter-disciplinary and trans-disciplinary perspective. In this context, it is said that the department system is more innovative than the chair system in the direction of reconstruction of the knowledge framework and content in the emerging knowledge-based society which demands the restructure of intelligence.

Organization with openness vs. organization with closure

As far as selection of students is concerned, US did not pay attention to German apprenticeship, while Japan did pay much attention to it. This is related to examination system of either open competition or closed competition. This kind of difference is reflection of cultural difference of either conforming to homogeneity or heterogeneity of members in the recruitment process. US system intends to adopt integration of heterogeneous ascription, while Japanese system is apt to adopt disintegration of homogeneous ascription. The former attempted to control inbreeding ratio in staff members approximately under one third (Pierson, 1952), while the latter attempted to

encourage inbreeding ratio at maximum (Arimoto, 1981), though it is true to say that this inclination was undermined recently to a considerable degree (Arimoto, 1994).

Contract system vs. lifelong employment system

In the US system, academic career is shown with possessing often mobility among institutions because of working of the fixed-term appointment system in the process of recruitment and promotion of academic staff in the institutions and organizations. After this kind of probation and contract at the level of assistant professorship, academic staff promote to tenure position which is usually started from associate professorship around 40 years old. In Japanese system, this kind of latch system did not work well until recent time when "elective fixed-term appointment system" was finally introduced in some institutions and organizations so as to raise mobility (Yamanoi, 2003).

Manifest classification of institutions vs. latent classification of institutions

Carnegie classification of institutions was introduced into US higher education system and the social stratification of higher education institutions was made clear in all institutions from research universities to community colleges. In the realm of graduate education, research university, which occupies about 5 per cent of all higher education institutions, is considered to be the most prominent as well as prestigious in production of Ph.D. and academic productivity in both research and teaching, especially research. In Japan, this kind of category was introduced around 1980 tentatively but it has not been authorized publicly until recent days when new policy started by the MEXT, as mentioned previously, by way of 21st COE program and also COL program. Among these, COE program started in attempt to build Japanese type Carnegie classification so as to make clear the latent existence of the social stratification of institutions in the graduate school.

Institutional control vs governmental control

Social stratification of higher education was made by promoting competition among institutions in US where the nation state regulation for establishment and improvement of institutions is working weaker than that in Japan where social stratification was established intently by the national government policy for more than one century since Meiji era. This kind of difference is still lasting in two countries. This difference has made a great deal of effects in forming difference of academic productivity and vitality in two countries thus far. In this regard, probably difference and its effect will last for a while in future, since there is likely to be no clear recent policy of science and technology in the different direction from this.

Concluding remarks

1. Relationship between the characteristics of national policy of science and technology, higher education policy and higher education reforms is very high, being worth paying much attention. This relationship is becoming more important in the emerging knowledge-based society where knowledge functions are considered to be important in not only university but also the total society. In the case of Japan, the basic plan of science and technology was introduced and it is said that on the basis of this plan, the direction of higher education reforms was basically defined.
2. National government's strategic intensification of science and technology is intensively directed to the following focal points: promotion of basic field; intensification of R & D responding to the national and social issues including the field of life science, information and communication, environment, nanotechnology and stuff, energy, producing skill, social basis, frontier; response to the field of rapid development. These kinds of policies and plans in the level of system are necessarily enforcing the government authority to the higher education reforms in the levels of institutions, organizations and groups by way of higher education policies and plans.
3. A series of the national policy in science and technology was directed to the enhancement of scientific productivity comparable to that of the most advanced system all over the World, especially US at the post-war time, which has become COE by invention of graduate school for the first time in the higher education history. In this context, the fruitful outcome of the Japan's national policy with regard to science and technology mostly depends on how to get successful output in graduate education as well as graduate school.
4. The role of graduate school, which intends to integrate knowledge discovery and KBS1 knowledge assimilation, will increase its weight at the age of the shift from to KBS2, because the construction of organizations with response to knowledge function and nature is inevitable. US invented the system of organization of graduate school before arising knowledge-based society 2 and through the process of institutionalization of the graduate school, she could successfully realize a philosophy of making nexus of research, teaching and learning originally aimed by German university. On the other hand, Japan failed to do so at the first stage before the war and after the war Americanization was not successful despite she tried to introduce the American model of graduate school and education. It actually means the failure of constructing the organization for the nexus of research, teaching and learning.
5. It can be said that introducing a model seems to be fairly difficult since the construction of the enterprise pursuing the characteristics including openness, diversification and competitiveness is necessarily affected by such factors as culture, society, history of their own country. At the same time, however, fierce

competition with American model is inescapable at the emerging new era in which globalization, KBS2, market mechanism proceed and accordingly the international competition increases to the extent that quality assurance of graduate education is necessarily needed for the comparison among systems and institutions from a perspective of the global standard. The problem of globalization is more or less considered to be the problem of Americanization in the field of graduate education as well as the scientific and academic community.

6. Conducting various kinds of reforms on the basis of making analysis of weak points with regard to Japanese graduate education is probably the problem to be engaged at the next stage where Japan is confronted with this problem so as to form the center of learning. Instead of making over conformity and assimilation to the American model in the process of globalization, how to create identity, originality and creativity proper to Japanese graduate education is desired to be realized.

References:

Altbach, Philip G. (1996): The International Academic Profession: *Portraits of Fourteen Countries,* Princeton: Carnegie Foundation for the Advancement of Teaching.

Altbach, Philip G. (2002): *The Decline of the Guru:* The Academic Profession in Developing and Middle-Income Countries, Center for International Higher Education, Lynch School of Education, Boston College, Chestnut Hill, Massachusetts.

Amano, Ikuo (1993): *Kyusei Semon Gakko (Old Professional Schools),* Tokyo: Tmagawa University Press.

Arimoto, Akira (1981): *Daigakujin no Shakaigaku (Sociology of Homo Academics),* Tokyo: Gakubunsha Publising Co.

Arimoto, Akira (1996): "Cross-National Comparative Study on the Post-Massification Stage of Higher Education", *Research in Higher Education,* No.25, pp.1-22, Hiroshima: Research Institute for Higher Education, Hiroshima University.

Arimoto, Akira (2001): "Hoshotaikei nonakano Kenkyu Hyoka: Gakumon no Ronri no Kozoto Kinou" (*Evaluation or Research in Reward Sytem:* with Focus on Scientific Logic and Structure) Daigaku Hyoka Kenky (Academic Evaluation Research), JUAA, pp.16-24.

Arimoto, Akira (2002): "Globalization and Higher Education Reforms: The Japanese Case", in Urgen Enders and Oliver Fulton, (eds.) *Higher Education in a Globalising World*, Dordrecht: Kluwer Academic Publishers.

Arimoto, Akira (2004): "Academic Productivity and Development of Human Resouces in Higher Education", *Research in Higher Education,* No.34, Hiroshima: Research Institute for Higher Education, Hiroshima University.

Arimoto, Akira ed., (1994): Gakumon Chushinchi no Kenkyu: Sekai to Nihon nimiru Gakumonteki Seisansei to sono Joken (*Study on the Centers of Learning:* Academic Productivity and its Conditions in the World and Japan), Tokyo: Toshindo Publishing Co.

Arimoto, Akira and Shinichi Yamamoto, eds., (2003): Ddaigaku Kaikaku no Genzai *(Acedemic Reforms Today),* Tokyo: Toshinado Publishing Co.

Arimoto, Akira ed., (2003): Daigaku no Karikyuramu Kaikaku *(University Curricukum Refoms),* Tokyo: Tamagawa University Press.

Becher, Tony (1989): *Academic Tribes and Territories,* London: Open University Press.
Ben-David, Joseph (1977): *Centers of Learning,* New York: McGraw-Hill.
Boyer, E. L. (1991): *Scholarship Reconsidered,* Princeton: Carnegie Foundation of Advancement of Teaching.
Clark, Burton R. (1983): *Higher Education System in Cross National Perspective*, Berkeley: University of California Press.
Clark, Burton R. (1995): *Place of Inquiry,* Berkeley: University of California Press.
Council of Science and Technology, (2003): *Policy for Training and Reserve of Research Human Resources* so as to Promote International Competitiveness (in Japanese). Tokyo: Council of Science and Technology.
Geiger, L., (1986): *To Advance Knowledge; The Growth of American Universities*, 1900-1940, London: Oxford University Press.
Geigger, L., (1993*): Research and Relevant Knowledge; American Research Universities Since World War II,* London: Oxford University Press.
Gibbons, M., Nowotny, H., Limoges, C., Sschwartzman, S., Scott, P. & Trow. M., (1994): The *New Production of Knowledge: The Dynamics of Science and Research in Contemporary Societies.* London: Sage Publications.
Gumport, P. (2002): "Universities and Knowledge: Restructuring the City of Intellect", in S. Brint (ed.) *The Future of the City of Intellect: The Changing American University*, Stanford: Stanford University Press, pp.47-81.
Merton, Robert K. (1973): *The Sociology of Science: Theoretical and Empirical Investigations*, edited by N. Storer, Chicago: Chicago University Press.
National Institute of Population and Social Security Research (Kokuritsu Shakai Hosho・Jinkou Monadai Kenkyusho) (2004): *Population Projections for Japan: 2001-2050,* Home Page, Tokyo: National Institute of Population.
National Science Foundation (2002): *Science and Engineering Indicators 2002*, Volume 2, Appendix Tables, Arlington: National Science Board.
Osaki, Hitoshi, (1999): Daigaku Kaikaku 1945-1999 *(University Reform; 1945-1999)* Tokyo: Yuhikaku Publishing Co.
Pierson, W., (1952): *Yale College; An Educational History 1871-1921*, New Haven: Yale University Press.
Shinbori, Michiya (1985): "Academic Productivity no Kenkyu" (Study of Academic Productivity), *Research in Higher Education,* Vol. 1, Hiroshima: Research Institute for Higher Education, Hiroshima University.
Trow, Martin (1974): "Problems in the Transition from Elite to Mass Higher Education", *Policy for Higher Education*, OECD.
Ushiogi, Morikazu (1984): Kyoto Teikoku Daigaku no Chosen *(Challange of Kyoto Imperial Univeristy)*, Nagoya: Nagoya University Press.
University Council (1998): 21Seiki no Daigaku-zo to Kongo no Kaikakuhosaku nitsuite-Kyosoutekikankyo no nakade Kosei ga Kagayaku *Daigaku (A Vision for Universities in the 21st Century and Reform Measures*: To Be Distinctive Universities in a Competitive Environment, Tokyo: University Council.
Yamanoi, Atsunori (2003): "A Study on the System of Fixed-Term Appointments for Faculty Members: Focusing on the process from its introduction to legislation", *Higher Education Research in Japan* Vol.1, Hiroshima: Research Institute for Higher Education.

Journal of Educational Planning and Administration
Volume XIX No. 2, April 2005, pp. 199-222

Key Research Policy Issues and the Changing Role of the State in the Asia-Pacific Region

Grant Harman*

Abstract

Rapid economic and social changes in many countries of the Asia-Pacific region are impacting significantly on university research policy at both national and institutional levels. Leading higher education systems in the region are following similar developments to those found generally in OECD countries, particularly leading to changing roles for the state in research policy and innovation, establishment of new mechanisms for allocating public funding of research, experiments in priority setting and research concentration, enhanced university-industry research partnerships, and more serious efforts to capture research outputs in order to create new jobs and produce economic and social benefits. On the other hand, poorer countries find great difficulty in meeting enrolment pressures, let alone allocating significant sums to support research.

Introduction

This paper discusses the broadly defined recent changes in national and institutional research policy for higher education in the Asia Pacific region. It concentrates particularly on the role of the state in university R&D (research and development), public funding of university research, priority setting for research, university research links with industry, and commercialisation of university research outputs. While the main emphasis is on the Asia-Pacific region, the discussion is set in a broader international context, with greater emphasis being given to national rather than institutional policies. Because of a lack of detailed English language documentation and reliable statistics for many countries of the region, the discussion concentrates mainly on those countries with well-developed innovation systems where information is readily available.

The term 'research policy' is used in the paper to refer to guidelines and decisions expressed in directives, regulations of laws with regard to the funding and regulation of research activities while the term 'research management' refers to implementation of

* Centre for Higher Education Management and Policy, School of Professional Development and Leadership, University of New England, Armidale NSW 2351, Australia, Email: gharman@metz.une.edu.au

research policy, including determination of strategic directions, allocation of resources and roles, and monitoring and evaluation of performance. Often in public and academic discussions, the terms 'research policy' and 'science policy' are used interchangeably, even though in its limited sense, the term 'science policy' does not include the social sciences, humanities and creative arts (Nowotny, Scott & Gibbons 2001).

Academics sometimes find it difficult to come to grips with use of such terms as research policy and research management. Understandably, they see university research as being activity undertaken by individual academics or groups of academics, working with a large degree of independence. While generally, national and institutional research policies have no intention of diminishing academic independence and creativity more than necessary, governments and other research funders increasingly are concerned to ensure that scarce resources are employed effectively and efficiently.

While there is an extensive literature on what constitutes research and how this differs across disciplines and various institutional settings (Whiston & Geiger 1992; Haden & Brink 1992), research can be defined as critical and creative investigations undertaken on a systematic and rigorous basis, with the aim of extending knowledge or solving particular practical or theoretical problems. Extension of knowledge can be aimed at the discovery of previously unknown phenomena, development of explanatory theory and its application to new situations, and work that provides significant contribution to particular disciplines, tackles problems of social and economic significance, or produces original works of intellectual merit.

Since research activity varies considerably in terms of its disciplinary orientations, objectives, methodologies employed, and end products and their use, policymakers and sometimes academics themselves find it convenient to make various distinctions, such as between basic and applied research, and between curiosity-driven and problem-driven research. Many countries now use OECD (Organisation for Economic Development and Cooperation) categorisation for statistical collections and sometimes policy discussions into *pure basic research* (experimental and theoretical work undertaken to acquire knowledge without looking for long-term benefits), *strategic basic research* (experimental and theoretical work undertaken to acquire knowledge in the expectation of useful discoveries), *applied research* (original work undertaken to acquire knowledge with a specific application in view) and *experimental development* (systematic work, using existing knowledge gained from research or practical experience, directed to producing new materials, products or devices) (OECD 2002). While various categorisation has considerable utility in monitoring research performance and in discussions of research policy issues, it has been subject to considerable criticism, especially as traditional boundaries are becoming increasingly blurred in many new multi-partner and trans-disciplinary research centres.

Universities are key elements in national innovation and science systems, especially in developed countries. They carry out extensive research activities, train future researchers and other skilled personnel, and generate and communicate new knowledge. University research adds to the overall stock of scientific knowledge on which industrial

research draws, while academic laboratories are a source of advanced instrumentation often accessed by industry. Universities undertake research activities for a variety of reasons, but particularly important are strong academic commitments to the value of research and scholarship that are highlighted in university charters and mission statements, and are integral parts of academic and disciplinary cultures. But, in addition, universities engage in research because of the status and recognition it attracts, its value in supporting teaching efforts particularly at advanced levels, and as vehicles for providing service to the wider society.

With the increasing recent emphasis on international business competitiveness, the production, application and use of new knowledge generated by universities have taken on increasing importance. Traditionally, high quality university research was regarded as work, that breaks new ground or is innovative; is systematic and rigorous, with appropriate in-depth analysis or synthesis; and leads to publication or other forms of dissemination so that the findings are open to peer scrutiny and assessment, and are available to the benefit of the wider community. However, with the increasing commercialisation of university research and new partnerships between universities and industry, some traditional academic commitments and values are being challenged such as open dissemination of research results and sharing of research materials among scientists.

Apart from universities, other institutions of importance in science and innovation systems are public-sector research institutions (PRIs) and research laboratories operated by business firms. However, the balance of activity between these three different types of research performing bodies varies considerably between different countries.

The research functions of universities have changed to a major extent over the past two centuries. The classical European university concept of research-based teaching developed following the establishment by Wilhelm von Humboldt of the University of Berlin in 1810 and continues to be influential today, while the idea of the modern research university developed in the United States in the second half of the 19th century. In the early part of the 20th century, the research university idea spread widely to many other industrial countries, with a strong emphasis being placed on the role of the university focusing primarily on basic research and research training, with some commitment to applied research but little to developmental research. The mission and fundamental values of the university at this stage were only moderately tied to the economy and employment of graduates. From the Second World War on, however, demands made on scientific research for reasons of national defence and economic and social development brought universities more directly into contact with research users, leading to ongoing efforts to reform and redirect university research. While the classical university idea retains considerable appeal within academia, increasingly modern universities are being forced to accept a wider research role and to become more directly involved with business, industry and government (OECD 1998). Combined with this has been the rapid growth in student enrolments and moves towards more strongly market

driven approaches, with students, firms, governments and other 'customers' placing increasing pressures on university directions and priorities.

Universities in the Asia-Pacific region are responding to these changes in the context of a new emphasis on the knowledge revolution whose focus is on the ability to create, access and use knowledge as being fundamental determinants of global competitiveness. According to the World Bank Knowledge for Development Project, key determinants of national success in this knowledge revolution include increased codification of knowledge and development of new technologies, closer links between industry and the national science base, increased importance of education and up-skilling of the labour force, the importance of investment in 'intangibles' such as R&D, education and software, and the desirability of innovation and productivity increases being more important in competitiveness than GDP (gross domestic product) growth (Dahlman 2002). This rapidly changing context provides particular challenges for countries that need to develop strategies in order to use new and existing knowledge to improve performance in traditional sectors, exploit opportunities for 'leapfrogging', and develop new sectors. Even the smallest and poorest countries need to address these challenges in order to support advanced-level university training and ensure some level of capacity to access new internationally-used technologies.

Higher Education and Research in Asia and the Pacific

The Asia Pacific region is a vast collection of states with over three billion people, containing almost 60 per cent of the world's population but only one-third of the world's higher education enrolments and only about 30 per cent of the world's wealth. It includes two countries each with a population in excess of one billion people as well as many small nation states. Countries of the region differ greatly in ethnicity, social characteristics and the extent of their recent economic development, with striking differences between rich and poor countries and between rural and urban areas. Sharp contrasts also exist between exceedingly wealthy nations and poor countries and between nations that have for many years operated market economies and newly independent countries of Central Asia (Harman 1998).

The diversity of the region is clearly reflected in its higher education systems. The region includes some of the largest higher education systems in the world but also micro-systems that cater for small numbers of students. Some higher education systems are amongst the strongest and best resourced internationally while others struggle to find sufficient resources even to provide the most basic elements of higher education provision. Systems such as those of the Indian sub-continent are still largely public systems, whereas in Japan, Korea, the Philippines, Indonesia and Thailand, a high proportion of students are now enrolled in private higher education. Table 1 illustrates the diversity in enrolment size, staff numbers and the production of graduates. By far the largest highest education systems are those of China, India, Japan and Korea, while some of the smallest are those of Bhutan and Mongolia.

TABLE 1
Size of Selected Asia and Pacific Higher Education Systems as Measured by Total Enrolments, Teaching Staff and Graduates

	Total Enrolments Tertiary Education ISCED 5&6	*Teaching Staff*	*Total Graduates*
Australia	845,132	-	151,862
Bangladesh	878,537	47,137	-
Bhutan	1,837	164	-
Cambodia	25,416	2,124	-
China	12,143,723	679,888	1,948,080
Hong Kong SAR	128,052	10,063	-
India	9,404,460	399,023	-
Indonesia	3,017,887	217,403	476,971
Japan	3,972,468	477,161	1,068,878
Lao	16,621	1,372	2.924
Malaysia	549,205	20,473	-
Mongolia	84,970	6,575	14,868
Myanmar	553,456	10,522	-
Nepal	103,290	-	-
New Zealand	171,962	11,252	42,791
Philippines	2,432,002	93,956	351,078
Republic of Korea	3,003,498	144,185	519,719
Vietnam	749,914	32,977	121.292

Sources: Unesco Institute of Statistics (2003) *Global Education Digest 2003,* Montreal.

Higher education in the future information age is likely to play a greater role in preparing the region's labour force than in the past. Some analysts have argued that the economic returns to higher education are rising with a shift to science-based industries and services, and according to the Asian Development Bank (2003, p 28), this is being borne out by empirical data. Many countries in the region also dramatically expanded higher education enrolments in the 1980s and 1990s. Hong Kong, China, Korea, the Philippines, Singapore and Thailand all now have relatively high levels of age cohorts enrolled in tertiary education.

National capacity in research within higher education systems and overall capacity in R&D within the region vary considerably. Table 2 provides UNESCO data on the number of researchers per million of population and overall R&D expenditure as a percentage of GNP. By far, the strongest countries in terms of researchers per million inhabitants are Japan, Singapore, Australia and the Republic of Korea while in terms of R&D expenditure in relation to GNP (gross national product), the two strongest

economies are Japan and the Republic of Korea, and then at a lower level Singapore and Australia. In some countries, particularly China and India, rapid transformation is taking place, driven by substantial public and private investment. It should be noted that the figure provided in this Table for Japan is considerably higher than figures that appear in some OECD publications since OECD uses more conservative estimates of R&D expenditure in Japanese universities than does the Japanese Statistics Bureau (Stenberg 2004, p. 25).

TABLE 2

Researchers and R&D Expenditure in Selected Asian and Pacific Nations

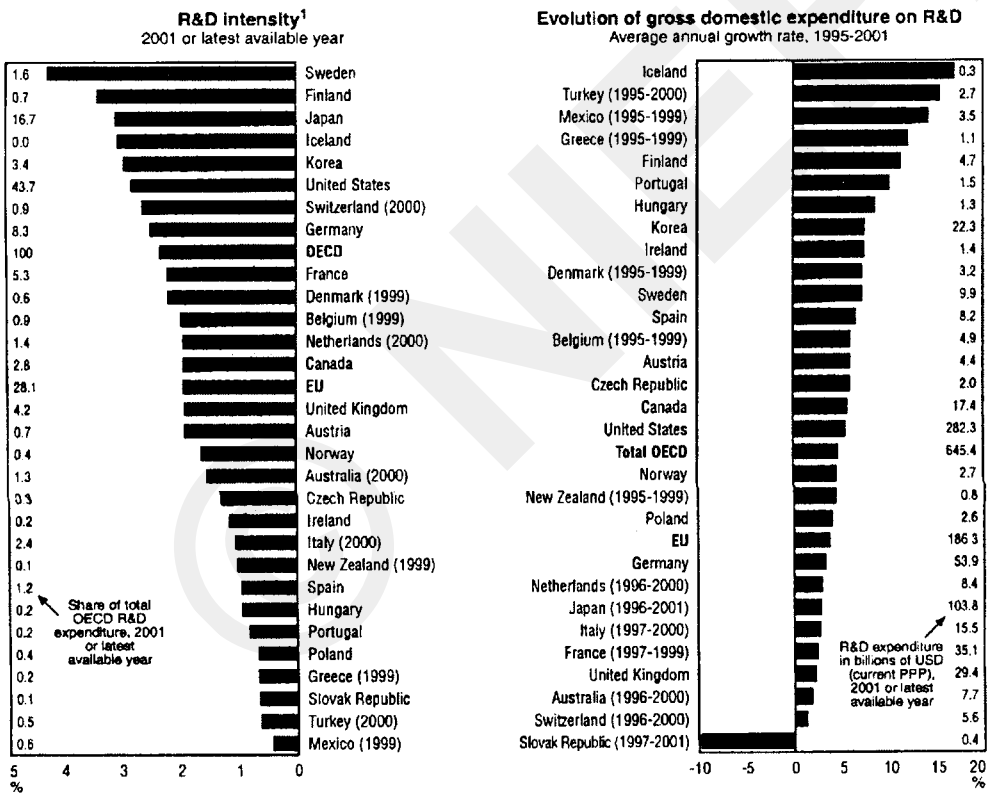
	Year	*Researchers per million inhabitants*	*R&D Expenditure as % of GNP*
Australia	2000	3439	1.53
Bangladesh	1995	52	0.03
China	2001	584	0.30
Hong Kong SAR	1998	-	0.44
India	1996	157	0.78
Indonesia	1998	182	0.07
Japan	2001	5321	3.09
Republic of Korea	2001	2880	2.96
Malaysia	1996	93	0.24
New Zealand	2001	-	1.03
Pakistan	1996	72	0.92
Singapore	2001	4052	2.11
Sri Lanka	1996	191	0.19
Thailand	1997	374	0.10

Source: UNESCO (2003) *UNESCO Selected R&D Indicators,* Paris.

Leaders in innovation and higher education research within the Asian and Pacific region perform well within the international context. In fact, total expenditure on R&D activities in China, Japan and Korea combined in 2001 has been estimated to have been approximately equal to that of the whole European Union (Stenberg 2004, p 19). Table 3, with two diagrams relating to trends in domestic R&D expenditure for OECD countries, points to the relative achievements of Japan, Korea, and Australia in terms of R&D intensity and evolution of gross domestic expenditure on R&D over the period 1995-2001. Japan accounted for 16.7 per cent of total OECD R&D expenditure in 2001 while Korea accounted for 3.4 per cent. Over the period 1995-2001, Japan invested US$103.8 billion in domestic R&D and Korea US$22.3 billion. While in Japan and Korea, business is the main source of funding for R&D, in both Australia and New Zealand, business funding is less important than government funding (OECD 2003a, pp. 18-21). In

Australia and New Zealand, universities are the major source of basic research but they co-exist with public sector institutions devoted to particular sectors of national interest, such as defence, energy and agriculture. In East Asian countries, that were formerly oriented towards technical applications and the assimilation of foreign technology, university research remained relatively modest for many years, owing to lack of financial support, over-regulation and heavy teaching responsibilities of academic staff. However, in recent years, Japan in particular has boosted efforts in basic research (OECD 1998, p. 22).

Table 3: Trends in Domestic R&D Expenditure



Source: OECD (2003) *OECD Science, Technology and Industry Scoreboard.* Paris: OECD.

Other comparative information is available from the current World Bank Knowledge for Development Project that has made estimates of the performance of a large number of Asian countries on a number of indicators, including economic incentive regimes, education, information and communications technology capacity, and innovation. These

figures demonstrate impressive achievements in a number of Asia-Pacific countries and substantial improvements in others. On economic incentive regimes, Hong Kong and Singapore stand out, while on education Korea and Japan are at the forefront, with big improvements having been made in Malaysia, Indonesia and Vietnam. On information and communications technology capacity, Singapore, Hong Kong, Taiwan, Japan and Korea are the leaders, with substantial recent improvements having been made in China, India and Vietnam as well as in Malaysia and the Philippines. In terms of innovation, Singapore, Korea and Japan do well at the higher end of the spectrum. Malaysia performs well, particularly in relation to manufacturing, while China and India have a critical mass of researchers that give them advantages over others. Significant improvements in innovation have been made in the Philippines, Indonesia and Vietnam (Dahlman 2002).

Role of the State in Research and Innovation

Governments today are generally playing increasingly important roles in funding, stimulating and directing research activity. In doing so, they use a variety of 'policy instruments' or strategies to achieve particular objectives, including allocation of block grants and specific purpose funds to institutions, research centres and individual researchers and research groups; establishment of major research centres and institutes; investment in major research equipment, provision of economic incentives and disincentives (including subsidies, pricing structures and taxation concessions or charges); regulation (such as legislation relating to intellectual property (IP)) and the provision of information. In addition, ministers and officials increasingly use persuasion and advocacy. Some of the least understood instruments for encouraging R&D and research commercialisation are taxation concessions, such as the Australian 125 per cent deduction for business R&D expenditure.

Governments within the Asia-Pacific region today are faced with various pressures and new challenges related to their role in research. First, governments are being forced to respond to demands from a more diverse set of stakeholders. Traditionally, research was seen as having two main stakeholders, the research community, and those who fund research. Under these arrangements, research universities and researchers largely determined research agendas while governments saw their responsibilities essentially in maintaining capacity in knowledge creation that could benefit society and provide spillovers to the economic sector. In recent years, however, a larger group of stakeholders are demanding involvement in establishing research priorities and deciding on financial allocations while the business community itself is carrying out more research and is being more involved in supporting particular types of university research.

Second, important changes are taking place in the research enterprise and efforts to capture research benefits to meet social and economic needs. Especially in scientific and technological research, costs are rapidly increasing with the use of highly sophisticated and expensive equipment and other infrastructure support. There also is a general shift away from an almost exclusive emphasis on disciplinary research, which some see as hindering fruitful synergies across fields, towards more multi-disciplinary research that is

more directly responsive to societal needs and is carried on with more interaction between different research performers. This trend has been described by Gibbons and colleagues (1994) as shift from Mode 1 to Mode 2 research. Mode 1 research is generated within traditional disciplinary and cognitive context, while Mode 2 research emphasises the importance of the application of knowledge, transdisciplinary, and being more socially accountable and reflexive. While there is an ongoing debate about the extent to which Mode 2 research is actually replacing Mode 1 research, it is clear that more multi-disciplinary research is occurring at frontiers of scientific research, with many of the most exciting breakthroughs taking place at interfaces between traditional disciplines. This trend is often closely associated with proliferation in the channels for bringing new science and technology to the market place, with licensing and spin-offs combining more effectively with the role of venture capital, new IP legislation and new forms of labour mobility.

Third, countries face major challenges in ensuring the long-term sustainability of their research enterprises, particularly in maintaining breadth and diversity in research capacity, and ensuring a supply of highly trained human resources. Supply of highly trained scientists is closely related to capacity in Ph.D. training, the ability to secure Ph.D. training abroad or attract foreign-trained scientists, and success in addressing problems of 'brain drain' to other countries.

Fourth, in many countries there are increasing pressures for public accountability while the ideas of new Public Sector Management are being increasingly applied to the research sector. As in other areas of public spending, pressures are increasing for greater efficiency in research investment while stakeholders are making new or increased demands related to research directions and emphasis on such areas as health, environment and energy.

Governments have responded to these new challenges in different ways. According to the recent OECD report entitled, *Governance of Public Research* (2003b), based on an extensive survey, OECD member countries have responded by improving stakeholder involvement in priority setting with a wider range of stakeholders being involved; restructuring research funding by redefining responsibilities, combining agencies or developing new mechanisms of coordination; reviewing and renewing R&D funding mechanisms with a strong emphasis on use of competitive arrangements based on performance and merit; undertaking major funding initiatives to strengthen infrastructure support; encouraging enhanced partnerships between universities, public sector research organisations and private firms; and reform and restructuring of PRIs.

These trends clearly have been evident in OECD member countries within the region. In Japan, major administrative reform of the science system took place at the beginning of 2001, with establishment of a central coordinating body for science and technology policy. Increased autonomy was given to national research institutions and national universities while the ministry responsible for education and science was merged into one ministry with the agency responsible for implementing research *(OECD* 2003b). Earlier a new basic law for science and technology had been enacted in 1995 requiring the

Government to develop science and technology (S&T) plans for periods of five years at a time. In Japan, there has been a strong pressure favouring radical changes in the system of financing and performing research and innovation, with an attraction to overseas models particularly that of the United States (Stenberg 2004).

In Australia, the Australian Research Council and the National Health and Medical Research Council were given increased independence with new legislation and their own secretariats. All universities were required to submit annual research and research training reports, while a new performance based funding system was introduced for research and research training, and national research priorities were identified (OECD 2003b). More recently, a commissioned report has recommended closer collaboration between universities and major publicly funded research agencies and establishment of a single Strategic Research Council with an overall coordinating role (Department of Education, Science and Training 2004).

In Korea, a long-term strategic initiative for science and technology development and a five-year plan for S&T were established.

Public Funding of R&D

Public funding of university research and R&D is one of the major instruments used by governments to steer science systems and to capture more effectively economic and social benefits. Many countries have embarked on reforms of their funding systems in response to new demands and opportunities, enhancing their strategic planning capacity and paying more attention to the social and economic environment and to the evolving patterns of relationships between stakeholders. Overall, the volume of R&D funding has increased, although public funding is generally increasing at a lesser rate than private funding.

Traditionally, in industrialised countries, a high proportion of university research was financed by government as a 'public good' but in the 1990s, such funding declined with the result that universities were increasingly forced to seek new sources of support. Meanwhile, government funding increased for mission-oriented and contract-based research, more dependent on output and performance criteria. This forced universities to perform more short-term and market-oriented research.

According to the recent report (OECD 2003b), almost all OECD countries have increased R&D funding over recent years, although generally such increases have achieved little more than keep pace with expansion of economies. As a share of GDP funding for R&D in universities and other public research institutes remained flat at about 0.61 per cent between 1981 and 2000 for OECD countries generally, although there were some major variations between countries. Nearly all countries in the OECD study reported their intention to increase funding in future, but generally increases are expected to be mainly in priority areas and in new programs such as centres of excellence where funding is on the basis of competitive grants.

Different types of funding mechanisms are in wide use, particularly institutional or block grants, project funding and special programs funding but in each case, there is

increased use of competitive mechanisms and funding allocations being based on performance. *Institutional or block grant funding* takes different forms, although in most countries, traditionally, it was based on student enrolments or number of research units (or chairs such as in Japan). Generally, such funding comes without strings attached, although Korea is an exception. However, more recently, a clear trend is to separate institutional funding for research from institutional funding for teaching, and for allocations for mission-oriented funding on a competitive basis to be increased while long-term general institutional funding declines. Australia, New Zealand, Hong Kong and the Philippines all use separate streams of institutional funding for research, with allocations based on quality and/or performance. While Australia has used simple performance indicators (external research grants, higher degree completions and publication outputs), Hong Kong and New Zealand have opted for modified versions of the UK RAE (Research Assessment Exercise) based on assessments of research quality conducted every four years by some 70 different panels of experts. While throughout the 1990s, the Australian 'research quantum' scheme allocated about 5 per cent of total operating grant funding on the basis of performance indicators, the Higher Education Funding Council of England allocated some 20 per cent of total government funding on the basis of RAE assessments, resulting in leading research universities gaining larger amounts from their research allocations compared to their teaching allocations (Harman 2000). Since the early 1990s, the Hong Kong University Grants Committee has used a modified and less expensive form of the British RAE to allocate institutional funding, while New Zealand is currently introducing a performance-based research allocation system aimed to identify and reward researcher excellence with the hope of increasing the average quality of research (Ministry of Education 2002; Investing in Excellence 2004). Allocations will be based on the quality of researchers (60 per cent), research degree completions (25 per cent) and external research income (15 per cent).

With *project funding*, allocations are made on the basis of applications submitted in response to notifications or calls for tenders and are evaluated usually by peer review processes. Project funding is similar to business funding of R&D in that it tends to be contract-based, with specific objectives and milestones. A decade ago, the Australian Research Council expanded its range of project funding to include grants for projects with joint industry support.

Special programs are becoming increasingly common. These generally are linked to priority areas and funding is allocated on a competitive basis, often for centres of excellence, or special research centres involving universities and other partners. Centres of excellence have been established in many Asia-Pacific countries including Japan, Australia and New Zealand. Japan launched a new university resource allocation prioritisation program in 2002 called the 21st 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 science, chemistry and materials science information, electrical and electronics, humanities and interdisciplinary subjects. Each research unit selected is being allocated resources around JPY 100 to 500 million for five

years. In November 2002, some 113 research units at 50 institutions were selected out of 464 applications from 163 institutions. Australia has programs supporting special research centres, key centres of teaching and research, cooperative research centres (multi-site centres jointly funded by government and industry) and a small group of mega-centres in strategic areas such as biotechnology and ICT. In 2001, New Zealand established a centre of research excellence fund to support world-class centres expected to be involved in both research and knowledge transfer activities (Ministry of Education 2001).

In a number of advanced countries, an important trend is for increased R&D to be financed and performed by business. However, in Japan, business support for higher education and public research institutions has increased only slightly but it is still relatively small while in Korea, business funding for higher education research has decreased but this reduction has been compensated by increased funding from the Government, with an increase over last two decades of about 100 per cent. Other funding for university research comes from institution's own resources, endowments and patent licensing fees. In Japan and Korea, 5 per cent or more of research funding comes from other sources.

Across advanced regional economies, governments are increasingly linking evaluation and assessment with funding allocations. Detailed assessments sometimes are made prior to new initiatives while ongoing assessment of performance is increasingly common. Traditionally evaluation procedures were mainly based on the use of peer review of project applications but governments now are using in-depth reviews and various performance indicators, such as total external funding attracted, and number of publications, patents, start-ups, awards and prizes.

Priority Setting

Priority setting by governments and universities is a process of strategic choice with the aim of increasing returns on investment in research. In this process, some fields of research or particular research centres or research projects are selected over others to receive preferential funding. Both government and university priorities are being reflected in research funding decisions and reforms of funding mechanisms.

Priority setting is a complex and difficult political process involving many participants and taking different forms. Important distinctions can be made between different forms of priority setting – for example, between thematic priorities (e.g. such as improving health care) as opposed to structural priorities (e.g. different funding instruments), between disciplines (e.g. sciences as opposed to humanities) as opposed to priorities between different forms of research (e.g. basic vs. more applied research), and between relatively short-term as opposed to medium or longer-term plans.

Priority setting has had a number of drivers. Governments are increasingly aware of the direct relevance of knowledge gained through scientific to economic growth and social well-being and so, look for higher returns on their research investments. This is often accompanied by stronger accountability demands and the application of competitive

mechanisms and other new Public Sector Management ideas (as in Australia and New Zealand). In some cases, priority setting is driven by reductions in government budgets but more commonly priority setting is favoured to make decisions about how increased research budget allocations should be spent. Still again, many governments face strong pressures to provide larger allocations to particular areas, such as health or environmental studies, and so, need to free upfunding from other areas. In Korea, identification of research priorities is directly linked to selecting engines of future economic growth.

Priority setting is difficult because of competing pressures, existing rigidities particularly with highly decentralised funding in some countries, and the need to respond to new opportunities and societal needs. Shifting priorities within constrained budgets is particularly difficult and so often only any increased component of budgets are allocated by priorities. In the UK, for example, only annual increases in the science budget are allocated to priority areas as identified collectively by the various Research Councils and through the Foresight Exercise.

Governments in the Asia-Pacific region use a variety of priority setting mechanisms, including national science and technology plans, advisory bodies, and foresight processes and public consultation, while universities tend to depend on strategic plans, research management plans and particular competitive funding mechanisms. Since 1970, Japan has been conducting periodic technology forecasting exercises using the Delphi method while Korea uses foresight and the results are implicitly integrated into national priorities by experts who are involved in evaluation and pre-budget review. In many countries, governments have made deliberate attempts to centralise and coordinate priority setting. In Hong Kong, priority areas have been established by an Areas of Excellence Sub-Committee of the University Grants Committee, following recommendations of the Sutherland Committee of Review that indicated that Hong Kong needed world-class institutions with distinct areas of excellence in order to retain its leading economic position in the development of China and the Pacific Rim. To date, eight areas of excellence (including information technology, economics and business strategy, molecular neuroscience and Chinese medicine) have been selected for a period of five years in three rounds of funding with a total of HK$320m being allocated (University Grants Committee 2004). Frequently, national priority setting processes have broader participation to include scientific experts together with business and community representative in the interest of increasing transparency as well as in response to the genuine requirement to better respond to societal needs. In the Philippines, choice priority research areas for the National Higher Education Agenda was guided by the principles of multi-disciplinarity, policy orientation and possible impact.

In some countries, a 'top-down' approach is dominant such as in Japan, Norway and Hungary where the central government adopts explicit strategies, policies or plans that specify priority areas for research. In these countries, plus others such as Korea, Germany, Netherlands and Denmark, there is some form of central advisory body that makes recommendations about priorities. As already noted, Japan launched a new university resource allocation prioritisation scheme called the 21st Century COE Program

in 2002 with the aim of promoting research units of world class in selected fields (OECD 2003b, p 98). At the other end of the spectrum is the 'bottom-up' decentralised approach such as in United States, Canada and Sweden where advisory bodies relate to different government agencies in priority setting.

In the past, Australia depended on a sectoral and pluralist approach to priority setting, with priorities being set within major policy domains, often resulting in strong competition between research and operations in health, education or energy. However, the Commonwealth Government's innovation plan released in January 2001, *Backing Australia's Ability* (Howard 2001), flagged the need for an emphasis on research in which Australia enjoys or wants to achieve a competitive advantage. A significant shift in priority setting was announced by the Minister for Education, Science and Training in January 2002 when four research priority areas were announced for the Australian Research Council's 2003 funding round under the National Competitive Grants Program. More recently in 2002, the Australian Government began a new process to identify national research priorities that would influence the agenda of all major Commonwealth Government research funding agencies. This involved extensive consultation and development of a short list of priorities by an expert committee from more than 180 submissions. From the list of priorities in December 2002, the Government identified four thematic priorities: environmentally sustainable Australia, promoting and maintaining good health, frontier technologies for building and transforming Australian industries, and safeguarding Australia. Public research bodies are required annually to put forward plans to government on how they propose to implement the priorities.

Traditionally, within universities researchers set their own priorities within their own projects while at department and faculty levels, decisions on allocations were often made using relatively informal processes. But now many universities are being forced to take priority setting and selective funding more seriously, often leading to considerable tensions.

Research Links with Industry

As a result of institutional initiatives and government encouragement and financial support, in many countries universities have established much closer and more effective links with other research providers and stakeholders, particularly PRIs, industry laboratories, business firms and government agencies. These links take a variety of different forms including joint research centres and research appointments, shared use of facilities, industry funding of university research, and consultancy arrangements between universities and research users. In the United Kingdom, for example, a rapid increase in university-industry collaboration since the 1980s has led to a variety of different partnership arrangements with many positive outcomes including an impressive increase in the number of joint scientific publications. By the late 1990s, joint university-industry papers accounted for about half of all industrial scientific output (Calvert and Patel 2002). These new arrangements have increasingly broken down traditional arrangements whereby in modern economies, universities and PRIs are viewed as being responsible to

basic scientific and pre-commercial research, while industrial firms perform the bulk of applied research and product development (Hall 2004).

On the whole, these developments have worked well to the mutual benefit of the various partners and have contributed to successful innovation efforts. University research links with industry provide universities with substantial research support, consulting opportunities, support for postgraduate students, opportunities for graduate employment and opportunities for academics to gain insights into new developments within industry, while industry benefits through access to university expertise and facilities, access to university IP, and supply of well trained graduates. Admittedly, considerable tensions are sometimes generated and even scientists themselves acknowledge that there are risks involved.

Particularly, important partnerships in a number of countries are new research centres with multi-university partners as well as partners from PRIs, government departments and business firms. An example in the Asia-Pacific region is the Australian Cooperative Research Centre program that has resulted in establishment of some 70 multi-site centres. Funding is provided by the Australian Government as well as from partners. Some CRCs are set up using a company structure while others are unincorporated using the legal basis of one or more partners.

While governments, universities and the researchers involved in partnerships are generally supportive of university-industry partnerships, critics allege that such partnerships threaten traditional academic values, lead to distortions in the balance between basic and applied research, and tend to corrupt academics with commercial values to the extent that some academics neglect their responsibilities in teaching and research. It is also alleged that industry contracts lead researchers to withhold scientific information from colleagues and delay publication and thus adversely affect the free flow of scientific information.

Various evaluative studies have investigated various aspects of the impact of the new industry links on universities and academic work. American studies point to the dangers in these new relationships, particularly the impact on academic work and values, forcing scientists to abandon the traditional cooperative mode of research (Dickson 1984; Kenney 1986). In their multi-national study of academic capitalism, Slaughter and Leslie (1997) reported that while senior academics often respond positively to opportunities to attract funds from industry, many junior academics are confused and ambivalent, having 'difficulty conceiving of careers for themselves which merged academic capitalism and conventional academic endeavor'. Other scholars (eg Etzkowitz & Peters, 1991), on the other hand, provide evidence to support the claim that many academic researchers increasingly accept the concept that profit generated from research need not corrupt and conclude that to date there has not been any great effect on academic behaviour with regard to direct industry funding of academic research. Particularly important in addressing criticisms of the new commercialism have been the detailed studies of researcher behaviour by Blumenthal and colleagues. One study (Blumenthal, Gluck, Louis, Stoto and Wise 1986) that reported on a survey of 1200 academic researchers in

40 major American universities in the area of biotechnology found that researchers with industrial support publish at higher rates, patent more frequently, participate in more administrative and professional activities and earn more than colleagues without such support. At the same time, researchers with industry funds are much more likely than other biotechnology researchers to report that their research has resulted in trade secrets and that commercial considerations have influenced their choice of research projects.

American findings have been largely confirmed by Australian studies and evaluations. Various performance indicators point to the considerable success of efforts by the Australian Government to enhance university-industry links while officially sponsored evaluations and reviews point to a high level of overall success for particular programs. Studies of science and technology academics in leading Australian universities also show that researchers with industry funding tend to more senior and more likely to hold national competitive grants than colleagues without industry funding. Industry funded academics also have better publication records, spend longer hour at work each week and more time on postgraduate teaching, administration, committee work and interaction with colleagues (Harman 1999). Another study of science and technology academics in five leading research-intensive universities revealed that an estimated 40 per cent of regular academic staff enjoyed industry funding with about 60 per cent of these having attracted funding in excess of A$250,000 over the past three years (Harman 2002). About 40 per cent of respondents with industry funding reported having conducted research where the results are the property of a sponsor and cannot be published for a period without consent. Half of these admitted having delayed publication for more than six months; but safeguarding the researcher's self-interest was as common a motive for delaying publication as was protecting the property of a sponsor.

University Research Commercialisation and Technology Transfer

Since the early 1980s, first in America, and more recently in many other developed countries, governments and research-intensive universities have been putting much more effort into enhancing capacity in research commercialisation and in the transfer of university generated inventions and discoveries to the commercial sector. These developments have been driven partly by the wish of universities to generate additional income but universities also have become increasingly involved in commercialisation activities to enhance relationships with firms and to generate political support by demonstrating the positive outcomes of public investment in research. Governments, on the other hand, seek to capture the benefits of university research to facilitate economic and social development, and to generate wealth.

The terms 'research commercialisation' and 'technology transfer' are often used synonymously, although, strictly speaking, there are important differences in their precise meanings. Research commercialisation refers to the process of turning scientific discoveries and inventions into marketable products and services. Generally, university research outputs are commercialised by licensing patents to companies or by the creation of 'spin-out' companies that usually depend on assignment of university IP for their

initiation. In the scholarly literature, the term 'technology transfer' has a number of specialist meanings but in essence refers to 'the movement of know-how, technical knowledge, or technology from one organisation to another' (Bozeman 2000, p 629). The most common use of the term is in relation to the transfer of inventions and associated 'know-how' from research organisations (especially universities and PRIs) to research users.

Research commercialisation and technology transfer is based on IP rights, of which patents, industrial designs, copyrights and trademarks are the most important. IP rights reward investment in R&D by granting ownership to inventors, their employers, those who funded the research, or some combination. Over the past two decades, governments and universities have become increasingly aware of the value of IP and various strategies that can be employed to derive commercial and public benefit.

Licensing of inventions and the creation of new companies, of course, are not the only mechanisms of research commercialisation employed by universities since both graduates and academics regularly carry knowledge from universities to business firms, while industry accesses university-based knowledge through sponsored research, conferences and academic journals (Sizer 2002). However, increasingly licensing and company creation are seen as key mechanisms of university research commercialisation.

In a number of Asia-Pacific countries, governments and universities are allocating increased funds to support research commercialisation. Frequently, governments have a multiplicity of programs with numerous agencies being involved, raising questions about policy coherence and coordination, and about whether or not large corporations tend to benefit more than SMEs (small to medium sized enterprises) and universities. Some countries clearly are doing better than others in terms of measured outputs and economic growth rates, while within countries there are notable examples of particular regional successes. This raises important questions about the effectiveness of different combinations of government and university strategies, about the relative amounts of funding involved, and how such funding is employed and with what success.

Why some countries are more successful than others in commercialisation of university, research appears to be dependent on a variety of factors, particularly government financial support and the regulatory framework, incentive systems operating to affect the behaviour of universities and researchers, institutional culture, and the legal basis relating to the ownership and commercialization of IP. Important recent contributions have been made by the Swedish economist, Magnus Henrekson, in combination with two American-based colleagues, Nathan Rosenberg and Brent Goldfarb (Henrekson & Rosenberg 2001; Goldfarb & Henrekson (2003). These scholars argue that America has been far more successful than Sweden in the commercialization of university research, despite Sweden's strong research base. They attribute the different success particularly to different government roles, a stronger incentive structure in America for both universities and academics to be actively involved in research commercialisation, and the legal basis for IP. While Sweden has employed a largely government led 'top-down' approach with an academic environment that discourages

academics from actively participating in commercialising their ideas, the American approach has been strongly 'bottom-up', with government IP legislation providing strong incentives for institutional and academic involvement in research commercialisation. This has been combined with a highly competitive American higher education environment.

According to Henrekson and Rosenberg (2001), the American 'bottom-up' approach led essentially by major research universities, which, under the Bayh-Dole Act of 1980, had ownership of all IP resulting from federal research grants. In this situation, their argument is that both Federal and State Governments did relatively little to develop new government agencies or other mechanisms to enhance university capacity in technology transfer. This argument appears to have considerable validity, but it needs some modification in view of recent major investments by numerous American state governments in expensive research infrastructure (Geiger 2003).

While a number of continental European countries appear to follow a Swedish-type model (Gittelman 2002), in many other countries including the United Kingdom, Canada, Australia and New Zealand, there is a mixed approach, with emphasis being placed on new government support and incentive programs for industry and universities, as well as on strong incentive systems for universities and academics. The role of incentives clearly is of great importance in any theory explaining the growth of science-based entrepreneurship. At the same time, governments clearly can play important roles to support science-based entrepreneurship, from providing incentives to universities such as via the Bayh-Dole Act in the United States with regard to IP ownership to providing different forms of subsidies, grants, loan funds and guides on good practices. In many cases, major government emphasis has concentrated particularly on providing seed funding to assist early development phases of commercialisation of inventions that have commercial potential as well as various programs of grants and loans to assist companies and to encourage university-industry collaboration. In the United Kingdom, for example, in combination with the Welcome Trust and the Gatsby Charitable Foundation, the Government established the University Challenge Fund to provide seed funds to groups of universities for early stage R&D (Australian Research Council 2000, p. 14). In a relatively small number of cases, governments have established new specialised commercialisation agencies, such as in Sweden, where since 1994 seven broker institutions, called technology bridging foundations, have been established in major university regions (Henrekson & Rosenberg 2001). Their task has been to mediate commercialisation of R&D from universities and researchers to small and medium sized enterprises by facilitating patenting processes and matching up researchers with venture capital funding. These foundations have been designed to accept some of the responsibilities that in the United States lie with technology licensing offices on university campuses.

Relatively little detailed data is available on the research commercialization success of different countries outside the United States, Canada, the United Kingdom and Australia. For this reason, in 2001, the OECD Committee for Scientific and

Technological Policy commissioned a project to collect empirical evidence about patenting and licensing activity in universities and PRIs in OECD countries as well as information on the legal and regulatory frameworks that govern IP. While the data presented in the project report (OECD 2003b) need to be treated with caution, they give clues about comparative national performance and point to a range of issues needing for investigation.

Laws and policies governing the ownership of IP are being revised in a number of countries, generally with a view to encouraging ownership of IP by institutions performing the research. In Japan and Korea, recent reforms in funding regulations have given universities more control over the IP generated by their researchers. These reforms echo the landmark American Bayh-Dole Act of 1980. Changes in IP laws in Korea, for example, have been driven by recognition that a considerable amount of university and PRI research is not being channelled to industry in a timely manner. In Australia. universities are able to claim IP rights since it is a general principle of common law that an employer is entitled to any IP rights created by an employee in the course of their employment. Further, both the Australian Research Council and the National Health and Medical Research Council have specifically stated that they do not claim ownership over IP resulting from research they fund (Christie, D'Aloisio, Gaita, Howlett & Webster 2003).

A major barrier has been lack of financial incentives for universities, PRIs and researchers, and inability of institutions to take responsibility for the cost of management of IP. This is well illustrated in the case of Korea where in the late 1990s it was recognized that, despite increasing investment in Korea in R&D, the share of patent applications was still surprisingly small. Despite the fact that the public sector accounted for about 27 per cent of investment in R&D in the late 1990s, it only accounted for less than 5 per cent of patent applications. Further, a 1997 survey by the Korea Intellectual Property Office revealed that only 31 per cent of total patents awarded were licensed (Yun 2003). Legally, public universities and PRIs have operated under different patent law to private universities, with IP in public universities being the property of the state. IP management arrangements were modified by the Technology Transfer Facilitation Law of 2000 that unified IP management in all public institutions, requiring the establishment of technology transfer offices and sharing of proceeds of license income between inventors and institutions, and by amendment of the Patent Law in 2001 allowing public universities to gain financially from patent licensing (Yun 2003, pp 240-250). Further legislative changes followed in 2002 that resulted in transfer of ownership of inventions from professors to Transfer License Organisations set up by universities while more recently the Korean Intellectual Property Office has designated 55 universities for special support in IP creation and management (Choi 2003).

Since it was recognized in Japan that intellectual property issues cross the boundaries of many ministries, in 2002 a Strategic Council on Intellectual·Property was established 'in order to quickly establish and advance a national strategy for intellectual property' (Stenberg 2004 p 17; Motohashi 2003). This led to enactment of a new Basic Law on IP

in 2002 which aimed particularly to encourage the creation of IP in universities and increased international standardisation, with particular measures directed to facilitating the establishment of technology licensing offices in universities and supporting the education of specialists in IP law.

Many other countries in the region are reviewing and strengthening IP legislation and management although in many cases other issues than IP ownership within universities are of central importance. In China, further strengthening of the role of the State Intellectual Property Office (SIPO) has occurred following membership of the WTO. This has concentrated particularly on administrative issues and issues related to software piracy. In India, recent effort has concentrated particularly on modernization of patent information services and modernization of the trademarks registry.

Expansion of research commercialisation activity and as a direct consequence of legislation to give IP rights to all or most university research institutions has stimulated the development of research commercialisation offices concerning with filing patent applications, entering into licensing agreements with third parties and being involved in the creation of spin-out companies. These developments have required considerable institutional, financial and human resources, but in many countries the direct contributions of governments have been limited. However, in a small number of countries, including Japan, governments have provided short-term support to universities to assist in covering the costs of patenting and commercializing inventions (OECD 2003c, p 13).

In a number of countries including Australia, Japan, Korea, China and New Zealand universities have expanded existing research management offices, created new in-house research commercialisation offices or established specialized offices with an arms-length relationship using company structures. Korea, the United Kingdom, Denmark and Germany are experimenting with regional or sector-based technology transfer offices to manage technology transfer activities for groups of universities and public research institutes. Potential economies of scale might be realised by spreading fixed costs over a greater number of institutions and exploiting the advantages of portfolio diversification, but these models may find difficulty in developing close working relationships with researchers. With the alternative model, a recent development is to local technology transfer specialists in university faculties, responsible to both deans and a central university technology transfer office.

The size of patent portfolios and stock of currently active patents varies considerably between countries, as does income and number of start-ups and spin-outs. Summary data from the OECD survey are shown in Table 4. Korea clearly is a major player internationally in patenting and licensing. While much of the recent Korean increase in patenting has been attributed to expansion of biotechnology, patenting is also significant in other fields including health, information technology, food and energy. Patenting outcomes usually reflect a country's R&D and industrial specialisation. In Korea, for example, where ICT is important in business value added production, over 70 per cent of universities reported having filed patents in ICT and electronics.

TABLE 4

Summary Results from OECD Survey on Patenting and Licensing Activities in Universities and Public Research Institutes

		Patents		Licenses		Start-ups and spin-offs:
		Total Patent Stock in last Year	Number filed in last Year	Licences earning income	Gross income Euro (000)	No. created in last year
Australia (2000)	All	-	834	491	99525	47
	Uni	-	586	-	79834	32
	PRI	-	248	-	19691	15
Belgium (2001)	All	506	121	4	240	15
Germany (2001)	PRI	5404	1058	1188	66368	37
Italy (2000)	All	-	190	84	-	36
	Uni	-	102	12	-	27
	PRI	-	88	72	-	9
Japan (2000)	All	682	567	324	1397	6
Korea (2001)	All	9391	1692	132	3822	56
	Uni	404	244	22	1032	19
	PRI	8987	1448	110	2790	37
Netherlands (2000)	All	991	212	93	11400	37
	Uni	394	111	-	-	27
	PRI	597	101	-	-	10
Norway (2001)	PRI	114	43	39	7700	51
Spain (2001)	All	781	133	136	961	11
Switzerland (2001)	All	1184	175	77	5650	68
	Uni	914	132	61	2800	56
	PRI	270	43	16	2850	12
United States (2001)	All	-	8294	-	-	-
	Uni	-	6135	8670	12974	390
	PRI	-	2159	484	52	
Russia (2000)	All	-	171	8	1375	15

Source: OECD (2003) *Turning Business into Science*. Paris, p 15.

Notes : Australia: Gross income in US$; Italy: Number of patent applications estimates; Netherlands: Gross income is an estimate. United States: Total number of earning licenses for federal laboratories under-estimated and income is in US$; Russia: Patent applications are estimates.

Concluding Comments

Countries across the Asia-Pacific region are facing unprecedented changes in their higher education systems as they come to grips with fundamental economic and social change, and the impact of globalisation and increasing international economic competition. These changes are impacting significantly on university research policy, with clear trends towards some redefinition of the role of universities and redirection of their research activities. Leading higher education systems in the region are following similar

developments to those found generally in OECD countries, particularly changing roles for the state in research policy and innovation, establishment of new mechanisms for allocating public funding of research, experiments in priority setting and research concentration, enhanced university-industry partnerships, and more serious efforts to capture research outputs in order to create jobs and produce economic and social benefits. Many other countries of the region are following similar trends, particularly China, India, Malaysia and Thailand, although statistical data and detailed information is less easy to access. On the other hand, many of the poorer countries find great difficulty in meeting enrolment pressures let alone allocating significant sums to support research.

While the discussion has concentrated mainly on national policy particularly in science and technology disciplines, and relating to public funding and priority setting, industry business links and research commercialisation, it is important to recognise that significant changes are affecting research in a wide range of different academic disciplines and are providing difficult challenges for vice-chancellors and presidents, especially in relation to developing strategic priorities and implementing mechanisms for research funding selectivity.

References

Asian Development Bank (2003): *Key Indicators 2003: Education for Global Participation.* Manilla.

Australian Research Council (2000): *Research in the National Interest: Commercialising University Research in Australia.* Canberra: Australian Government Publishing Service.

Blumenthal, David, Michael Gluck, Karen Seashore Louis, Michael A Stoto and David Wise (1986): University-Industry Research Relationships in Biotechnology: Implications for the University. *Science*' 232, 1361-1366.

Bozeman, B. (2000): Technology Transfer and Public Policy: a Review of Research and Theory. *Research Policy*, 29, 627-655.

Calvert, J. & Patel, P. (2002): *University-Industry Research Collaboration in the UK.* Brighton: SPRU, University of Sussex.

Choi, J. (2003): Creation, Management and Use of IP – An Integrated and Proactive Policy IP Policy. Paper prepared for WIPO *Asia Pacific Regional Seminar on Intellectual Property Strategy for Economic Development* Kuala Lumpur, 9-11 December.

Christie, A.F., D'Aloisio, S., Gaita, K. L., Howlett, M. J. & Webster, E. M. (2003) *Analysis of the Legal Framework for Patent Ownership in Publicly Funded Research Institutions.* Canberra: Commonwealth Department of Education, Science and Training.

Dahlman, C. (2002): *Knowledge for Development: Assessment Framework and Benchmarking.* Washington: Knowledge for Development, World Bank.

Department of Education, Science and Training (2004): *Review of Closer Collaboration between Universities and Major Publicly Funded Agencies.* Canberra.

Dickson, S (1984): *The New Politics of Science.* New York: Basic Books.

Etzkowitz, H. & Peters, L. (1991): Profiting from Knowledge: Organisational Innovations and the Evolution of Academic Norms. *Minerva* XXİX, 133-166.

Geiger, R. (2003): *Beyond Technology Transfer: New State Policies for Economic Development for U.S. Universities.* Porto: paper presented at 16th CHER Annual Conference,.

Gibbons, M., Limoges, C., Nowotny, H., Schwartzman, S., Scott, P., & Trow, M. (1994) *The New Production of Knowledge: The Dynamics of Science and Research in Contemporary Societies.* London: Sage.

Gittleman, M. (2002): *The Institutional Origins of National Innovation Performance: Careers, Organisations, and Patents in Biotechnology in the United States and France.* New York: unpublished manuscript, New York University.

Global Education Digest 2003: Comparing Education Statistics Across the World (2003). Montreal: UNESCO Institute for Statistics.

Goldfarb, B. & Henrekson, M. (2003) Bottom-up versus Top-down Policies owards the commercialisation of University Intellectual Property. *Research Policy*, 32 (4), pp. 639-658.

Haden, C. R. & Brink, J. R. (Eds) (1992) *Innovative Models for University Research.* Amsterdam: North Holland.

Hall, B. H. (2004): *University-Industry Research Partnerships in the United States.* Kansa: Kansai Conference Paper, February.

Harman, G. (1998): Institutional Challenges and Response Strategies in *National Strategies for Regional Cooperation in the 21st Century: Proceedings of the Regional Conference of on Higher Education Tokyo 8-10 July 1997.* Bangkok: Unesco Principal Regional Office for Asia and the Pacific.

Harman, G. (1999): Science and Technology Academics and University-Industry Research Links in Australian Universities. *Higher Education*, 38 (1), 1999, 83-103.

Harman, G. (2000): Allocating Research Infrastructure Grants in Post-binary Higher Education Systems; British and Australian approaches. *Journal of Higher Education Policy and Management*, 22 (2) 111-126.

Harman, G. (2002): Australian University-Industry Research Links: Researcher Involvement, Outputs, Personal Benefits and 'Withholding' Behaviour. *Prometheus*, 20 (2), 143-158.

Henrekson, M. & Rosenberg, N. (2001) Designing Efficient Institutions for Science-Based Entrepreneurship: Lessons from the US and Sweden. *Journal of Technology Transfer*, 26 (3), 207-231.

Howard, J. (2002): *Backing Australia's Ability: Real Results, Real Jobs.* Canberra: Commonwealth
of Australia.

Kenney, M (1986): *Biotechnology: The University Industrial Complex*, New Haven: Yale University Press.

Ministry of Education (2001): *The Centres of Research Excellence Fund.* Auckland:

Ministry of Education (2002): *Development of the Performance-Based Research Fund.* Auckland.

Ministry of Education Investing in Excellence: The Report of the Performance-Based Research Fund Working Group. Auckland:.

Motohashi, K. (2003): *Japan's Patent System and Business Innovation: Reassessing Pro-Patent Policies.* Institute of Innovation Research, Hitotsubashi University and RIETI.

Nowotny, H, Scott, P. & Gibbons, M. (2001): *Re-Thinking Science: Knowledge and the Public in an Age of Uncertainty.* Cambridge: Polity.

OECD (1998): *University Research In Transition* (1998) Paris: OECD.

OECD (2002): *Frascati Manual.* Paris, OECD.

OECD (2003a): OECD Science, Technology and Industry Scoreboard. Paris: OECD.

OECD (2003b): *Governance of Public Research: Towards Better Practices* Paris: OECD.

OECD (2003c): *Turning Science Into Business: Patenting and Licensing at Public Research Organisation.* Paris: OECD.

Sizer, J. (2002): Research and the Knowledge Age. *Tertiary Education and Management,* 7, 227-242.

Slaughter, S. & Leslie, L. (1997): *Academic Capitalism: Politics, Policies, and the Entrepreneurial University.* Baltimore: The John Hopkins Press.

Stenberg, L. (2004): *Government Research and Innovation Policies in Japan.* Ostersund: Swedish Institute for Growth Policy Studies.

UNESCO (2003) *Selected R&D Indicators* Paris: UNESCO.

University Grants Committee (2004): *Areas of Excellence.* Hong Kong: University Grants Committee.

Whiston, T.G. & Geiger, R. L. (1992): *Research and Higher Education: The United Kingdom and the United States.* Buckingham: The Society for Research into Higher Education & Open University Press.

Yun, M. (2003): Regulatory Regime Governing Management of Intellectual Property of Korean Public Research Organisations Orgànisations: Focus on the Biotechnology Sector in *Turning Science Into Business: Patenting and Licensing at Public Research.* Paris: OECD.

Journal of Educational Planning and Administration
Volume XIX, No. 2, April 2005, pp. 223-255

Policy Development and Its Impact on Higher Education Research – An Australian Case Study*

V. Lynn Meek#

Abstract

Australia has been a world leader in terms of it contribution to scientific knowledge relative to its population and wealth. However, international competition in the field of research and development (R&D) is continually increasing and Australia is in danger of losing its position in the world R&D rankings. In Australia, the Universities are the main instigators of R&D of all types. However, government policy on university research is both complex and at times contradictory. This paper attempts to evaluate the Australian higher education research policy and provides some tentative suggestions on how it might be improved.

Introduction

Over most of the last century, higher education has been shaped by the norms of science, democracy and the need for an educated citizenry, cultural preservation and trained bureaucratic elite. But with the advent of the so-called knowledge economy/knowledge society, higher education has become to be regarded by politicians, industrialists and some academics as well, not only as a creator and transmitter of knowledge, but also as 'a major agent of economic growth: the knowledge factory, as it were, at the centre of the knowledge economy' (*The Economist* 1997). According to Scott (1997), 'higher education systems are no longer simply "knowledge" institutions, reproducing the intellectual and human capital required by industrial society, they are becoming key instruments of the reflexivity which defines the post-industrial (and post-modern) condition'

---

* Paper presented in the First Research Seminar for Asia and the Pacific – Changing Research Policy in the Higher Education System of the Asia-Pacific Region, organized by Unesco Forum on Higher Education, Research and Knowledge, Paris, Tokyo: United Nations University (13-14 May 2004).

Professor and Director, Centre for Higher Education Management and Policy, University of New England, Armidale, NSW 2351, Australia
E-mail vmeek@pobox.une.edu.au

The challenges currently faced by the contemporary university are not a result of increasing lack of relevance to society but are due to its very success. As the knowledge society continues to develop, the university is faced with a growing number of competitors both in research and training. Yet, what is not in doubt is the continuing importance and centrality of the university, as knowledge is increasingly brought within market and political exchanges. The question, therefore, is not if the university will survive, but rather, in what form and with what role(s)? Society imposes new roles, pressures and demands on higher education while simultaneously expecting the preservation of key traditional functions (Clark 1998; Neave 2000; 2002). Higher education institutions in turn help shape the very society that generates these new and traditional expectations. The modern university subsequently operates in a climate of what Barnett (2000) refers to as a world of super-complexity. The university simultaneously helps generate this super-complexity and is asked to assist in resolving the uncertainties it generates.

As part of a wider agenda of public sector reform, new approaches to higher education steering and coordination increasingly shift from government control to forms of market-like coordination. This trend towards marketisation and privatisation of public sector higher education has been well established over the last decade or so, and is clearly visible both in the language of policy documents (students as customers and clients, Jackson, 2002), knowledge as a product or commodity, price and quality relations, etc. and in their implementation: the introduction of tuition fees, performance-based funding and conditional contracting (Hayden, 2003). The introduction of these market-like mechanisms makes the environment in which higher education institutions must operate, all the more fluid and turbulent.

However, while acknowledging the increasing importance of the market in defining the role and purpose of higher education, it needs to be recognised that the market place is only one of several forces shaping the structure and character of higher education institutions and systems. It would be a mistake to reduce all the forces bringing about change in higher education to market relations. Analysis of current trends must both incorporate the importance of market steering of higher education while accounting for other social, political and cultural forces that help shape the sector and individual institutions. As Scott (2003: 212) puts it:

> The lesson drawn by many political (and university) leaders was that the way forward for higher education was to abandon collectivist public-service public-sector policies and practices and embrace the 'market'; universities must seize the opportunity to become the leading organizations in the burgeoning global knowledge economy. Not to seize this opportunity was to risk marginalization – even, eventually, extinction. The discussion of the impact of globalization in higher education continues to be dominated by this neo-liberal orthodoxy, but it is this orthodoxy (better, ideology) that must be challenged if universities are successfully to embrace the 'world', in all its problematical diversity, rather than simply the global market place.

Where, in the past, universities had a sense of shared intellectual purpose (at least to a degree), bolstered by the security of centralised funding and control, at present, they are confronted by a much more complex, fluid and varied environment that articulates different and sometimes conflicting demands, thus creating new and complex realities. Consequently, new distributions of authority emerge, new (accountability) relationships arise amongst constituents inside and outside the university, and a new dynamic within policy field develops. Clearly, Australian higher education and the development of research within it are caught in such dynamics. Australia, more so than many (if not most) countries, has gone down the market path, with mixed results. Thus, the nation's higher education system may serve as an important case study for higher education policy development elsewhere.

This paper commences with a brief sketch of the background to the Australian higher education system and the role of research and development (R&D) within it. This is followed by a summary of government reforms of higher education and a profile of the present state of the sector. It then turns to an examination of the various policy reviews and their recommendations that have helped shape the structure and character of higher education research over the past ten years or so. It concludes with an analysis of the outcomes of various policy implementations and the issues they raise.

Background

Australia is a federation of six states and two territories. An exceptional feature of the higher education sector is that the States have legislative control of higher education institutions, whilst financial responsibility (since 1974) rests with the Commonwealth. The nation's higher education sector consists of 37 public universities, some of which are quite large with enrolments in excess of 45,000 students, two small private universities and a number of small specialist institutions, both public and private.

Whereas in terms of landmass Australia is the 6th largest country in the world – approximately the same size as continental United States – it has a population only slightly larger than the Netherlands. Most of the nation's population of some 20 million people (0.3% of world population) is highly urbanised. 'The country's economy is 1.9% of the Gross Domestic Product of the OECD, and accounts for about 1% of world trade' (DEST 2003: 3). Historically, the nation's wealth was based on primary products – mineral and agricultural. But in recent decades, there has been a deliberate attempt by government and industry to switch the basis of the Australian economy from primary products to knowledge – to create, what one Prime Minister termed, in the 1980s as the Clever Country. While in the early 1970s, about 21% of Australia's GDP was based on manufacturing and 5.4% on Agriculture, presently these figures are 12% and 3.6% respectively. As the Chief Economist of one of the country's largest banks puts it: 'Australia's economic growth will increasingly be linked to the mortarboard, not the sheep's back ...' (SMH 22/4/2004).

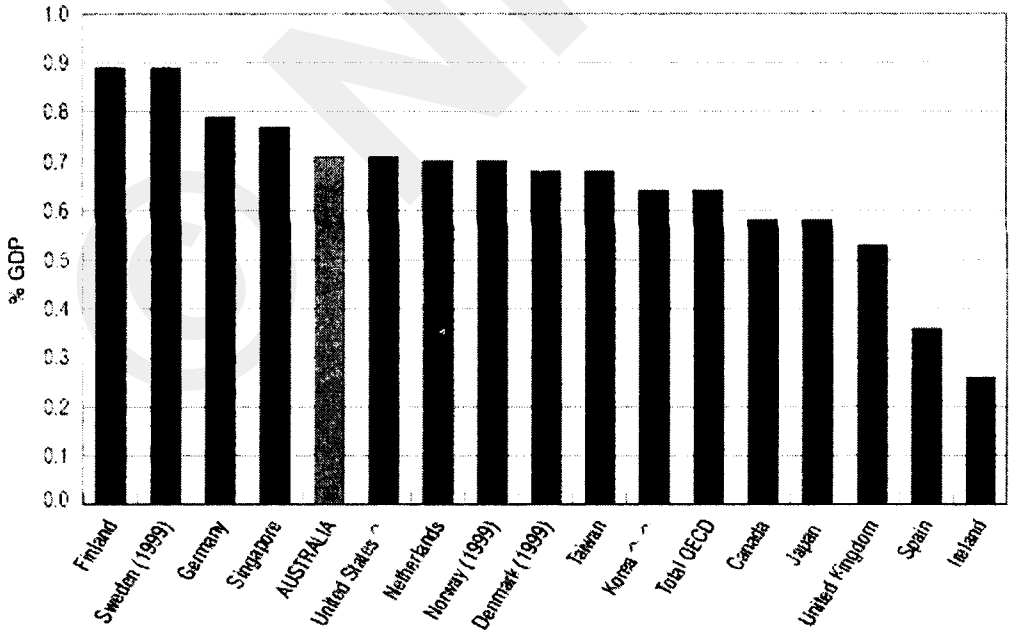
Australia has a well-developed but comparatively small science base, with the majority of its R&D effort concentrated in the public sector. Taking into account the size

of the nation, Australia's contribution to world science is impressive, particularly with respect to medical and health disciplines and biological sciences and astronomy. Based on 2002 data, Australia:

- contributed 2.88% of the world's output of research publications (including in the sciences, social sciences and humanities) up from 2.3% in 1988
- was ranked 9th out of 21 countries behind the United States, Japan, United Kingdom, Germany, France, Canada, Italy and Spain in the total number of research publications and ahead of countries such as the Netherlands, Sweden, Switzerland and Korea
- was ranked 8th out of 21 countries in the number of research publications on a per capita basis, ahead of the United States, Canada, Germany, France and Japan and behind Switzerland, Sweden, Israel, Denmark, Finland, Netherlands and the United Kingdom (DEST 2003a: 6).

For a number of historical and geographical reasons, the funding of Australian R&D is more highly dependent upon the public purse than is the case in most other developed countries. In 2000, as figure 1 illustrates, government-financed expenditure on R&D was 0.71% of GDP, compared to an OECD average of 0.64% (DEST 2003a: 18).

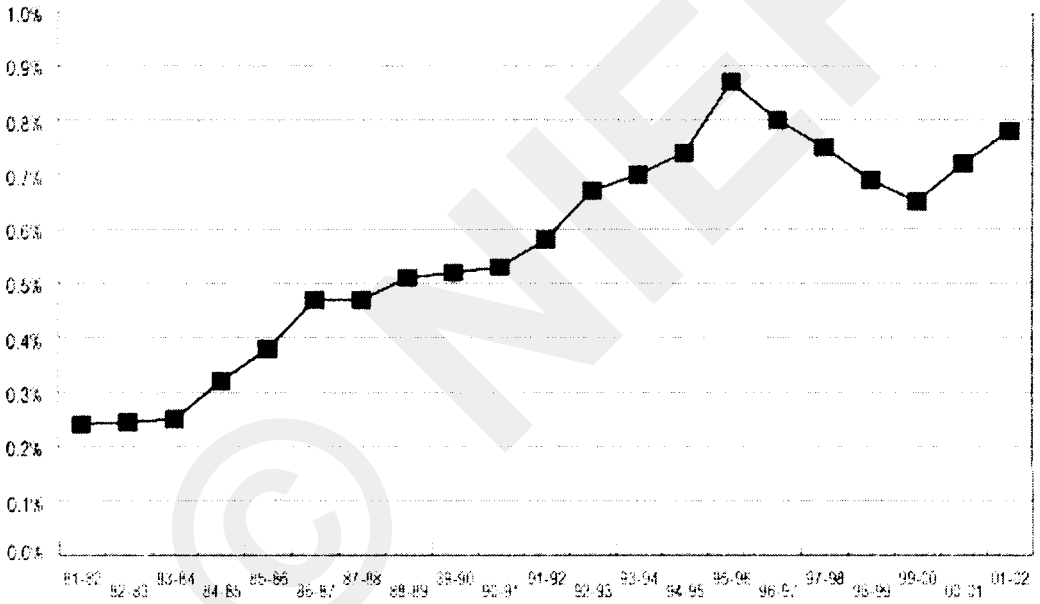
Figure 1: Government-financed expenditure on R&D as a percentage of GDP, 2000



Source: DEST 2003a: 18

In contrast, Business Expenditure on R&D (BERD) is low compared to other OECD countries. This is largely due to the fact that most of the large multinational corporations in Australia have their headquarters elsewhere and conduct little of their R&D in this country (Gallagher 2000). Unlike the USA and the UK, there are very few private foundations for Australians to look to for research support (cf Wills 2001), and there is nowhere the level of endowment support that some of the major US universities enjoy. While there has been some recent recovery, BERD as a percentage of GDP researched a peak in 1996, after which it declined sharply, largely due to the impact of the government's change to the R&D tax concession from 150% to 125% in the last half of the 1990s (figure 2).

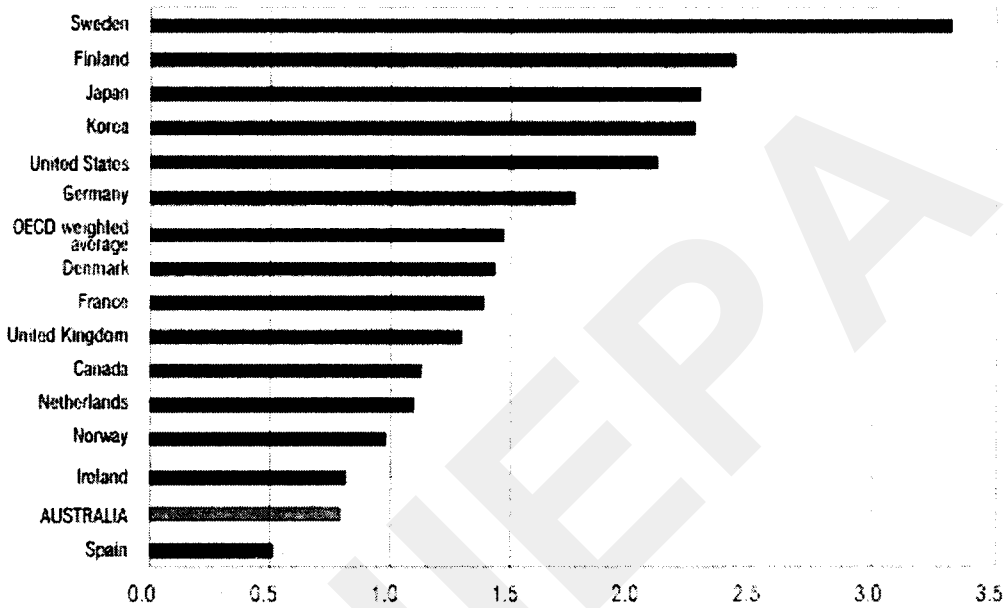
Figure 2: Australian BERD as a percentage of GDP, 1981 – 2002



Source: DEST 2003a: 25

Australia's BERD, as a percentage of GDP in 2001, was less than half of the OECD average of 1.62%, and 'in 2000 Australia ranked 16th in the OECD in the share of gross expenditure on R&D undertaken by business (47%) compared to the OECD average of just under 70%' (DEST 2003: 25; see figure 3). The remaining gross expenditure on total R&D was 23% from state and federal government, 27% from higher education and 3% from the private non-profit sector (AVCCa 2003: 14).

Figure 3: BERD as a % of GDP, selected countries 2001

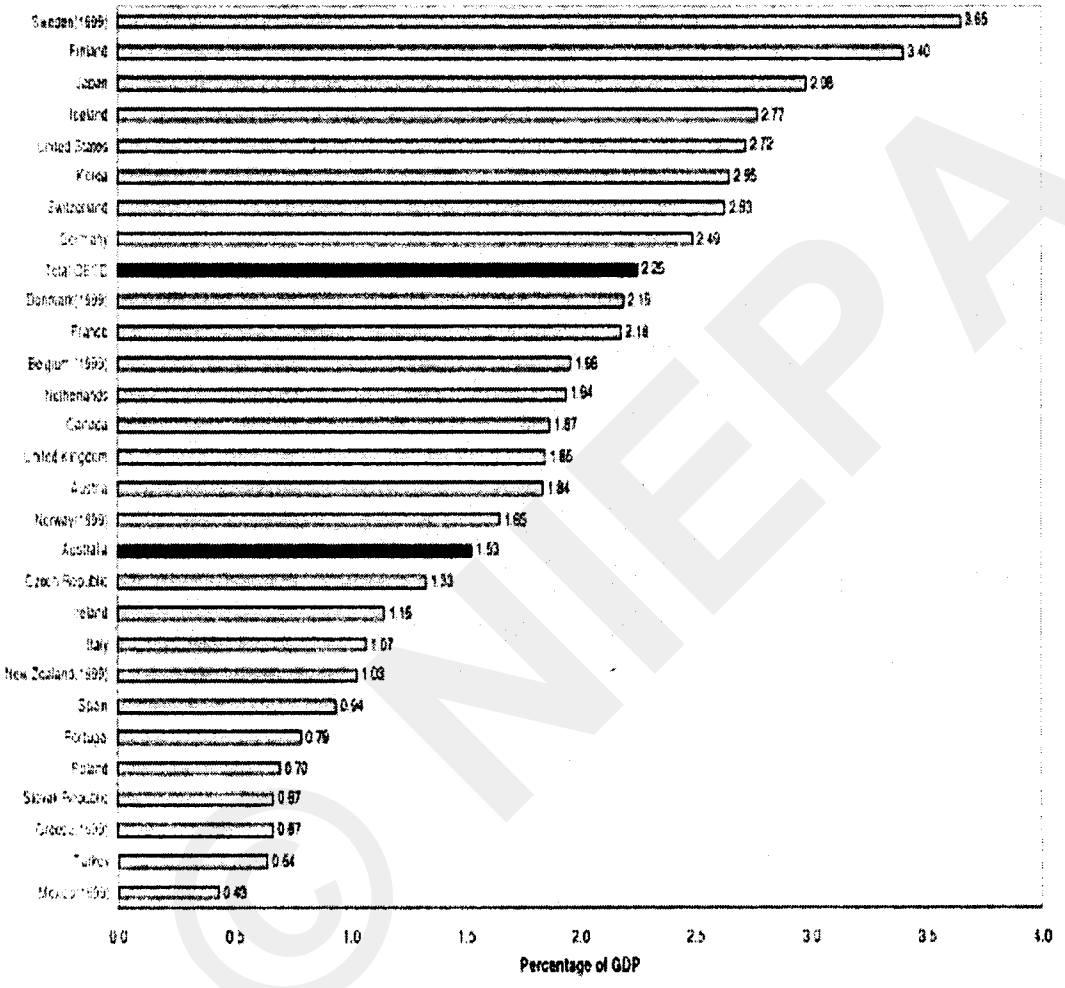


Source: DEST 2003a: 26

Australia also lags behind many other OECD countries in terms of Gross Domestic Expenditure on R&D (GERD) as a proportion of Gross Domestic Product (figure 4). Australia's total expenditure is 1.53% of GDP compared to an OECD average of 2.25%. There have been calls from such bodies as the AVCC that Australia increase its investment in research to 2% of GDP by 2010 and 3% by 2020.

Table 1 provides an overview of Australian R&D performance relative to that of other OECD countries in terms of key indicators: Gross Domestic Expenditure on R&D (GERD), Expenditure on R&D in the Business Enterprise Sector (BERD), Expenditure on R&D in the Higher Education sector, Government Intramural Expenditure on R&D (GOVERD), Government Financed GERD, and Industry Financed GERD. In terms of these indicators, Australia performs above the OECD average with respect to public sector investment in R&D, but, as already indicated, below average overall.

Figure 4. GERD as a Percentage of GDP by OECD Country, 2000



Source: DEST 2003c: 13

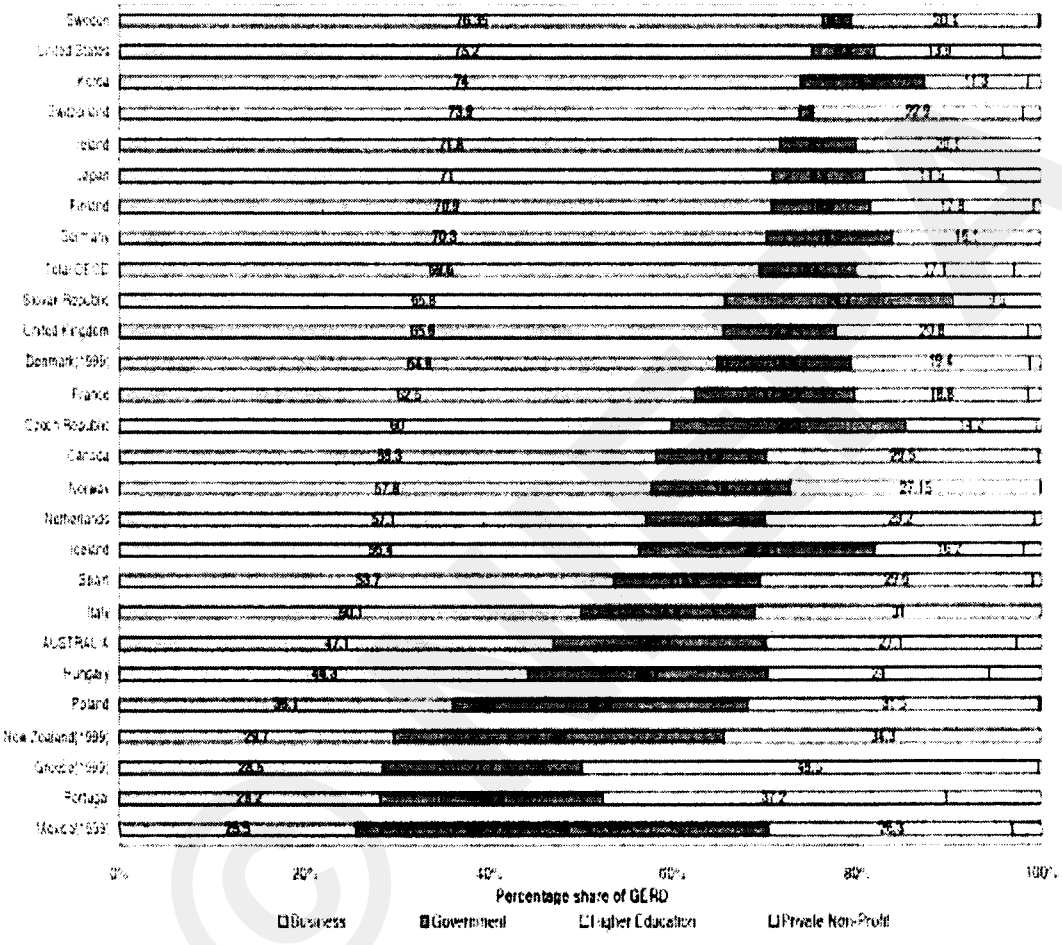
TABLE 1
Overview of International R&D Performance by OECD Country, 2000

	GERD (Million Current PPP$)	*GERD/ GDP*	*BERD/ GDP*	*HERD/ GDP*	*GOVERD/ GDP*	*Govt-Financed GERD/ GDP*	*Industry-Financed GERD/ GDP*
Total OECD	**604575.0**	**2.25**	**1.56**	**0.38**	**0.23**	**0.64**	**1.44**
United States	265179.6	2.72	2.04	0.38	0.18	0.71	1.88
Japan	98389.3	2.98	2.11	0.43	0.29	0.58	2.16
Germany	53568.9	2.49	1.75	0.40	0.34	0.79	1.64
France	32873.2	2.18	1.37	0.41	0.38	0.84	1.15
United Kingdom	27184.0	1.85	1.21	0.38	0.22	0.53	0.91
Korea	18939.6	2.65	1.96	0.30	0.35	0.64	1.92
Canada	16193.4	1.87	1.09	0.55	0.22	0.58	0.79
Italy	15482.8	1.07	0.53	0.33	0.20	-	-
Sweden (est)	8879.4	3.96	3.03	0.81	0.12	0.90	2.77
Netherlands	8440.2	1.94	1.11	0.57	0.25	0.70	0.97
AUSTRALIA	**7743.3**	**1.53**	**0.72**	**0.41**	**0.35**	**0.71**	**0.70**
Spain	7568.2	0.94	.050	0.28	0.15	0.36	0.47
Switzerland	5600.8	2.63	1.96	0.60	0.03	0.61	1.82
Belgium (1999)	4944.7	1.96	1.40	0.47	0.06	0.45	1.30
Finland	4457.0	3.40	2.41	0.61	0.36	0.89	2.39
Mexico (1999)	3505.0	0.43	0.11	0.11	0.19	0.26	0.10
Denmark (1999)	3204.1	2.19	1.42	0.43	0.32	0.68	1.09
Turkey	2685.3	0.64	0.21	0.39	0.04	0.32	0.28
Poland	2583.3	0.70	0.25	0.22	0.23	0.44	0.23
Norway (est)	2430.3	1.64	0.95	0.45	0.25	0.67	0.83
Czech Republic	1892.5	1.33	0.80	0.19	0.34	0.59	0.68
Portugal	1358.9	0.79	0.22	0.29	0.19	0.51	0.22
Ireland	1235.6	1.15	0.83	0.23	0.09	0.26	0.76
Greece (1999)	1123.0	0.67	0.19	0.33	0.15	0.33	0.16
Hungary	998.6	0.80	0.36	0.19	0.21	0.40	0.30
New Zealand (1999)	760.7	1.03	0.31	0.35	0.37	0.52	0.35
Iceland	219.4	2.77	1.56	0.45	0.71	-	-

Source: DEST 2003c: 12

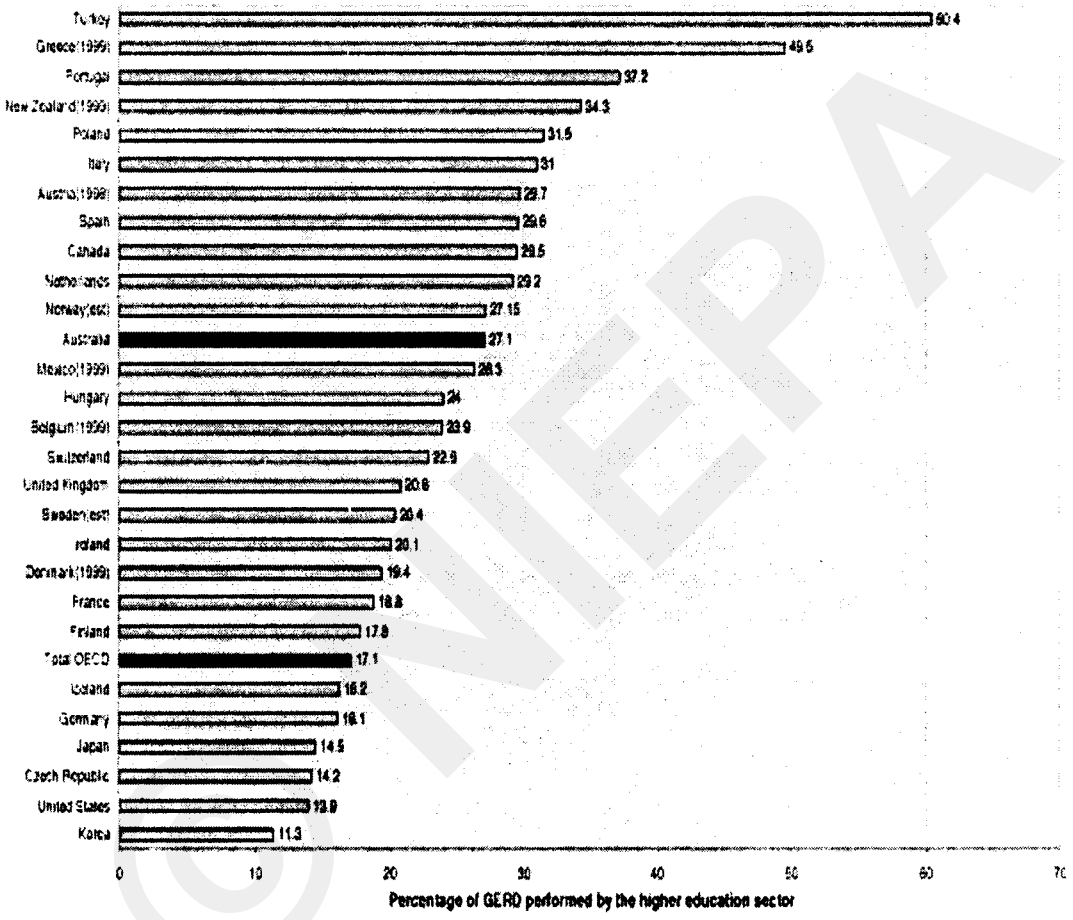
The relatively low level of investment in R&D from the private sector means that government has had to play a leading role in funding Australian science and innovation. The federal government channels support it for R&D through a variety of schemes and organisations, the two major being the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and the nations universities, the former receiving about $612 million direct from government and the latter $6652 million. Of course, Commonwealth support for universities is for teaching as well as research. About 27% of GERD is performed by the higher education sector (figure 5), which is a fairly large proportion relative to many other OECD countries (Figure 6).

Figure 5: GERD performed by sector and OECD country, 2000



Source: DEST 2003c: 19

Figure 6: Percentage of GERD performed by the higher education sector by OECD Country, 2000: 39



Source: DEST 2003c: 39

Also, a greater proportion of Australia's R&D workforce is located in higher education than is the case for most OECD countries (Table 2)

TABLE 2
Researchers per 10,000 Labour Force by Sector of Employment

Country	*Business*	*Government*	*Higher education*
USA	70	4	10
Japan	64	5	26
Sweden	52	6	33
Finland	41	16	40
Germany	34	10	17
Ireland	33	2	15
United Kingdom	32	5	17
Canada	31	5	21
Denmark	28	14	20
France	28	9	22
European Union	25	7	18
Netherlands	23	10	16
Australia	**15**	**10**	**41**
New Zealand	9	9	26

Source: AVCCb 2003: 10

Table 3 gives a rough idea of university expenditure on R&D by source of funds. One interesting aspect is the small but steady increase in R&D expenditure from state and local government sources. As mentioned above, in 1974, almost total funding for higher education was assumed by the Commonwealth, and since then the funding and policy influence of state governments on higher education has been on the wane. But in recent years, some states have been targeting university funding, particularly in the bio-technology fields, in the belief that such investment will strengthen the local economy – a clear commitment to the notion of the knowledge economy. Several states have established science and innovation councils under such banners as: Queensland's Smart State, Victoria's Science, Technology and Innovation Initiative, New South Wale's BioFirst Strategy and Western Australia's Innovate WA policy (Meek 2002, Meek et al 2003).

TABLE 3
University Expenditure on Research and Experimental Development by Source of Funds, 1988 – 2000

Source of Funds	*Figures in Per cent*						
	1988	1990	1992	1995	1996	1998	2000
Commonwealth Government							
General University Funds				66.1	65.4	63.7	62.9
Commonwealth Schemes				16.9	16.3	16.6	17.4
Other Commonwealth Gov.				6.6	7.0	7.4%	6.4
Total Commonwealth	91.3	88.4	91.1	89.6	88.7	87.7	86.8
State and Local Government	1.5	2.5	2.1	2.2	2.2	2.7	3.2
Business Enterprise	2.6	2.2	2.5	4.7	5.2	5.2%	4.9
Other Australian	3.9	6.2	3.7	2.5	2.8	2.9%	3.0
Overseas	0.7	0.7	0.6	1.1	1.1	1.6%	2.2

Source: AVCC 2003a: 6

Table 4 gives a more detailed picture in terms of money specifically targeted for research [the government component of full-time staff salaries (25%) nominally devoted to research is excluded. As the Table illustrates, about two-thirds of university income specifically for research comes from government sources and one-third from business and industry.

TABLE 4
Research Income by Source, 2001

Research Income Source	*Amount ($)*	*% of total research Income*
Commonwealth Competitive Grants	475,337,497	40.88
Non-Commonwealth Competitive Grants	14,364,311	1.24
Total National Competitive Grants	**489,701,808**	**42.12**
Local Government	4,691,588	0.40
State Government	101,714,402	8.75
Other Commonwealth Government	93,601,769	8.05
Total Other Public Sector Funding	**200,007,759**	**17.20**
Australian Contracts	119,014,269	10.24
Australian Grants	70,262.074	6.04
Donations, Bequests and Foundations	64,926,726	5.58
International Funding	137,089,095	11.79
Syndicated R&D	1,622,206	0.14
Total Industry and Other Funding	**392,914,370**	**33.79**
Total Government Grants (Excluding CRCs)	**689,709,567**	**59.32**
Total Financial Data (Excluding CRCs)	**1,082,623,937**	**93.11**
Cooperative Research Centre (CRC) Funding		
Commonwealth Grants to CRCs	58,245,303	5.01
Non-university participants	12,806,703	1.10
Third party contributions	9,032,234	0.78
Total CRC funding	**80,084,240**	**6.89**
Total Research Income (Public Universities)	**1,162,708,177**	**100.00**

Source: AVCC 2003a: 11

History of government reforms of higher education

Throughout the 1970s and into the 1980s, policy makers and institutional leaders alike became increasingly concerned about the future of Australian higher education. This culminated in a push at the end of the 1980s to make higher education more relevant to national economic needs and priorities. The 1988 federal government White Paper initiated a dramatic transformation of Australian higher education which, among other things, led to the abolition of the binary distinction between universities and CAEs and the creation of the Unified National System (UNS) in which there is now a much smaller number of significantly larger institutions all called universities. The reforms also placed the need for selectivity and concentration of research squarely on the agenda. These

events are often referred to as the Dawkins' reforms, in recognition of one of their primary architects, the then federal Minister of Employment, Education and Training, Hon'ble John Dawkins.

In July 1988, the White Paper on higher education was adopted by the federal government and set in train a period characterized by the dismantling of the binary system; a challenging view that teaching and research are inextricably linked; the emergence of new systems of funding and emphasis for higher education institutions to diversify their funding sources; a sharper sense of the real importance of research to economic well-being; a growing appreciation that for relatively small countries such as Australia, concentration and selectivity are essentials in any national research policy; and a much greater emphasis on institutional management (Dawkins 1988).

The major policy shifts can be summarised as follows:

- a shift in some of the cost of higher education from the State to the individual; the government lessened its financial commitment through the introduction of such mechanisms as the Higher Education Contribution Scheme (HECS — partial tuition payment through the tax system);
- Enhanced national and international competition for students and research income;
- Greater emphasis on accountability for the government dollar;
- Greater deregulation within the higher education sector;
- Increased reliance on income gained from sources other than the Commonwealth; and
- Clear expectation that higher education contributes to economic prosperity and the knowledge economy

Diversity, quality and coordination of the higher education sector were key policy intentions of the White Paper and have continued to be so, despite the change of government. The White Paper is quite clear regarding the UNS not being a uniform system by stressing that:

- The new arrangements will promote greater diversity in higher education rather than any artificial equalisation of institutional roles;
- The ultimate goal is a balanced system of high quality institutions, each with its particular areas of strength and specialisation but co-ordinated in such a way as to provide a comprehensive range of higher education offerings; and
- Diversity and quality are paramount; the unified system will not be a uniform system

However, the sector's responses to these policy initiatives have not necessarily been in accord with the initial intentions. In particular, there have been numerous unintended consequences resulting from the changed policy framework - this is especially true in the areas of research management, funding and training. At the national level, degrees of concentration and selectivity have not occurred to the extent expected from the policies. However, a more informal concentration and grouping of research universities has

occurred. A relatively new and interesting phenomenon resulting from competition is the creation of alliances and networks of various types such as Universities 21; Group of 8; the Australian Technology Network; and Innovative Research Universities Australia (Wood and Meek 2002).

With the change of federal government in March 1996, it became clear that the size of the task to which higher education must adapt had, in fact, substantially increased. The 1996 budget statement from the newly elected Liberal coalition government regarding higher education placed additional pressures and challenges on this sector. Key changes announced in the 1996 budget statement included:

- a reduction of operating grants by 5 per cent over three years;
- a lowering of the HECS repayment threshold; an increase in level of HECS payments; and the introduction of differential HECS according to course of study;
- no Commonwealth supplementation of academic salary increases;
- an insistence upon return of funds if enrolment targets are not met; and
- a phasing out of postgraduate coursework enrolments from Commonwealth funded load.

The funding changes have had a profound and largely a negative effect on higher education from which the sector is still reeling. Total public investment in Australian universities peaked in the mid-1990s and then decreased through to 2001. The funding cuts to higher education initiated in 1996 did not really start to bite until the end of the decade. But with advent of the new millennium, it has been generally recognised that Australian higher education faces a funding crisis (AVCC 2001; Chubb 2000). Funding of Australian higher education increased during the period 1995–2000 with respect to all sources of revenue. However, direct public funding from the Commonwealth government declined by 11% in real terms – Australia being only one of the two OECD countries in which this occurred. And, while total funding increased by 12.5% in real terms, total student load increased by 21% (Phillips et al 2002: 28). Research funding per se has also suffered.

> Australia's investment in research and development has fallen steadily in the past few years, at a time when many of our major competitors and trading partners are increasing their commitment to research and innovation.
>
> In 2000-01, total national expenditure on research and development was just over $10 billion, or around 1.5% of GDP – below most of the OECD member nations and half the target level set by Canada, the European Union, and others (AVCCb 2003: 13).

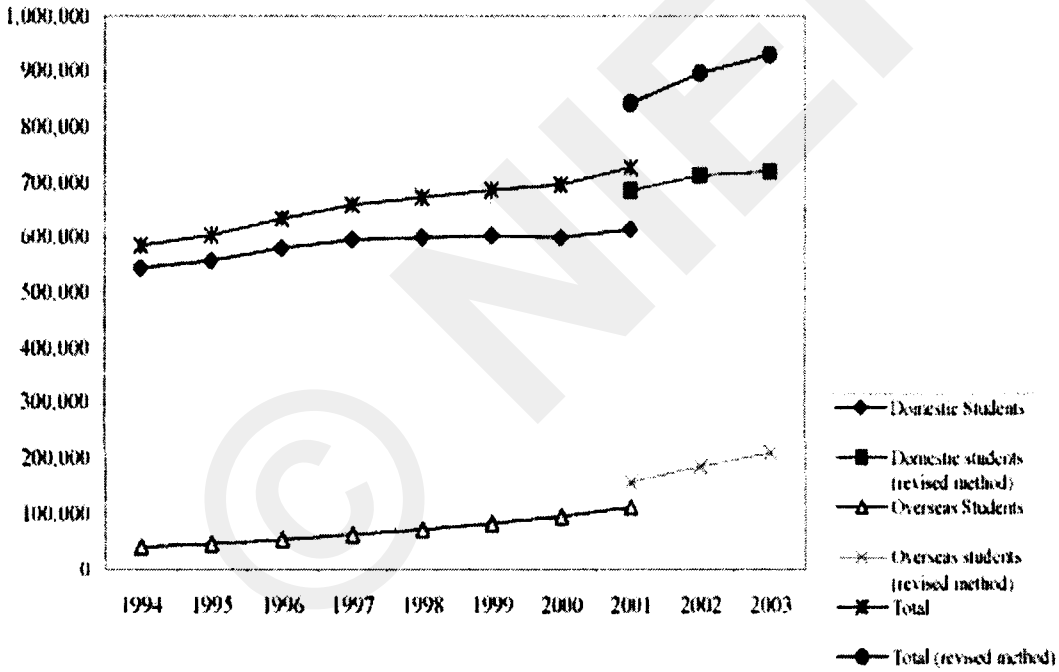
Nearly all of the recent reviews and changes to Australian higher education have attempted to address the funding issue in one form or another – with government primarily relying on market mechanisms rather than increased public subsidies to solve the problem. The paper summarises recent reviews and policies' changes to higher education that have had a direct impact on research and research management. But first a

few words need to be said about the size and structure of the present higher education system.

Current profile of Australian higher education

In 2003, Australian universities enrolled nearly one million students, about 23% of whom were full-fee paying international students. The overseas student market is worth more than $5.2 billion annually to Australia and makes it one of the nation's largest export earners. Fees paid directly to higher education institutions from overseas students rose from $627 million in 1997 to $1,423 billion in 2001. Presently, overseas students contribute about 13% to the total higher education budget.

Figure 7: Domestic and Overseas Students 1993 to 2003



Source: DEST 2004

Since the late 1980s, there has been a substantial growth in Australian higher education, from about 485,000 students in 1990 to more than double that in 2004. However, in recent years, most of the student growth has been fuelled by overseas students (see figure 7). In the period 1995 to 2001, the number of commencing domestic

students increased by 8.6%, while the number of commencing overseas students rose by 146% (Phillips et al 2002: 8). The slow growth in domestic student numbers does not indicate a slackening in demand but lack of available places to meet demand (ibid).

Funding of Australian higher education increased during the period 1995–2000 with respect to all sources of revenue (Table 5). However, direct public funding from the Commonwealth government declined by 11% in real terms. And, while total funding increased by 12.5% in real terms, total student load increased by 21% (Phillips et al 2002: 28).

TABLE 5

University revenue by source 1995–2000 ($B) (adjusted by CPI to 2000 terms)

	1995	1996	1997	1998	1999	2000	% change
Commonwealth	4.7	4.9	4.7	4.6	4.4	4.2	-11.0
HECS	1.0	1.0	1.3	1.5	1.7	1.7	68.9
Fees	1.0	1.2	1.3	1.4	1.6	1.7	75.3
State	0.1	0.1	0.1	0.1	0.1	0.1	25.8
Other	1.5	1.5	1.4	1.3	1.3	1.6	7.9
Total	8.3	8.6	8.8	9.0	9.1	9.3	12.5

Source: Phillips et al 2002: 26

The government says itself that it no longer funds, but subsidises higher education. The proportion of the budget going to higher education from the Commonwealth government varies according to whether or not HECS is included as part of the Commonwealth grants (see Figures 8 and 9).[1] If HECS is excluded, then substantially less than 50% of the Revenue for higher education comes direct from the Commonwealth (Figure 9).

Figure 8: Sources of Revenue 1998 – 2002

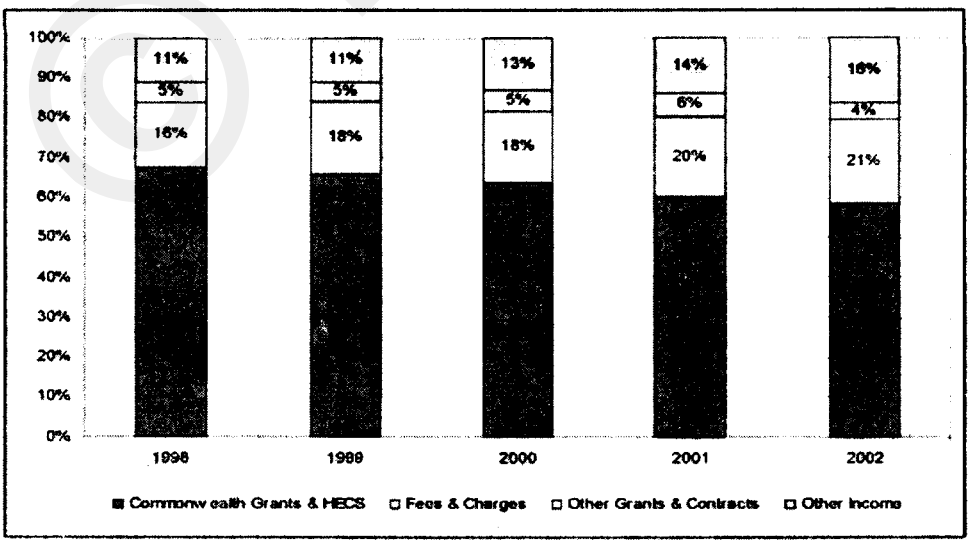
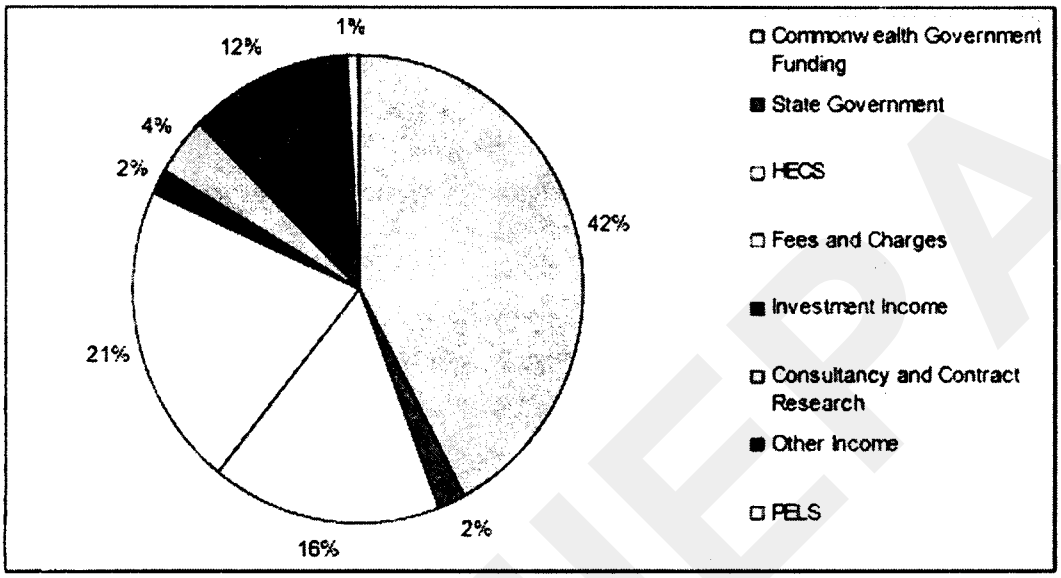


Figure 9: Source of Revenue 2002



Source: DEST 2004

Funds for research and research training are allocated through a variety of performance-based funding programs administered by the Department of Education, Science and Training or the Australian Research Council's peer-reviewed competitive grants. Universities receive research funding from a number of other agencies and schemes, such as the National Health and Medical Research Council (NHMRC) and Cooperative Research Centres (CRCs). Research policy and funding are discussed in more detail in the following section of the paper

Over-reviewed and under-funded[2]

A number of peak bodies have argued the need for a stable and predictable policy environment to support universities and their research and development endeavours. However, the sector has been, and continues to be, the subject of a number of wide-ranging government inquiries and reviews - the outcomes of which have been variable. The range of these inquiries can be illustrated by some of the following reports which were released in the two-year period 1997-98.

- Priority Matters (Stocker Report 1997)
- Learning for Life: Review of Higher Education Financing and Policy 1998 (West 1998)
- Review of the Cooperative Research Centres 1998 (Mercer and Stocker 1998)

Apart from inquiries and reviews that have directly involved the higher education sector, other initiatives also have the potential to impact on the way in which the sector operates. Examples include the following reports:

- Going for Growth: Business Programs for Investment, Innovation & Export (Mortimer Report 1997)
- The Global Information Economy – The Way Ahead (Goldsworthy/IIFC Report 1997)
- Investing for Growth 1997 (Government responses to Mortimer & Goldsworthy reports)
- A Platform for Consultation 1999 (Ralph Review of the Australian Business Taxation System)

Substantial resources are involved in the sector participating in and responding to the terms of reference of such government inquiries and reviews. However, where there has been little in the way of policy direction or funding commitment resulting from some of these reviews, their value to the sector must be questioned (Wood and Meek 2002).

A particular theme of more recent government reviews and discussion and policy papers has been the role of universities in innovation. These include the following reports:

- The Virtuous Cycle: Working Together for Health and Medical Research 1999 (Wills Chair)
- New Knowledge, New Opportunities - June 1999 A Discussion Paper on Higher Education Research & Research Training
- Knowledge and Innovation - A Policy Statement on Research and Research Training December 1999
- Innovation Summit January 2000/Australian Science Capability Review - The Chance to Change November 2000
- Backing Australia's Ability - Government Response to the Batterham reports
- The capacity of public universities to meet Australia's higher education needs – Senate Review 2001

A brief overview of the key issues and recommendations of these reports and papers is provided below.

The Virtuous Cycle, the Final Report of the Strategic Review of Health and Medical Research (The Wills Review). This report was released on 12 May 1999. It made major recommendations about the level and manner of funding available to universities, hospitals and other research organisations for medical and medical biotechnology research. Among the issues identified were increasing the level of public investment; better management of research; greater involvement with industry; development of priority-driven research that contributes directly to population health and evidence-based health care; and the education and training of health and medical researchers.

New Knowledge, New Opportunities. In June 1999, a discussion paper on research and research training, *New Knowledge, New Opportunities* was released, which provided the

basis for extensive community debate about the policy and funding framework for university research and research training (Kemp 1999a).

It identified several deficiencies in the current framework which limit institutions' capacity to respond to the challenges of the emerging knowledge economy: funding incentives that do not sufficiently encourage diversity and excellence; poor connections between university research and the national innovation system; too little concentration by institutions on areas of relative strength; inadequate preparation of research graduates for employment; and unacceptable wastage of resources associated with low completion rates and long completion times of research graduates. A particular concern was with research training and the funding of Ph.D. and Master's research students. The key reforms proposed by the paper included:

- An enhanced role for the Australian Research Council
- Research infrastructure as a component of research grants. The preparation by universities of research and research training management plans
- A new university block funding programme, the Institutional Grants Scheme, to support research and research training and to encourage institutional diversity
- An Australian Postgraduate Research Student Scheme, based on *portable* HECS exempt scholarships for research degree students.

Knowledge and Innovation. The Government released its policy statement on research and research training, *Knowledge and Innovation* in December 1999. Major changes to the policy and funding framework for higher education research in Australia were identified in the policy statement. These included:

- a strengthened Australian Research Council (ARC) and an invigorated national competitive grants system;
- performance-based funding for research student places and research activity in universities, with transitional arrangements for regional institutions;
- the establishment of a broad quality verification framework supported by Research and Research Training Management Plans; and
- a collaborative research program to address the needs of rural and regional communities (Kemp 1999b).

The most important recommendation of the White Paper for research management within universities concerns increased competition over research funding, particularly with respect to funding for Ph.D. and Master's research students.

Knowledge and Innovation instituted two new performance-based block funding schemes. The approaches are intended to reward 'those institutions that provide high quality research training environments and support excellent and diverse research activities. The Institutional Grants Scheme (IGS) will support the general fabric of institutions' research and research training activities, and assist institutions in responding flexibly to their environment in accordance with their own strategic judgements' (Gallagher 2000). The Scheme absorbs the funding previously allocated for the Research

Quantum and the Small Grants Scheme. Infrastructure funding through the Research Infrastructure Block Grants (RIBG) scheme will be retained.

Funding under the IGS is allocated on the basis of a formula that reflects success in attracting research income from a diversity of sources (60 per cent), attracting research students (30 per cent), and the quality and output of its research publications, through a revised publications measure (10 per cent). The Government considers that institutions are likely to be more outwardly focused in their research when research income from all sources is equally weighted, unlike previous arrangements which gave lesser weight to income received from industry (Gallagher 2000).

Funding for research training (RTS) is also allocated through a performance-based formula. Institutions will attract a number of scholarship places based on their performance through a formula comprising three elements: number of all research students completing their degree (50 per cent), research income (40 per cent) and a publications measure (10 per cent).

Innovation Summit/Australian Science Capability Review. Further development of a framework for higher education research has been assisted by the Chief Scientist's Review of the Science Base and the National Innovation Summit, announced by the then Minister for Industry, Science and Resources. The Summit was held in early 2000, and organised by the Business Council of Australia and the then Department of Industry, Science and Resources. The Summit aimed to identify and develop a consensus on clear strategies for Government, industry and the research community to encourage future economic growth and improve Australia's competitiveness and innovation capacities. The Summit was supported by six Working Groups which focused on particular critical innovation issues. The Working Groups examined such areas as industrial innovation; intellectual property management; the human dimension of innovation; institutional structures and interfaces; innovation and incentives; and resource and infrastructure consolidation and cooperation (Wood and Meek 2002).

Based on the Australian Science Capability Review, the Chief Scientist presented a Discussion Paper in August 2000 entitled *The Chance to Change* (DISR 2000a). The recommendations from this Paper and the resulting Final Report released in November 2000 centred around three themes of investment: Culture; Ideas; and Commercialisation. The principal recommendations included: doubling the number of Australian Post-doctoral Fellows; providing 200 HECS scholarships for students undertaking science/education qualifications and 300 for students in mathematics/physics/chemistry; increased funding for the ARC and for university research infrastructure; testing a national site licence concept between HEIs and publishers to try and keep prices down; expansion of the CRC program; and more strategic approaches by universities and government-funded research agencies to the management of intellectual property. To ensure that the recommendations of the Review accorded with government and community objectives, an Implementation Committee was proposed (Wood and Meek 2002).

Backing Australia's Ability. At the beginning of 2001, in a package entitled *Backing Australia's Ability,* the federal government announced its $2.9 billion five-year strategy to boost innovation. The strategy builds on a number of other government initiatives mentioned above. The main measures of the innovation plan can be summarised as follows:

- $995m HECS-style loan scheme for 240,000 postgraduate students (which Kemp has indicated could be capped)
- 25 Federation Fellowships for top researchers, worth $225,000 a year for five years
- New 175% tax concession for additional R&D - $460m (All spending figures are total over 5 years).
- Existing 125% tax concession tightened to save $345m
- New 37.5 cents in the dollar R&D tax rebate for small companies - $13m
- Australian Research Council grants funding doubled - $736m
- Boost for research equipment, libraries and laboratories - $583m
- R&D Start Program continued for small and medium businesses - $535m
- Co-operative Research Centres program expanded - $227m
- Centres of excellence in biotechnology and information technology - $176m
- Major national research facilities - $155m
- 21,000 new full-time university places over 5 years in mathematics, science and IT - $151m
- Foster science, mathematics and technical skills in government schools - $130m

The government's additional investment was planned to achieve the following outcomes: 'generating new ideas, developing ideas into products, and developing a highly skilled workforce. It strongly emphasised greater involvement of industry in research, to encourage more effective take-up of the results or research, and substantially increased commercial application' (AVCCb 2003: 3). In addition to government commitment, the *Backing Australia's Ability* plan also requires the States and business and research institutions to spend $6 billion over the same period to attract its grants and incentives.

Though the Innovation Strategy was welcomed by many in the public and private sectors, there was the question of whether the financial commitment would be sufficient to offset the substantial funding cut-backs made to the higher education sector since 1996. Despite this being 'the largest commitment to innovation ever made by an Australian Government' (Howard 2001), it only spent $159.4 million in its first year of 2001-02. Much of the funding did not begin to flow for two or three years after the announcement – with $946.6 million to be outlaid in 2005-06.

The capacity of public universities to meet Australia's higher education needs – Senate Review 2001. This review of higher education was announced at the end of 2000. The terms of reference are extremely broad and include addressing: (a) the adequacy of

current funding arrangements with respect to: the capacity of universities to manage and serve increasing demand, institutional autonomy and flexibility, and the quality and diversity of teaching and research; (b) the effect of increasing reliance on private funding and market behaviour on the sector's ability to meet Australia's education, (c) training and research needs, (d) the quality and diversity of education; (e) the capacity of public universities to contribute to economic growth; and (f) the regulation of the higher education sector in the global environment.

The review received more than 300 submissions and collected evidence at a number of public hearings. Recommendation one of the report states that 'the Government end the funding crisis in higher education by adopting designated Commonwealth programs involving significant expansion in public investment in the higher education system over a ten year period'. However, the receptiveness of the government to arguments that the sector needs additional funding has been minimal (Wood and Meek 2002).

Higher Education at the Crossroads. Throughout 2002, the federal government conducted a review of Australian universities under the banner 'Higher Education at the Crossroads'. Despite a number of position papers and numerous submissions from the sector, government policy was merely announced as a *fait accompli* as part of the 2003 budget statement. The package of higher education reforms was entitled *Universities: Backing Australia's Future*. Though there is commitment of some new money, basically the policy continues the trend towards greater privatisation of higher education funding through increasing tuition fees, allowing institutions to set their own fees (within a range) and allowing institutions to enrol a greater number of full fee paying domestic undergraduate students. After protracted debate and a number of amendments to the recommendations, the following recommendations were accepted by the Australian Parliament in December 2003:

- More than 34 000 new Commonwealth supported places.
- Increasing the Commonwealth contribution per student place by 2.5 per cent from 2005, building to a 7.5 per cent increase by 2007, conditional on institutions providing staff with genuine choice of industrial agreements and adherence to the National Governance Protocols which are designed to encourage efficiency, productivity and accountability in the sector.
- Providing greater support for regional campuses.
- Raising the repayment threshold under HECS-HELP from $24 365 in 2002-03 to $35 000 in 2004-05 ($36 184 in 2005-06) which will significantly improve the financial position of many graduates with lower incomes.
- $327 million for two new scholarship programmes over the next five years to assist students with education and accommodation costs.
- More than $50 million in additional funds over five years to support a range of equity initiatives.

- From 2005, universities will be able to set student fees within a range from $0 to a maximum 25 per cent above the current HECS rates.
- Increasing the maximum number of Australian fee-paying students (with the exception of medicine) from 25 to 35 per cent of a total course cohort.
- A new programme to enable all full fee paying students undertaking an award programme at an eligible institution to borrow the amount of their tuition fees from the Commonwealth. These loans will be subject to the same repayment arrangements as under the HECS-HELP programme.
- Providing Student Learning Entitlements to cover the duration of a Commonwealth-supported students' course for up to seven years with flexibility for an extension in the case of longer courses.
- Providing places for the National Priority areas of nursing and teaching and special fee arrangements to encourage people to enrol in these fields.
- A new Learning and Teaching Performance Fund will be introduced from 2006 to reward institutions that best demonstrate excellence in learning and teaching. A total of $251 million will be allocated under the fund between 2006 and 2008.
- A new National Institute for Learning and Teaching in Higher Education will be established with ongoing annual funding of $22 million from 2006.
- A total of $83 million will be allocated between 2006 and 2008 under the new Workplace Productivity Programme to encourage improvements in workplace productivity.
- Additional funding of $4 million over five years on quality initiatives including additional funding to enhance the operations of the Australian Universities Quality Agency in relation to offshore audits.
- A new Collaboration and Structural Reform Fund will be established for three years from 2005 to encourage innovation and collaboration within the sector.
- Approximately $40 million in transitional funding to ensure that no institution is disadvantaged under the new funding arrangements.

According to the Minister, the recommendations will result in an increase in public investment in the sector of $2.6 billion over the next five years and $11 billion over the next ten years (DEST 2004: 3). But as with the funding commitments in *Backing Australia's Ability*, most of the funding increases come at the end rather than the beginning of the periods identified.

The Crossroads review and recommendations had little to do with research *per se*. The Minister of Education, Science and Training in recognising this announced in 2003 seven additional reviews of research: Mapping Australia's Science and Innovation; Research Collaboration Between Universities and Publicly Funded Agencies; Evaluation of Knowledge and Innovation; National Strategy on Research Infrastructure; Review of Backing Australia's Ability; Evaluation of Co-operative Research Centres. The reports of several of these reviews were released in late 2003 or early 2004. But the recommendations appear to do little to disturb the status quo, and at the time of writing the government had yet to declare its position on the recommendations. Some of the

outcomes of the report on Mapping Australia's Science and Innovation are outlined in the following section of this paper. It is interesting to note that the *Evaluation of Knowledge and Innovation* (2004) recommends 'That the government provide increased funding to allow universities to carry out their responsibilities to renew and enhance their institutional research infrastructure, to develop their own strategic research focus and to properly carry out competitively awarded research projects'. Other recommendations included consideration of research quality assessment, possibly using a modified form of the UK Research Assessment Exercise (RAE).

Inquiry into higher education funding and regulatory legislation – Senate Review 2003. In June 2003, the Senate referred to its Employment, Workplace Relations and Education References Committee the task of inquiring into the impact of the *Universities: Backing Australia's Future* recommendations. The Committee established a sub-committee which held numerous public meetings and received more than 480 submissions before reporting to Parliament in November 2003. The Senate report was entitled *Hacking Australia's Future, Threats to institutional autonomy, academic freedom and student choice in Australian higher education.* The report was highly critical of many of the governments proposed policies, recommending that 'The bill is so badly flawed, at both a philosophical and technical level that it should not be given a second reading'. But as discussed above, the government was able to muster the number to gets its legislation passed following more or less minor amendments.

National research priorities. At the beginning of 2002, the government announced, as a result of a 'consultation' process that was far from transparent, that a portion (33%) of the Australian Research Council's (the largest non-medical research funding agency in Australia) funding would be targeted to research in the following four priority areas: nano- and bio-materials, genome/phenome research, complex/intelligent systems, and photon science and technology.

In May 2002, the government instituted a review process to further set national research priorities for government-funded research in the areas of science and engineering. According to government, the priorities 'will highlight research areas of particular importance to Australia's economy and society, where a whole-of-government focus has the potential to improve research, and broaden policy outcomes' (DEST 2002: 1). The priorities announced at the end of 2002 are:

- An environmentally sustainable Australia.
- Promoting and maintaining good health.
- Frontier technologies for building and transforming Australian industries.
- Safeguarding Australia.

These priorities subsume the ARC research priorities mentioned above. When the priority review process was first initiated, the intention was to follow the research priority setting exercise in the sciences and engineering with one in the social sciences and humanities. But that did not happen. Rather, sub-goals for each priority area were written in such a way that the social sciences and humanities could be incorporated. Nonetheless,

while broad in scope, the priorities are 'hard-science'-oriented and mainly emphasise areas of immediate economic relevance. The research priorities are applicable across all Commonwealth's research agencies and funding bodies.

Outcomes and analysis

It is quite difficult for several reasons to assess the impact and outcomes of policy on higher education and its research efforts. Data is often sporadic, out of date and difficult to obtain. But more importantly, the effects of particular policies often take a considerable amount of time to appear. This problem is exacerbated when the implementation of the funding dimensions of particular polices is relegated to a relatively distant future – which is the case for the set of policies contained in both *Backing Australia's Abilities* and *Our Universities: Backing Australia's Future.* The stark effects of the government's 1996 financial cut-backs to higher education did not become blatantly apparent until the end of that decade. The impact of new money committed through *Backing Australia's Abilities* is only starting to emerge. But while the analysis of higher education and research policies are necessarily complex, they are also vital, given the importance of the sector to the nation's economic and social well-being. Given the caveats mentioned above, this section of the paper attempts to summarise what appear to be some of the key trends and issues in Australian research policy and effort.

The report on *Mapping Australian Science and Innovation* lists a number of weaknesses of Australian Science (DEST 2003a). These include:

- Australia's scientific standing in the world may be at risk and, in general, Australian science and patented technology has limited visibility and impact on the development of world technologies.
- Business innovation involving R&D and development of new technology remains low by international standards
- Investment in the development of strategic ICT capability is low, which may weaken the innovation base and the future competitiveness of the economy.
- Australia's commercialisation record remains low compared to other countries and is uneven within and across different research sectors. Continuing barriers to commercialisation include lack of access to early stage capital, a shortage of management and entrepreneurial skills and lack of fully effective links between researchers and industry.
- Challenges remain in fostering science and innovation collaboration and linkages, especially between publicly funded research providers and industry.
- Australia's research infrastructure is under pressure in terms of investment and maintenance, and in leveraging access to international research infrastructure in an environment of increasing scale, costs and technical complexity.
- The long-term sustainability of Australia's skills base in the enabling sciences is under pressure in some areas with declines in participation in most science subjects in Year 12 and in S&T subjects at the undergraduate level at university.

- Availability of innovation skills and cultural attitudes towards innovation limit Australia's innovation potential.
- While total gross expenditure on R&D as a proportion of GDP is now some 50% higher than in 1981, Australia continues to rank towards the bottom of OECD countries in terms of R&D investment.
- Government support for business R&D is low by international standards, being less than half that of the leading OECD countries.

Besides being over-reviewed, the single most fundamental issue facing Australian higher education, in general, and research, specifically, remains, not surprisingly, funding. But more is at issue than just money. At the heart of the problem is the question of whether Australia is to have a publicly supported, publicly subsidised or fully private higher education system. Some have argued that little will be achieved with respect to funding until government agrees to restore full supplementation of operating grants for academic salary increases. While the government in the present round of reforms has committed some new money to the sector, most of it will be absorbed by the present round of salary increases as a result of enterprise bargaining. Moreover, as indicated above, the government's main funding reform has been to shift even more of the burden to the student consumer. But student fees will not support an increased research effort. In fact, with an ever worsening staff/student ratio, in some universities money earned through research effort is actually subsidising teaching through payment of staff salaries. The Minister promised to 'undertake by February 2005 a review of the cost adjustment factor indexation mechanism for the Commonwealth funding of universities from 2007-08' (DEST 2004).

There is an expectation that the federal government in the May 2004 budget will announce additional funding for research infrastructure that supplements and extend the funding committed through the 2001 *Backing Australia's Ability*. Given the fact that 2004 is an election year, some research infrastructure funding increase is quite likely – though in American term, the US does not have a monopoly on pork-barrelling. But it is unlikely that the budget will address the more fundamental structural and long-term funding issues. The longer research infrastructure is allowed to decline, the more difficult it becomes for the nation to recover its R&D standing relative to the rest of the world. A past President of the Australian Vice-Chancellors Committee observes that 'the pace of change in public investment in universities is such that if our universities get too far behind those in other countries, we will not catch up' (Chubb 2000: 3). He also raised the concern that 'Australia will become an importer of knowledge and an exporter of talent and that we will have too few educated personnel locally to add value to the efforts of others let alone enough to produce from our own'. For a number of historical and structural reasons, the Australian research effort is more dependent on public support than most OECD nations. However, the ideological commitment of the government has been to the market and privatisation.

A deeper issue in Australian higher education research is the connection between teaching and research. No country can afford to fund all of its universities as if they were

world-class research intensive institutions. On the other hand, there are those who argue that all university teaching must be informed by research. Moreover, each institution has its own special arguments why it should be recognised as a leading research university (whether or not the facts support such arguments). The collapse of the binary system of higher education in the early 1990s has exacerbated this problem. The introduction of new research performance based funding measures (RTS and IGS) mentioned above are designed to concentrate research funding on the research performers. It is too early to tell whether the policies will have the desired effect since up to 2005 a cap has been placed on how much funding individual universities can lose or gain through the application of the policies. But in the longer term, more radical policies may be necessary.

Appropriately, government has instituted a number of policies to boost business investment in R&D. *Mapping Australian Science and Innovation* (DESTa 2003: 367) pointed out that 'Australia is the only country in which business funding of research and development as a percentage of GDP is lower than government funding of research and development as a percentage of GDP'. The review in a background paper also observed that a key OECD finding is that 'rapid growth in research and development is largely driven by increases in business-performed research and development' (AVCC 2003b: 10). Given the country's history of investment in R&D, it is probably necessary to attempt to increase the share coming from business and industry. But this should complement, not diminish, the investment from other sectors, particularly government.

With research policy strongly based on principles of concentration and selectivity, it is hardly surprising that the government would wish to set national research priority areas. The danger here, however, is if funding becomes progressively concentrated in priority areas, innovation may be 'straight jacketed'. This is one of the dilemmas a small country with a limited science base faces. While the nation cannot adequately fund all kinds and aspects of modern research, it must maintain a broad enough science base to participate in advances in knowledge globally. According to the AVCC (2003x: 22), 'The key issue is plurality: as a nation we need to support a range of research, and do so by a number of different means. Allowing any single approach to dominate would inevitably result in a diminished overall research capacity and a weaker national innovation system. The impact of research prioritisation should be restructured to recognise this fact'.

Another aspect of priority setting is the prominence given to science and engineering at the expense of the social sciences and humanities. The present round of priorities gives little more than lip service to the social sciences. Much of the present thinking is based on the assumption that worthwhile research means commercialisation and commercialisation means science and technology. Again, a more balanced approach is necessary. The social sciences have much to add, particularly to the nation's social and cultural prosperity. They also have an important role to play as critic of the environmental and social consequences of scientific and technologically driven development. But with an increasing emphasis on commercialisation, the role of the university of 'speaking truth to power', may be lost sight of. There is some evidence to suggest that this is a significant problem in the United States higher education sector (Newman et al). Even the AVCC

(2003b: 12) agrees that 'Recent priority setting in research has underrated the contribution made by the social science and humanities. The AVCC states that:

> The research base must include the humanities and social sciences. The focus in recent years on science, engineering and technology (SET) has marginalised areas of research and scholarship which play an important role in society, and which provide the vital critical and creative underpinnings of many other disciplines. The social sciences and humanities provide an understanding of ourselves and of the human and natural world around us, and work with the sciences towards resolving the full spectrum of problems and challenges which confront us.

Related to the issue of priority setting is the emphasis placed on pure basic research relative to applied and developmental research. Both government and institutional management alike have been very interested in the commercialisation of research outcomes. This has resulted in a shift of funding over the years from pure-basic to applied research, as is depicted in Table 6. The linear view of scientific innovation no longer has credibility. Nonetheless, if basic, 'blue-sky' research is progressively diminished, the fountain of ideas and advances in knowledge that feeds other forms of research and technological innovation may dry up as well. (AVCC).

TABLE 6
University Expenditure on Research and Experimental Development by Type of Research Activity, 1988-2000

Type of Research Activity	*Percentage*					
	1988	*1990*	*1992*	*1996*	*1998*	*2000*
Pure Basic Research	38.0	41.0	40.0	34.1	33.5	30.5
Strategic Basic Research	24.0	22.0	24.0	25.0	25.4	24.0
Applied Research	31.0	31.0	30.0	34.7	35.0	37.8
Experimental Development	7.0	6.0	6.0	6.2	6,1	7.7
Total ($m)	1,076.8	1,350.8	1,695.2	2,307.6	2,600.2	2,774.6

Source: AVCC 2003a: 7; Annual expenditure are in respective year price.

The emphasis on applied research reflects the concern by both government and institutional leaders that research outcomes are commercialised, which in turn leads to the funding of the type of research most likely to achieve this result. This appears to have resulted in a sharp decline in non-oriented/advancement of knowledge type of research, as is reflected in Table 7.

TABLE 7
Socio-economic Objective of Research by Type of Funds

% of Total HERD for SEO	*Percentage*											
	Economic Development			*Society*			*Environment*			*Non-oriented Research*		
	'96	*'98*	*'00*	*96*	*'98*	*'00*	*'96*	*'96*	*'00*	*'96*	*'98*	*'00*
All sources	21	23	29	25	27	40	7	7	6	46	42	25
Commonwealth National Competitive Grants	21	24	27	25	26	39	8	7	6	46	43	28
State and Local Government	21	27	31	51	47	48	10	9	12	18	17	10
Business	43	42	44	21	22	32	9	10	7	26	25	16
General University Funds	18	22	28	24	27	40	7	7	5	50	44	27
Overseas	23	26	27	36	32	47	6	4	5	33	38	21

Source: AVCC 2002: 3

Society remains the major research category with respect to socio-economic objective of research, partially due to the fact that health research is classified under society. The category of 'economic development' is steadily increasing, while the most alarming trend is 'the sharp decline in 'Non-oriented Research', or what used to be classified as 'Advancement of Knowledge'. Fields which fall into the non-oriented research category include: Mathematical sciences; Physical sciences; Chemical sciences; Earth sciences; Biological sciences; Political science and public policy; Studies in human society; and Behavioral and cognitive sciences' (AVCC 2002: 2). Noting the decline in basic research, the AVCC (2003b; 19) warns that 'without a strong footing in pure basic research, the national innovation system will run out of ideas – or have to import them, at increasing expense, from elsewhere. Secure and substantial investment in basic research is decidedly in the national interest'.

Conclusion

To conclude, the argument in this paper is that there is not one best approach to coordinating and funding university research at the national level. A number of competing demands must be balanced – balance and plurality are the key words. Moreover, while the public good nature of research must be recognised and supported, the fact remains that someone must pay for it. As research becomes more elaborate and

expensive, policies of concentration and selectivity are necessary. With respect to research, government and universities alike must make choices. But the choices must be informed ones – not driven primarily by ideology – and take place within a set of parameters that will sustain the research endeavour in the long-term. In this respect, the AVCC's (2003b: 4) recent advice to government on a follow up package to *Backing Australia's Ability* provides some useful guidelines. The key critical factors for research excellence and innovation listed by the AVCC are:

- A pluralist research funding system that supports a dynamic range of research, with no single body or approach dominating to the detriment of innovation;
- Substantial and increasing investment in universities core research building capacity, based on the quality of each university's performance, that enables each university to pursue its strategic objectives and support national needs;
- Major ongoing investment in research infrastructure;
- Effective incentives for business to commit effectively to research and innovation;
- A commitment to basic research as essential to innovation; and
- A commitment to research that includes all knowledge areas to include the social sciences and humanities (as well as science, engineering and technology).

Australia has no choice but to further develop its national research capacity, a task in which the country's universities have a leading role to play. Government's task is to provide the policy context, including funding, to ensure that the universities continue to provide the innovation base necessary for the nation's economic and social advancement. Higher education contributes to the knowledge factory, but the products of that factory need to be seen in social and cultural as well as economic terms.

Notes

[1] 'HECS revenue is returned to the higher education system via the Higher Education (HECS) Special Account. The Commonwealth contributes the difference between the repayments received and the total HECS payments required to be made to the sector (the latter being total HECS liability minus upfront payments)... For 2002–2003, total student repayments are expected to be $848 million. This comprises $137 million in voluntary repayments and an estimated $710 million repaid via the taxation system. These repayments represent 49 per cent of the total HECS payments required to be made to the sector. The balance of the payments required to be made were funded from a Commonwealth contribution of $870 million. The accumulated HECS debt at 30 June 2003 is estimated to be $9.1 billion' (DEST 2004: 3).

[2] This section is a revision and update of Wood and Meek 2002.

References

Chifley Research Centre *An Agenda for The Knowledge Nation. Report of The Knowledge Nation Taskforce (2001)* Canberra:. http://www.alp.org.au/kn/kn_report_020701.html

Australian Bureau of Statistics (2001) *Research and Experimental Development, Businesses, Australia 1999-2000.* Cat: *8104.0*

Australian Science and Technology Organisation (2001a) Data on Brain Drain and Gains leave Controversy *Incites August http://www.asto.com.au/incites.htm*

Australian Science and Technology Organisation (2001b*)* Government Calls a Halt to Publication of Vital Data on Australian Innovation *Incites June, http://www.asto.com.au/incites.htm*

AVCC (2003a), *Key Statistics on Higher Education: Research.* AVCC, Canberra.

AVCC (2003b), *Advancing Australia's Abilities: Foundations for the Future of Research in Australia.* AVCC, Canberra.

AVCC (2002), 'Major Points from the *ABS release Research and Experimental Development Higher Education Organisations Australia*'. AVCC, Canberra.

AVCC (2000) *'Our Universities: Our Future'*. Support Papers.

Barnett, Ronald (2000), *Realizing the University in an Age of Super-complexity*, SRHE and OUP, Buckingham.

Chubb, I. (2001), *"A Presentation to the National Press Club"*, Sydney, 14 March, 2001.

Chubb, I. (2000) *Our Universities: Our Future.* An AVCC discussion paper. December.

Clark, B. (2000), 'Developing a Career in the Study of Higher Education', in *Higher Education: Handbook of Theory and Research*, ed. John Smart, Vol. xv, Agathon Press, New York.

Dawkins, JD (1987) *Higher Education: a Discussion Paper* (Green Paper*),* Canberra: AGPS.

Dawkins, JD (1988) *Higher Education: a Policy Statement* (White Paper*)* Canberra: AGPS.

DEST (2004), *Higher Education Report for the 2004–2006 Triennium.* DEST, Canberra. (electronic version)

DEST (2003a), *Mapping Australian Science & Innovation – Summary Report.* McMillan Printing Group, Canberra.

DEST (2003b), *Mapping Australian Science & Innovation – Final Report.* McMillan Printing Group, Canberra.

DEST (2003c), *Australian Science and Innovation System: A Statistical Snapshot*, DEST, Canberra.

DEYTA (Department of Education, Training and Youth Affairs) (1998) *Learning for Life: Final Report of the Review of Higher Education Financing and Policy*, (West). Canberra: DETYA.

DEYTA (1999) *Higher Education Report for the 1999 to 2001 Triennium*, Canberra: DETYA.

DEYTA (2000a) *Higher Education Report for the 2000 to 2002 Triennium*, Canberra: DETYA.

DEYTA (2000b) *Research Expenditure 1998: Selected Higher Education Statistics DETYA, 2000.*

DEYTA (2001a) *Staff 2000. Selected Higher Education Statistics 2000.*

DEYTA (2001b) *Students 2000. Selected Higher Education Statistics 2000.*

DEYTA (2001c) *Submission to Senate Employment, Workplace Relations, Small Business and Education Committee Inquiry into the Capacity of Public Universities to Meet Australia's Higher Education Needs.*

DEYTA (2001d) *Higher Education: Report for the 2001 to 2003 Triennium.* Canberra: Commonwealth of Australia.

Department of Industry, Science and TOURISM (1998) *Review of Greater Commercialisation and Self-Funding in the Cooperative Research Centres Programme.* (Mercer, D. and Stocker, J external steering committee). May. Canberra.

Department of Industry, Science and Resources. (2000a) *The Chance to Change*: Discussion Paper by the Chief Scientist (Batterham), Canberra.

Department of Industry, Science and Resources (2000b) *Innovation: Unlocking the Future*, Final Report of the Innovation Summit Implementation Group (Miles) August Canberra.

The Economist. "Inside the Knowledge Factory." 2 October (1997), htpp://www.economist.com.

Gallagher, M. (2000) *The Emergence of Entrepreneurial Public Universities in Australia.* DETYA Higher Education Division Occasional Paper Series 00/E.

Halem, B. (2001) Kemp Attacks UNI Chief's Crisis Claim', *The Australian* August 22, p. 3.

Hayden, Martin. (2003), 'An Australian Perspective on System-Level Strategic Performance Indicators for Higher Education', in Akiyoshi Yonezawa and Frans Kaiser, (eds.), *System-Level and Strategic Indicators for Monitoring Higher Education in the Twenty-First Century*, Bucharest: UNESCO, ch. 25

Howard, J. (2001) *Backing Australia's Ability* Commonwealth of Australia. January.

Information Industries Taskforce (IITF) (1997) *The Global Information Economy - The Way Ahead.* (Goldsworthy Chair).

Jackson, Jim. (2002). 'The Marketing of University Courses under Sections 52 and 53 of the Trade Practices Act 1974 (Cth)' *Southern Cross University Law Review*, Vol.6: 106-132
Institute for Scientific Information (2001). http://sunweb.isinet.com/isi/index.html

Kemp, D. (1999a) *New Knowledge, New Opportunities: A Discussion Paper on Higher Education Research and Research Training.* Canberra: AusInfo.

Kemp, D. (1999b) *Knowledge and Innovation. A Policy Statement on Research and Research Training.* Canberra: AusInfo.

Meek, V.L.(2002), *'Evaluation of Higher Education Programs and Initiatives in Other States and Territories* which may Inform the Development of Policy in Victoria'. Office of Higher Education, Victoria Department of Education and Training, 2002: 1-153.

Mortimer D. (1997) *Going for Growth Business Programs for Investment, Innovation and Export*

Neave, G (2002), 'The Stakeholder Society', in J. File & L. Goedegebuure (eds.) *The Cheps'Inaugurals*; Enschede: CHEPS.

Newman, Frank., Lara. Couturier and Jamie Scurry (2004). *The Academic Marketplace: Preserving Higher Education's Soul in the Age of Competition.* San Francisco: Jossey-Bass, forthcoming.

Phillips, David, Lenore Cooper, Chris Eccles, Deborah Lampard, Geoff Noblett, and Peter Wade (2002). *Independent Study of the Higher Education Review.* Sage 1 Report. Byron Bay, NSW: Phillips Curran, http://www.kpac.biz.

Ramsey, A. (2001) Spaghetti and Meatballs lands Kim in Soup, *Sydney Morning Herald*, July 4.

Review of Business Taxation, A Tax System Redesigned, (1999) (Ralph chair) July. Canberra: Treasury.

Scott, Peter (1997), 'The Changing Role of the University in the Production of New Knowledge', *Tertiary Education and Management*, Vol. 3, No. 1.

Scott, Peter, (ed.) (1998), *The Globalisation of Higher Education, Buckingham*, Open University Press.

Scott, Peter (2003), 'Changing Players in a Knowledge Society'. In G. Breton and M. Lambert (eds.) *Universities and Globalization.* Paris: Unesco: 211-222.

Senate Employment, Workplace Relations, Small Business and Education References Committee (2001) *Universities in Crisis*. 27 September. Commonwealth of Australia

Senate Employment, Workplace Relations, Small Business and Education References Committee (2003). *Hacking Australia's Future: Threats to Institutional Autonomy, Academic Freedom and Student Choice in Australian Higher Education*. Commonwealth of Australian

Stiriling, R. (2001) *Innovation R&D Review*, February, p. 5.

Stocker, J. (1997) *Priority Matters*. A report to the Minister for Science and Technology, on Arrangements for Commonwealth Science and Technology, by the Chief Scientist, Professor John Stocker. Canberra, AGPS.

The Sydney Morning Herald (2004). 22 April.

Wills, P (Chair) (1998) *The Virtuous Cycle: Working Together for Health and Medical Research*, Health and Medical Research Strategic Review, December.

Wills, P. (2001) *The National Investment in Science, Research and Education*. Address to the National Press Club, Canberra. 21 August.

Wood, F.Q and Meek, V.L. (2002), 'Over-reviewed and under-funded? The Evolving Policy Context of Australian Higher Education Research and Development', *Journal of Higher Education Policy and Management*, Vol. 24 (1): 7 - 25.

Wood, F. and Boardman, K (1999) *International Networks and the Competitiveness of Australia's Science and Technology*. Canberra: Australian Academy of Science. http://www.science.org.au/academy/media/intnet.ht

Journal of Educational Planning and Administration
Volume XIX No. 2, April 2005

IASSI QUARTERLY

INDIAN ASSOCIATION OF SOCIAL SCIENCE INSTITUTIONS (IASSI)

(SOCIAL SCIENCE JOURNAL DEVOTED TO ADVANCEMENT OF SOCIETY THROUGH GREATER SOCIAL UNDERSTANDING)

VOL. 22 APRIL-JUNE 2004 NO. 4

Contents

SUBSCRIPTION RATES

For India and SAARC Countries, including postage: Rs.250/- for one year. Single copy Rs. 70/-.

For other countries: US $ 40 per year or equivalent, including postage by surface mail, and US $ 50 by airmal. Single copy US $ 15 by Airmail and US $ 12 by Surface mail.

Enquiries and Correspondence should be addressed to Member-Secretary, Indian Association of Social Science Institutions (IASSI) Room No.97, IIPA Hostel, Indian Institute of Public Administration, Indraprastha Estate, New Delhi-110 002.
(Tel: 2331-5284, 2335 6834, 2332 4581, Fax: 011-2331-5284; E-mail: stiassi@bol.net.in

Journal of Educational Planning and Administration
Volume XIX No. 2, April 2005, pp. 257-277

RESEARCH NOTE

Gender Disparity in Participation and Mathematics Achievement in the 2nd Cycle Primary Education in Addis Ababa, Ethiopia

Tilaye Kassahun*

Abstract

This study was designed to make a comprehensive assessment about gender disparity in primary education participation in Ethiopia, to make a comparative analysis about mathematics achievement for females and males at the upper primary education level and to investigate about existing gender stereotypes in the minds of school children through both objective and subjective data gathering techniques/instruments, applied to 309 boys and 302 girls drawn from 10 schools on the basis of diversified sampling techniques. The collected data was analysed with the help of SPSS 11.0 for Windows. The results of data analyses revealed that both the gross primary enrolment ratio and the net primary enrolment ratio for girls was lower than that of boys at national level but they were more or less the same for Addis Ababa. These enrolment ratios had shown increasing trends over a period of time for both sexes. The Gender Parity Indices were found to be 1.0 for Addis Ababa and 0.7 for the nation as a whole. It was also proved that mathematics achievement was strongly associated with student gender and girls' achievement was significantly lower than that of boys'. It was also evident that traditional stereotypes, which favour male dominance in mathematical ability, were still prevalent at a modest level in the schools studied.

Introduction

It is becoming well recognized and an accepted fact that education is an important instrument for promoting peace and prosperity in a given society. The evidence is also

* Lecturer and senior planning expert at the Ethiopian Civil Service College and Doctoral Research Fellow at Faculty of Management Studies (FMS), University of Delhi.
E-mail: tilayeayen@yahoo.com

clear that the total benefits to education multiply when schools open their doors to both sexes equally. In particular, female education has become one of the most powerful forces that contribute to all-rounded improvement in society's life (Berelson, 1969; Kingdon, 2002). The authors suggest that the benefits of educating women are manifold, ranging from improved productivity, income and economic development on the national level to a better quality of life on the individual life, notably a healthier and better nourished population and greater autonomy among women. Currently, there are also well-documented links between mothers' education and their children's readiness for learning; and between female education and productive self-employment. Simply stated, education of women has a substantial economic and social return to a given country.

Motivated with such benefits of education in general and females' education in particular, the Ethiopian Government, like other governments in the world, has taken a series of measures to promote females' education and to increase overall school enrolment over the past three decades. Particularly, the present Government has demonstrated its keen interest and taken a number of measures to increase the size of school enrolment at various levels. Among these measures, the New Education and Training Policy, inaugurated in 1994 by the Transitional Government of Ethiopia (TGE 1994a), strongly address such an issue. The Policy was devised as a means to confront complex problems that the then education system was entangled with problems such as of relevance, quality, accessibility, equity and medium of instruction (TGE, 1994a: 2). This had led to a dramatic change in objectives and structure of the country's educational system. The overall change in the structure of the education system is from 6+2+4 to 8+2+2. This is to mean that the former 6 years of elementary, 2 years of junior secondary and 4 years of senior secondary schooling system has been changed to 8 years of primary education (Grades 1-4 as 1st cycle and Grades 5-8 as 2nd cycle of primary education), 2 years of general secondary education (Grades 9&10), and 2 years of preparatory secondary education (Grades 11&12) or vocational and technical training offered parallel to it (TGE, 1994b: 14).

Following the issuance of the policy, school enrolments have expanded manifold in which case boys and girls have got more access to schooling than before; new schools have been established and more places have been added to the old ones throughout the country. For example, in the period between 1994/95 and 1998/99, the net enrolment rate at primary level (Grades 1-8) had increased from 20.7 per cent to 47 per cent for boys and from 14.7 per cent to 31.9 per cent for girls (MOE, 1999: 21). The same document attests that the overall primary school enrolment for both sexes had increased from 17.8 per cent to 39.6 per cent in the above-stipulated period, which was an improvement by over 100 per cent from the base time (i.e. 1994/95). What is more, the curricula and syllabi of different subjects have been revised and/or introduced afresh. The Government has also put in place an *Education Sector Development Program (ESDP)* in 1997, by means of which it has stipulated the target of achieving *Universal Primary Education* by the year 2015 (MOE, 2001), which otherwise is called as *Millennium Goal* by the United Nations

(UNESCO, 2004). The New Education and Training Policy, its Strategy and ESPD are all geared towards achieving such a lofty goal.

In spite of such a concerted effort demonstrated by the Government and considerable level of success in opening access to education for a great deal of school-age children in the past 10 years, the country's education sector is still being confronted with a number of daunting challenges, some of which include inaccessibility of schools for a great number of school-age children, a huge level of inequity in educational participation and the multifaceted impediments to female achievements in mathematics and science subjects (MOE, 2001; UNESCO, 2004). This highlights the fact that the country's education system still suffers from glaring gender inequity problem. In this regard, there is a widely shared viewpoint that while legal barriers to achieve gender equity have been more or less scrapped virtually all over the country, there are still a lot of other barriers that prevent the complete attainment of the goal. In particular, there are barriers, which emanate mainly from the minds of people and still prevent girls from going to schools and study mathematics and science subjects comfortably. As a result, a large number of school-age children especially girls still remain out of school and even those who got the opportunity to get access to schooling are not enjoying the privilege of studying science-related subjects which may open their doors to the most luxurious jobs in their future careers.

Further, the day-to-day observation of school records shows that there is a remarkable gender difference in achievements of mathematics and science subjects at various levels of educational setting (MOE, 1999). Substantiating this viewpoint, Assefa (1991) reveals that girls tend to perform lower than boys in mathematics and science subjects. Similarly, Anbessu and Barbara (1988) in their study of primary school performance have pointed out that boys had performed better than girls in quantitative-oriented subjects, while the reverse has been recorded in language subjects. Another achievement study conducted by Genet (1991) discloses that girls had performed very unsatisfactorily in mathematics and science subjects in Ethiopian School Leaving Certificate Examination (ESLCE). And research findings (e.g. Keynes, 1989; Sander, 1985) indicate that mathematics performance differs by sex towards the latter part of primary education.

A number of factors are attributed to such a difference such as parental bias, stereotypes favouring males, mistreatment of teachers and lack of personal confidence in mathematical ability (Fennema & Sherma, 1978; Keynes, 1989). Most girls experience very low self-confidence towards their mathematics learning. Their positive view of mathematics learning deteriorates as they ascend through the hierarchy of schooling. Therefore, construction of such negative images towards girls' mathematics learning adversely affects their performance in the subject. Unless these constraining factors are investigated thoroughly and possible solutions are solicited, all efforts directed towards gender equality may end in vain. Moreover, if they are left unnoticed and/or untreated on timely basis, such obstacles to females' education may seriously hamper the efficiency of the education system as they could bring about a sizeable number of school drop-outs and

repeaters into the system. That is exactly what this research has been designed for. Particularly, the major concern of this research was to conduct a diagnostic survey on the level of gender equity in primary education and on girls' performance in mathematics at the second cycle of primary education in Addis Ababa.

Objectives of the Study

The main purpose of this study was to examine the extent of gender disparity in primary education participation in Ethiopia and in mathematics performance in the second cycle of primary education in Addis Ababa. On the basis of this main objective, the following basic questions have been raised to be answered during data analyses:

1. What is the status of primary education enrolment among boys and girls in Ethiopia?
2. Is there a significant association between student gender and mathematics achievement in the upper primary education in Addis Ababa?
3. Is there a significant difference between boys and girls in their mathematics performance in Addis Ababa?
4. Do boys and girls differ in their attitudes towards mathematics achievement-cum-gender related stereotypes-cum-subject matter preferences in Addis Ababa?

Methodology

Sampling: The study was intended to represent the student population of Addis Ababa, especially those students who were attending in the upper primary schools (i.e. Grades 5-8) in the year 2001. At the time of data collection, there were 89,042 boys and 100,484 girls registered to attend upper primary schooling (Grades 5-8) in Addis Ababa. In this study, 611 students (309 boys & 302 girls) were selected as sample. The subjects were drawn from Grade 6 based on stratified random sampling and judgemental sampling techniques. The samples were drawn from five government and five non-government schools, which were co-educational (See Table 1). In terms of age, about 51.3 per cent of the respondents were under 13 years old, 43.9 per cent of them were in the range of 13 and 15 years inclusive, and the remaining 4.8 per cent were of more than 15 years of age.

Instruments and Measurement of Variables: In this study, the researcher employed both objective and subjective instruments of data collection. To maintain the *objectivity* of the data collection, he used standardized mathematics test and documentary analyses. The test was developed and refined in different stages by a team of experts (For details of *Standardization of the Test*, refer to Appendix).

TABLE 1
Sample Distributions by School

School Name	*School Ownership**	*No. of Sections Taken*	*No. of Students*	*Respondents in (%)*
Ras Abebe Aregay	NGS	1	70	11.5
Medhane Alem	GS	1	54	8.8
Betelihem	NGS	1	65	10.6
Meskerm 2	GS	1	59	9.7
New Era	NGS	1	68	11.1
Arbegnoch	GS	1	57	9.3
Belay Zeleke No. 2	GS	1	63	10.3
J.F. Kennedy No. 2	NGS	1	61	10.0
Menelik II	GS	1	50	8.2
Africa Andinet No. 1	NGS	1	64	10.2
Total		10	611	100.0

* GS stands for "Government school", while NGS stands for" Non-Government school."

The final version of the test, constituting forty items, was administered to the subjects at appropriate time. The test papers were corrected by a group of experts with a help of appropriate software. To facilitate the ease of understanding for the analyses and to have a clear picture about the extent of relationship between the two constructs (viz., gender and mathematics achievement), a two-stage coding scheme was established. In the first stage, each individual's score out of 40 questions was transformed into 100 using appropriate formula. In the second stage, the old coding scheme was improved by recoding the original score out of 100 per cent. At this stage, a *four-level performance coding system* was created in reference to each individual's total score out of 100 per cent: *Poor (< 25%), Low (25-49%), Medium (50-74%), and High (>74%).*

In addition, the study had also used questionnaire to gather the opinions of the same students pertaining to different aspects of schooling as part and parcel of *subjective* data collection technique. The questionnaire items focused on demographics of the students, their attitudes towards their teachers, mathematics and other subjects, household responsibilities and parental support. The items were adapted from the earlier works of the researcher (Tilaye, 1997). The items were selected from the scale that showed a high level of reliability coefficient ($\alpha = 0.88$). Further, a team of four experts from National Organization for Examinations (NOE) had evaluated and recommended the validity of these items for the study of the problem under consideration. What is more, the study had employed documentary analyses to gather the right information from relevant sources (viz., Ministry of Education, Addis Ababa Education Bureau, and schools).

Methods of Data Analysis: The collected data have been analysed with the help of SPSS 11.0 for Windows. This was used to produce the following results: (1) Descriptive statistics (e.g. mean, standard deviation, percentages) of basic information and

distribution of scores. Each individual's score out of 40 items was later transformed into percentage point based on appropriate formula so as to facilitate an easy understanding of the level of mathematics achievement by gender and school type. Further, the attitudes of pupils towards parental support, their ability and confidence in mathematics, teachers' treatment of students, and level of subject preference were described in terms of percentage. (2) The Chi-square was computed to check whether there was association between mathematics achievement and gender. (3) Finally, t-test was conducted to assert whether the observed mean score difference between sexes was significant or not. The appropriateness of these statistical techniques for a study like this has been highlighted by a number of behavioural scientists (e.g. Babbie & Halley; Shavelson, 1981).

Results and Discussions

In this study, a total of 611 Grade 6 students (309 males and 302 females) participated as the subjects of the study. The results of achievement test, the responses of the students and results of documentary scrutiny have been analysed and interpreted. Following are the findings and discussions with respect to the variables of this study. For the sake of convenience, Tables have been put in the Appendix section (refer to Appendix B).

Selected Indicators of Education System at National and Regional Levels

Education indicators play an important role in providing a clear picture about the performance of an educational system in a given country or region. These parameters highlight the tangible changes that have occurred over a period of time as a result of some policy interventions and by the activities of the government and other stakeholders. The indicators can be used as important sources of information for policy-makers, planners, researchers and other stakeholders to make appropriate decisions and take appropriate action for correcting educational problems.

In this study, an attempt has been made to assess the status of some of the critical indicators in the Ethiopian education system in order to have a glimpse of information about the achievement of the present government over its tenure, as shown under.

Gross Enrolment Ratio at Primary Level (Grades 1-8): This is one of the most widely used indicators of education coverage. It refers to *the proportion of total number of pupils (irrespective of their age) in primary schools expressed as a percentage of the corresponding school age population in the country.* The normal age for primary school enrolment in Ethiopia ranges from *seven* to *fourteen*. Gross enrolment ratio (GER), as a crude measure of education coverage, comprises under-aged and over-aged children apart from the normal cohort of school-aged children for a given level of education. As a result, it may attain the proportion reaching more than 100 per cent.

As can be seen from Table 2, the GER at primary level had increased from 43 per cent to 67.3 per cent for boys, from 26 per cent to 47 per cent for girls, and from 34.7 per cent to 57.4 per cent for both sexes combined during the period from 1996/97 to 2000/01. A closer look at the figures in the Table shows that the GER had increased by about 56.5

per cent for boys, 80.8 per cent for girls, and 65.5 per cent for both sexes in the period ranging from 1996/97 to 2000/01. The primary enrolment had shown an increasing trend during each subsequent year for both the sexes.

TABLE 2
National Gross Primary Enrolment Ratios by Gender (Grades 1-8)

Year	*Boys*	*Girls*	*Both*
1996/97	43.0	26.0	34.7
1997/98	52.0	31.2	41.8
1998/99	55.9	35.3	45.8
1999/00	60.9	40.7	51.0
2000/01	67.3	47.0	57.4

Source: MOE, Education Statistics Annual Abstract, Addis Ababa, 2001, p. 24

Net Enrolment Ratio at Primary Level: The net enrolment ratio (NER) is the best way of measuring education participation rate and is a more refined indicator of coverage in terms of explaining the proportion of pupils enrolled from a specific group (MOE, 2001: 5). *The net enrolment ratio (NER) can be defined as the ratio of total number of primary school students who are in the official age bracket for the level to the total number of children in this age bracket in the country.* In the Ethiopian case, this can be defined by the formula: the number of primary school pupils in the age range of 7-14 divided by the total population of children in the country within the age range 7-14 multiplied by 100. NER is usually lower than GER as it excludes over-aged and under-aged students but uses the same denominator as GER.

Table 3 depicts that the NER had also shown an increasing trend in the level of net enrolment among primary school children as was the case for GER. The NER for the year 2000/01 was estimated to be 55.7 per cent for boys, 41.7 per cent for girls and 48.8 per cent for both sexes combined. This is an increase by about 72.5 per cent for boys, 94 per cent for girls and 80.7 per cent for both sexes combined from the base year, i.e. 1996/97 (see Table 3).

TABLE 3
National Net Primary Enrolment Ratios by Gender (Grades 1-8)

Year	*Boys*	*Girls*	*Both*
1996/97	32.3	21.5	27.0
1997/98	43.4	28.0	35.8
1998/99	47.0	31.9	39.6
1999/00	NA	NA	NA
2000/01	55.7	41.7	48.8

Source: MOE, Education Statistics Annual Abstract, Addis Ababa, 2001, p. 23.
MOE, Indicators of the Ethiopian Education System, Addis Ababa, 1999, p. 21.
Relevant data were not available for 1999/2000.

Both the GER data and the NER data had indicated that primary school intake in the country has increased tremendously over the years. The level of intake increase was found to be higher for girls than for boys over a period of time. This shows that the Government might have given due consideration for improving access to primary education for school-aged children in general and to female children in particular. Such a trend may take the Government to fulfil its dream plan, which is attaining *Universal Primary Education* by the year 2015 as enunciated in its *Education Sector Development Program,* which came to limelight in 1997. Although the country's education participation is still far behind the level reached by other developing countries like India, the recent trend shows that the stipulated goal may be achieved if all things go smoothly as expected. This requires a concerted effort not only by the Government but also by all concerned members of the society.

According to UNESCO Institute for Statistics (2004), the primary school net enrolment ratio (both sexes) in India happened to be about 97 per cent in 1998/99, and 76 per cent in 1999/00 and 2000/01 each. This shows that Ethiopia has to go aggressively to make up to the level achieved by India and other progressive developing countries. These countries have approached more closely to the level of Universal Primary Education, which they promised to achieve by the year 2015 and which was set as the *Millennium Goal* by the UN general assembly in 2000.

Gender Disparity in Primary Level: The direction of gender disparity in primary enrolment can be indicated using *Gender Parity Index (GPI).* GPI is the ratio of female to male enrolment ratios (MOE, 2001: 8). In a situation of perfect equality between boys and girls, the value of GPI is 1, and 0 in case of highest disparity. It is usually computed based on gross enrolment ratio data.

As can be observed from Table 4, the GPI ranges from 0.5 to 1.0 in the country. Out of the 11 regional states in the country, the highest GPI has been attained by the country's capital city, while the least has been recorded in the Somali regional state. The country's overall GPI was found to be 0.7, which indicates that girls' participation in primary education is still lower than that of boys. This holds true for all regional states, except Addis Ababa whose GPI indicates more or less perfect equality of gender participation in primary education. All in all, six regions (viz., Addis Ababa, Tigray, Amhara, Afar, Dire Dawa, and Harari) had achieved gender disparity levels lower than the national average, while the remaining regions had shown the rate higher than the national average. The latter group of regions are required to make a great deal of effort in order to close the gap between males and females participation at primary education.

Repetition Rate in the Upper Primary Education (Grades 5-8): This is also another important indicator, which measures the proportion of students who remained in the same grade over one year and have used more resources for that grade. Repeating students tend to use more resources allocated to the school than those who pass to the next grade in one year. They also deny access for other interested and capable students when a school has

limited facilities or resources. This severely affects the internal efficiency of the country's education system.

TABLE 4
Gross Primary Enrolment Ratios and Gender Parity Index by Region (2000/01)

Region	Gross Enrolment Ratios			GPI
	Boys	*Girls*	*Both*	
Tigray	75.9	71.8	73.9	0.9
Afar	12.7	9.8	11.5	0.8
Amhara	56.9	49.7	53.3	0.9
Oromiya	73.5	42.1	57.9	0.6
Somali	13.4	7.2	10.6	0.5
Benshangul Gumuz	112.7	63.3	88.5	0.6
SNNPR	80.	46.	63.8	0.6
Gambella	117.1	73.0	95.8	0.6
Harari	120.8	89.1	105.3	0.7
Addis Ababa	118.0	118.5	118.3	1.0
Dire Dawa	84.1	67.1	75.7	0.8
Total	67.3	47.0	57.4	0.7

Source: MOE, Education Statistics Annual Abstract, Addis Ababa, 2001, p. 22

Table 5 depicts that the second cycle of primary education suffers from a considerable level of wastage due to repetition in the cycle. A hard look at the data in the Table indicates that females' repetition rate was consistently (in all grade levels) higher than males' for the nation as a whole. The results held true for Addis Ababa too, except in Grade 6. During the year, the incidence of highest rate of repetition had occurred in Grade 8, while the least had occurred in Grade 6. The degree of gender gap in repetition rate was also found to be highest in Grade 8 in which the number of female repeaters had increased substantially. Repetition was also found to be second highest (16% for boys and 18.3% for girls in Addis Ababa; 15.6% for girls and 22.3% for girls in the nation) in Grade 7.

TABLE 5
Repetition Rate in the Upper Primary Education in Addis Ababa and Ethiopia (2000/01)

Grade	Addis Ababa		Ethiopia	
	Boys	*Girls*	*Boys*	*Girls*
5	10.9	11.9	17.6	20.7
6	7.2	7.1	9.7	11.2
7	16.0	18.3	15.6	22.3
8	18.8	23.1	20.1	26.1
Total	13.2	15.2	15.3	20.2

Source: MOE, Education Statistics Annual Abstract, Addis Ababa, 2001, pp. 45, 58.

Relationship between Gender and Mathematics Achievement

As stated earlier, one of the main purposes of the present study was to examine the degree of relationship between gender and mathematics performance. To facilitate the ease of understanding for the analyses and to have a clear picture about the extent of relationship between the two constructs, the coding scheme for the test results was improved by recoding the original score out of 100 per cent. To this end, a four-level performance coding system was created in reference to each individual's total score out of 100 per cent: **Poor, Low, Medium** and **High** level of performance. This was done, based on the following formula:

- **Poor** when an individual's total score is below 25 per cent;
- **Low** when an individual's total score has fallen in the category of 25-49 per cent;
- **Medium** when an individual's total score is bound to be in the range of 50 and 74 per cent inclusive; and
- **High** when an individual's total score is bound to be in the range of 75 and 100 per cent inclusive. The results of the computation as per the above formula have been summarized in Table 6 below.

It is evident from Table 6 that about 4.9 per cent of boys and 10.9 per cent of girls had scored below 25 per cent and fallen under the category of 'poor' scorers. Similarly, about 48.2 per cent of boys and 56.0 per cent of girls were bound to fall under 'low' performers, about 30.1 per cent of boys and 24.8 per cent of girls had achieved 'average' level of performance, while 16.8 per cent of boys and 8.3 per cent of girls had achieved a 'high' level of performance in mathematics test. A closer look into the distribution of the achievement score indicates that about 66.9 per cent of girls had achieved below the desired national average score (i.e. 50%). The minimum and maximum scores of girls were 11 per cent and 94 per cent respectively. For boys, the minimum score was 8 per cent, while the maximum was 97 per cent. With regard to score dispersion, it was higher for boys' group (20.1%) than females' group (18.4%). The overall average score for the sample boys was 51.2 per cent, while it was 43.6 per cent for the girls. The computed chi-square ($\chi 2 = 19.33$, $p < .001$) shows that the levels of mathematics achievement and student gender were not independent. Instead, the results in the Table show that *there was a significant association between student gender and the level of mathematics performance*. In other words, the results of the analysis indicate that *mathematics performance was significantly related with a student's gender background, i.e. being a male or a female.*

Once the association between mathematics achievement and student's gender was ascertained, the data was further analysed with student t-test in order to assert whether the observed difference between the means of the two groups (viz., 51.2% for boys and 43.6 for girls) in mathematics achievements was significant enough. This analysis resulted in the t value of 4.89 with 609 degrees of freedom, which was found to be significant at the confidence level of 99.9 per cent. The gender gap observed between male and female achievements was 7.6 per cent, which could be considered high enough to explain the

difference between the sexes in mathematics achievement at the 6th grade level. Thus, the results indicated that *girls had once again scored significantly lower than their counterpart-boys in Grade 6 mathematics achievement test.* A hard look at Table 6 shows that the number of girls who scored "Poor" (below 25%) was more than double the size of boys who scored the same. However, the size of girls who scored a "High" grade (75% and above) was less than half the size of boys who scored the same.

TABLE 6
Level of Mathematics Achievement by Gender

Gender	Level of Achievement				N	Min (%)	Max (%)	Mean (%)	Std. Dev	$\chi 2$ (d.f =3)
	Poor	*Low*	*Med.*	*High*						
Male	15	149	93	52	309	8	97	51.2	20.1	
Female	33	169	75	25	302	11	94	43.6	18.4	19.33*
Total	48	318	168	77	611	8	97	47.4	19.6	

*P< 0.001

The results of the present study supported the findings of previous researchers (e.g., Assefa, 1991; FAWE, 1997; Genet, 1991; Seyoum, 1986). For example, a study conducted by Hilton and Berglund (1974) revealed that an individual's sex had appeared as one of the most powerful predictors of achievement differences among school children in mathematics. Similarly, a study conducted by FAWE (1997) revealed that a significant gender difference was observed in mathematics achievements in favour of boys. Hilton and Berglund (1974) in their study of primary school performance found out that girls performed worse than boys in all sample schools they had considered for their study.

Thus, the results of the present study once again confirmed the rhetoric that *there is a remarkable gender difference in the achievement of mathematics and girls tend to lag behind their counterpart boys in their mathematics performance.* However, the persistence of such results might discourage girls' success in schooling and lead them to boycott or discontinue further studies that involve mathematics. In connection to this viewpoint, Rosser (1995) reported that by far more girls than boys tend to quit secondary -school mathematics prematurely. This had severely crippled their (drop-out girls') adult lives as mathematics is often considered as a gate-keeping course for controlling access to the most lucrative professions, such as science, engineering and others. In this regard, it is not uncommon to observe in the world of work that many individuals, mainly women, are removed from the pipeline of recruitment for these professions due to their lack of ability and/or low performance in quantitative courses.

Students' Attitudes Towards Females' Mathematics Performance

Feminist researchers have forwarded a variety of explanations for female under-achievement in mathematics. Generally speaking, differences in achievement of girls and boys emanate from the interplay of personal, social, cultural, and institutional factors

(e.g., FAWE, 1997; Fuller, 1987; Genet, 1991; Keynes, 1989; Rosser, 1995; UNESCO, 1984). For example, Keynes (1989) reported that differential expectations of parents, school teachers, guidance counsellors, peers and community as a whole in a patriarchical society for students' performance in quantitative subjects, which favours males, plays a detrimental role in girls' performance in mathematics. Further, research has also succeeded in proving that, more often than not, majority of girls do not show interest in learning mathematics as they think it is a masculine subject (Fox, 1981). Research has documented that girls happened to be less confident in school mathematics ability than boys. Their confidence even deteriorates as they climb up the ladder of schooling (Fox, 1981). However, educational researchers (e.g., Brimer & Pauli, 1971) contend that lack of *self-confidence* in a given subject curtails one's effort and seriously hampers the person's achievement in the subject.

In this study, an attempt was made to assess the attitudes of students towards girls' achievement in mathematics and a host of other related views. These have been summarized in the sections that follow.

Parent's attitudes towards females' education: The available literature abounds that parent's preference to their sons' success and more support to them influences daughters' school performance in general and mathematics achievement in particular (FAWE, 1997; Genet, 1991; Seyoum, 1986). In relation to this viewpoint, the subjects of this study were requested to furnish their views pertaining to their parent's preference to schooling of their children. The results have been summarized in Table 7.

It is evident from Table 7 that an overwhelming majority of boys and girls agreed that both of their parents (guardians) did not show any favour for sons against daughters or vice versa when it comes to their schooling. More specifically, about 84.5 per cent of boys and 86.2 per cent of girls responded that their fathers (male guardians) had encouraged all of their children, irrespective of their sex, to pursue their study and perform well in schooling. Similarly, about 85.6 per cent of boys and 84.6 per cent of girls viewed that their mothers (female guardians) had shown equal interest in their sons and daughters' education.

From the remaining few respondents, about 7.2 per cent of them believe that fathers favour sons' education more than daughters', while 7.4 per cent believe to the contrary (i.e. fathers favour and encourage the education of their daughters more than their sons). When it comes to mothers' preference, about 6.5 per cent of the combined respondents agree that mothers tend to show more preference for their sons' education than that of their daughters', while about 8.3 per cent of the respondents opined that mothers give more preference for their daughters' education and high performance to their sons'. The results of this study revealed a very important finding leading to the conclusion that *girls in Addis Ababa seem to get either equal or more encouragement and support from their parents as compared to boys.* This indicates that there might be change of attitudes among parents towards their daughters' role in the society. These might have happened because of aggressive campaigns by the Government against gender stereotypes favouring male dominance in social institutions like schools and other organizations. It is

also likely that a relentless effort among women activists and viable government policy might have changed the attitudes of people towards women in the country. What is more, the fact that the samples were drawn from the Capital City whose parents were likely to be better educated and gender-conscious might have contributed to preferential treatment of girls to boys in schooling matters. Future research must address these issues in detail so that the effect of each and every factor on girls' school performance can be clearly identified.

TABLE 7
Parental Affiliations towards Children's Education

Parental Status	Respondents	Among their children parents encourage to pursue more and achieve high:			
		Sons	*Daughters*	*Both Sexes*	*Total*
Father (Male guardian)	Boys (%)	8.5	7.0	84.5	100
	Girls (%)	5.7	8.1	86.2	100
	Both (%)	7.2	7.4	85.4	100
Mother (Female guardian)	Boys (%)	7.2	7.2	85.6	100
	Girls (%)	6.1	9.3	84.6	100
	Both (%)	6.5	8.3	85.2	100

Household responsibilities of school children: Learning mathematics requires a lot of time and energy as a student is required to do lot of exercises from time to time. However, if the student is excessively engaged in household chores and other responsibilities, she or he may perform badly in the subject. In this study, an attempt has been made to assess the level of household burden the subjects of this study were carrying apart from their school works. Table 8 summarizes the results of the analysis.

As can be discerned from the Table, both boys and girls were participating in domestic works after their school. The results indicated that about 31.4 per cent of the girls and 25.2 per cent of boys reported as they used to participate "Always" in household works, while 52.6 per cent of the girls and 56.4 per cent of boys reported they were participating only "Sometimes." A closer look at Table 8 shows that, all in all, about 84 per cent of girls and 81.6 per cent of boys reported that they were working at home after or before their school time regularly or occasionally. This implies that an overwhelming majority of both sexes had domestic responsibilities, which shared the time of their school works.

With regard to the length of time the students spend on working household tasks, about 64.4 per cent of boys and 57.8 per cent of girls reported that they were demanded to work up to 3 hours a day. About 26.8 per cent of boys and 24.1 per cent of girls described that they were required to spend from 4 to 8 hours of their time to work for domestic affairs. Further, about 8.6 per cent of the boys and 18.2 per cent of the girls reported that they were asked to spend more than 9 hours of their time to undertake household duties on daily basis. The latter part of the analysis indicates that *girls were*

asked to spend more time on domestic chores than their counterparts (boys). This implies that more girls had to sacrifice their time doing domestic activities, which otherwise they could have used to work on schooling activities. Thus, such out-of school tasks might have contributed to the girls' low performance in mathematics achievement test.

TABLE 8
Household Responsibilities of Students

Item	Response	Respondents (in %)		
		Boys	*Girls*	*Both*
The frequency of students' participation in domestic chores (works)	Always	25.2	31.4	28.3
	Sometimes	56.4	52.6	54.5
	Never	18.5	16.0	17.8
	Total	100	100	100
Daily working hours	1-3 hrs	64.4	57.8	61.2
	4-6 hrs	16.3	13.6	15.0
	7-9 hrs	10.5	10.5	10.5
	Above 9 hrs	8.6	18.2	13.4
	Total	100	100	100

Teachers' treatment of individual students: Another critical factor, which was found to obstruct girls' achievement in mathematics, is teachers' bias in favour of boys in classrooms (e.g., UNESCO, 1984). By observing the classroom interaction between teachers and students, Robinson (1992) found that most teachers knowingly or unknowingly tended to organize classroom discussions to accommodate male learning patterns by disregarding females' interest. Similarly, after having extensive observation of teachers' interaction in classes in France, Loudet-Verdier and Mosconi (1995) reported that teachers tend to have more- and longer-interaction with boys than with girls. They further witnessed that girls were asked simpler questions than boys. These characteristics were even more accentuated in mathematics and science courses. Moreover, UNESCO (1984:23), after going through the experiences of different countries' teachers at schools, has concluded: (1) teachers spent more time talking to males and allow male students to talk more than females in classrooms; (2) girls had to wait longer for answer or assistance; (3) teachers knew a great deal more about the boys they teach; (4) teachers prefer to introduce topics which are usually associated with males; (5) majority of teachers prefer to teach boys, even though more stated, it was easier to teach girls; and (6) teachers had different expectations for males and females. This is believed to inhibit girls' ability to successfully learn mathematics.

This study has tried to examine the opinions of students' towards their teachers' level of gender-sensitivity in classrooms. A close look at Table 9 depicts that about 28 per cent of boys and 30.6 per cent of girls believed that most mathematics teachers were biased against girls in their classroom activities. On the other hand, about 30.5 per cent of the

boys and 26.3 per cent of the girls reported that their mathematics teachers were in favour of girls in their classroom activities. A sizeable number of boys (41.5%) and girls (43.1%) reported that their mathematics teachers were gender-neutral in their acts in classrooms. When the aggregate data were closely scrutinized, an overwhelming majority (57.8%) of students believe that their mathematics teachers were gender-sensitive in their classroom actions such as asking questions, giving related examples, recognizing students' efforts, etc. Of these, about 29.2 per cent of the respondents believe their teachers favour boys than girls, while 28.6 per cent of the respondents believe that their mathematics teachers used to favour girls more than boys. Thus, *it can be generalized that most mathematics teachers in the sample schools seemed to be gender-sensitive in which a slim majority of them favour boys than girls in their classroom activities.* However, the reliance of teachers on teaching methods that emphasize male dominance can create a 'chilly climate' for girls, which may lead to their (girls') under-achievement in mathematics.

TABLE 9
Students' Attitudes towards Teachers' Treatment of Students

Item	Responses	Respondents (in %)		
		Boys	*Girls*	*Both*
Most mathematics teachers in classrooms often:	Favour males	28.0	30.6	29.2
	Favour females	30.5	26.3	28.6
	Treat both sexes equally	41.5	43.1	42.2
	Total	100	100	100

Students' attitudes towards females' mathematics performance: Research over the last few decades has shown that girls' performance in quantitative-oriented subjects was seriously affected by gender stereotypes. Traditionally, mathematics is believed to be a masculine subject (or males' domain) and girls often find advanced mathematics achievement as elusive. Historically, the adage "mathematics is not for girls" and the belief that girls should not reveal their intelligence lest it should compromise their sexual desirability (and, thus, their social role as wife/mother) to have obstructed girls' achievement and interest in advanced mathematics. In addition, females seem to believe that mathematics has limited utility in their lives and it is unconnected to their mode of thinking (Fennema & Sherman, 1978). The attitudes of male students, teachers, relatives, and society in general reinforce girls' low self-efficacy in mathematical ability. In this regard, the present researcher was eager to assess the opinions of school children towards girls' achievement in mathematics, as he was very interested in knowing the level of gender stereotypes prevalent in the minds of school children in Addis Ababa. The results summarized in Table 10.

Indicate that an overwhelming majority of primary school students (58.3% of boys & 59.1% of girls) did not believe in the stereotypic views that biological difference in human beings is somehow reflected in mathematics achievement, which puts males in

favourable condition. On the other hand, there were some (28.3% boys & 28.7% girls) students who still believe that the biological differences between male and female gender can also bring about differences in mathematics performance between the two sexes. These students held the viewpoint that males are naturally superior to females in mathematics ability. This implies that *traditional stereotypic views pertaining to human academic performance in favour of males still have not lost the ground in the minds of the upper primary school students of Addis Ababa.* This might have been reinforced by the attitudes of children's immediate relatives and friends, teachers and other conservative (orthodoxy) groups in the society.

In its comparative analysis attempt, this study had further sought for the views of the students pertaining to the performance of girls in mathematics against boys. Once again, the results indicated in Table 10 reveal that about 40.8 per cent boys and 42.9 per cent girls seem to believe that the performances of both boys and girls in mathematics were more or less equal. Further, the results in the Table indicate that about 26.1 per cent of boys and 26.0 per cent of girls believe that girls perform either higher than or very higher than boys in mathematics. On the other hand, the second majority of both sexes (33.3% of boys and 31.1% girls) believe that girls perform either lower or very lower than boys in mathematics at the same level of educational system under equivalent circumstances.

TABLE 10
Students' Attitudes towards Females' Mathematics Performance

Item	Response	Respondents (in %)		
		Boys	*Girls*	*Both*
Biological difference in sex brings about difference in mathematics achievement.	Agree	28.3	28.7	28.5
	Disagree	58.3	59.1	58.7
	No idea	13.4	12.2	12.8
	Total	100	100	100
Female students' mathematics performance as compared to male students' mathematics performance is:	Very high	14	13.4	13.7
	High	12.1	12.6	12.4
	Same	40.8	42.9	41.8
	Low	24.2	23.4	23.8
	Very low	9.1	7.7	8.4
	Total	100	100	100
Which is the most preferred subject of study for you?	Mathematics	23.5	13.7	18.6
	General Science	30.6	42.4	36.5
	English	29.5	31.0	30.2
	Social Science	16.4	12.9	14.7
	Total	100	100	100

When the students were requested to choose the best subject out of four subjects they had to study for their future career (see Table 10), the findings revealed that only 13.7 per cent of girls opted for mathematics, while 23.5 per cent of boys opted for the same. In this regard, the most preferred subject for both sexes (30.6% boys and 42.4% girls) happened to be General Science. As a whole, the orders of the choices of the two sex groups were identical by which General Science, English, Mathematics and Social Science had occupied in descending order of priority of their choices, albeit the prevalence of huge disparities in respondent distribution by gender with respect to each subject. *The bottom-line of this analysis is that more girls than boys seem to show less interest in studying mathematics at the upper primary educational level.*

The findings of the present study were in concurrence with the findings of previous researchers (e.g., Assefa, 1991; Genet, 1991; Seyoum, 1986). These researchers invariably reported that the patriarchic or orthodoxy nature of Ethiopian society had contributed its share for the persistence of gender-related stereotypes in the country. These stereotypic views largely favour males against females and cause more harm on females than males in their roles in the society. The outcome has been even very devastating to girls' performance in mathematics and other quantitative subjects.

Conclusion

The main purpose of this study was to investigate the extent of gender disparity in enrolment and mathematics performance among the upper primary school students of Addis Ababa and bring about the prevailing traditional gender-related stereotypes into perspective. To achieve this broad objective, the study involved 611 sixth grade students drawn from 10 schools on the basis of diversified sampling techniques. The study had employed standardized mathematics achievement test, questionnaire and documentary analysis as data gathering tools. The collected data were analysed with the help of SPSS 11.0 for Windows. The results of data analyses revealed that both the *gross primary enrolment ratio* and the *net primary enrolment ratio* for girls were lower than that of boys at national level but they were more or less the same for Addis Ababa. These enrolment ratios had shown increasing trends over a period of time for both the sexes. The *Gender Parity Indices* were found to be 1.0 for Addis Ababa and 0.7 for the nation as a whole. Further, the repetition rate for females was higher than that of boys in the upper primary schools of Addis Ababa. It was also evident that there was a significant degree of association between student gender and mathematics achievement ($\chi 2 = 19.33$, $p < .001$). The average score for the girls was found to be 43.6 per cent, while it was 51.2 per cent for the boys, which caused the creation of a significant gender gap of 7.6 per cent with girls scoring lower than boys $t_{609} = 4.89$, $p < 0.001$).

When students' opinions pertaining to selected gender stereotypes favouring males were probed, the results indicated that most students appeared to believe theoretically in the equality of the two sexes in mathematics performance. Specifically, about 85 per cent of the students (both sexes combined) reported that their parents did support and encourage their children, irrespective of their gender, to pursue further and achieve high

in their studies, although a few of them tended to favour either of them (e.g., fathers for sons and mothers for daughters). Both boys and girls were mostly involved in household chores at considerable level with girls' weight of domestic workload being slightly heavier than boys'. About 57.8 per cent of students believe that their mathematics teachers were gender sensitive in their classroom behaviours with slight majority favouring boys. A great majority of sample students opined that they did not believe that difference in mathematics achievement was attributed to biological difference in sex although there were significant proportions of students who believe that difference in mathematics ability might be inherent in biological difference between sexes favouring males. In connection with this, about 40.8 per cent boys and 42.9 per cent girls believe that girls can perform as equally as boys in mathematics under similar circumstances, while about 33.3 per cent of boys and 31.1 per cent of girls believe that girls often perform 'lower' or 'very lower' than boys in mathematics if they are put under the same circumstances. The findings also revealed that mathematics was neither the first nor the least subject of choice for both girls and boys to study on. Only 13.7 per cent of girls had chosen mathematics as the priority subject of study for their future career, while 23.5 per cent of boys chose the same. The most preferred subject for both sexes happened to be general science while the least appeared to be social science.

In closing, this study has highlighted important findings, which can serve as key indictors for practical measures taken by the concerned authorities. On the basis of the findings, it was recommended that the Government and concerned agencies should push hard for sensitising people on issues of gender equity and importance of females' education. The Government should enforce laws against any gender inequity and stereotypes in the academic front. Taking these actions will contribute to the achievement of the *Millennium Goal*, which is attaining *Universal Primary Education* by the year 2015. It is also of interest to note that the responsible bodies should strive to address the problem of female under-achievement in mathematics and other quantitative subjects by devising viable community-based intervention mechanisms. Particularly, schools should provide a pleasant school environment, improved services, promote problem-solving skills, create collaborative experiences, use hands-on learning, allow for open discussions about gender stereotypes and directly attack the causes of female harassment and sources of sex-stereotypes by conducting rigorous research on the field. Besides, the educational leaders in different levels should try to discuss the matter with the students' parents and sensitise them on the importance of mathematics learning for their female children's future.

Finally, the viability of the present findings should be tested in a more comprehensive study. Future research might embrace elementary, secondary and tertiary levels in urban and rural settings.

References

Anbessu Biazen, and J. Barbara (1988) Problems in Primary School Participation and Performance in Bahir Dar Awraja, *Unpublished Research Report,* UNICEF/MOE.

Anderson, M.B. (1992) *Education for All-What Are We Waiting For*? New York: UNICEF

Assefa Beyene (1992) Female Participation and Performance in Rural Primary Schools of Ethiopia, *Unpublished Research Report,* ICDR.

Babbie, E., and F. Halley (1998) *Adventures in Social Research: Data Analysis Using SPSS for Windows 95,* Thousand Oaks: Pine Forge Press.

Berelson, B. (1969) Beyond family planning, *Studies in Family Planning*, 38: 1-16.

Brimer, M.A, and L. Pauli (1971) *Wastage in Education*, Switzerland: UNESCO, IBE.

Cammish, N.K., and C. Brock (1994) State, Status and the Status Quo: Factors Affecting the Education of Girls, *International Journal of Educational Development*, 14(3).

FAWE (1997) Female Education in Mathematics and Science in Africa, *Unpublished Research Report,* Nairobi.

Fennema, E. and J. Sherman (1977) Sex-related Differences in Mathematics Achievement, Spatial Visualization and Effective Factors, *American Educational Research Journal,* 14(7).

_____ (1978) Sex-related differences in mathematics achievement and related factors, *A Further Study Journal for Research in Mathematics Education, 9(4).*

Fox, L.H (1981) *The Problem of Women and Mathematics*, New York: Ford Foundation.

Gennet Zewdie (1991) Women in Primary and Secondary Education, *Gender Issues in Ethiopia,* Addis Ababa: IES

Hilton, T. L. and G. W. Berglund (1974) Sex Differences in Mathematics Achievement, A Longitudinal Study, *The Journal of Educational Research*, 67(3)

Kelly, A (1985) The Construction of Masculine Science, *British Journal of Sociology of Education,* 6 (2): 133-145.

Keynes, H.B.(1989) *Recruiting Girls for a More Successful Equation*, Project Report, University of Minnesota Institute of Technology, Spring.

Kingdon, G.G. (2002) The Gender Gap in Educational Attainment in India: How Much Can Be Explained? *The Journal of Development Studies,* 39(2): 25-53.

Loudet-Verdier, J., & N. Mosconi (1995) Interaction Between Teachers and Dtudents (girls or boys) in Mathematics Classes, in R. Clair (ed.) *The Scientific Education of Girls: Education Beyond Reproach?* Paris: UNESCO Publishing, pp. 139-148.

MOE (1999) *Indicators of the Ethiopian Education System*, Addis Ababa: Ministry of Education.

_____ (2001) *Education Statistics Annual Abstract 2000/01*, Addis Ababa: Ministry of Education.

Robinson, K.H. (1992) Classroom Discipline: Power, Resistance and Gender, A Look at Teacher Perspective, *Gender and Education*, 4(3): 273-287.

Rosser, S.V. (1995) U.S. Women in Science and Feminist Theories, in R. Clair (ed.) *The Scientific Education of Girls: Education Beyond Reproach?* Paris: UNESCO Publishing, pp. 103-117.

Sanders, J. (1985) Making the Computer Neuter, *The Computing Teacher*, April, pp.23-27.

Seyoum Teferra (1986) The Education of Women in Ethiopia: A Missing Piece in Development Puzzle, *The Ethiopian Journal of Education,* 10 (1).

Shavelson, R.J. (1981) *Statistical Reasoning for Behavioral Sciences,* Boston: Allyn and Bacon, Inc.

TGE (1994a) *Education and Training Policy*, Addis Ababa: EMPDA.

_____ (1994b) *Education Sector Strategy*, Addis Ababa: EMPDA.

Tilaye Kassahun (1997) Gender-specific Investigation into the Problem of High School Drop-outs in the Amhara Region, Unpublished Masters Thesis, Addis Ababa University.

UNESCO (1966) *An Asian Model of Educational Development Perspectives for 1965-80,* Paris: UNESCO

_____ (1984) Wastage in Primary Education 1970-1980, *Prospectus,* 14(3)

UNESCO Institute for Statistics (2004) *World Education Indicators*, Paris: UNESCO.

Appendix

Standardization Of The Achievement Test

The standardization of the achievement test was undertaken based on the following procedures:

1. The researcher had identified the contents covered from Grade 6 mathematics syllabus during the time of data collection in each sample school. This was done in consultation with mathematics teachers in respective schools. As a result, seven major content areas were identified as common coverage portions. These include Working with Whole Numbers, Set Theory, Prime Numbers and Fractions, LCM and GCF, Simplifying Fractions, Terminating and Non-Terminating Numbers, and Operations with Fractions.
2. The common areas of coverage identified in the list stated in step 1 above were used to serve the construction of items that could constitute the achievement test. The size of the items from each portion was determined based on the content analysis of the syllabus under consideration. Moreover, the researcher in consultation with curriculum experts had also decided to incorporate items to measure the three-levels of cognitive dimension (viz., knowledge, comprehension, and application).
3. Three test experts among mathematics teachers in the city were recruited to prepare achievement test at primary level. The main criteria for selection of the candidates were qualification (i.e. minimum college diploma in mathematics), experience (i.e. minimum 10 years of teaching the subject), and standard test development ability (i.e. those who participated on the National Baseline Assessment project, which was designed to investigate school achievements of 4th grade students in the country in the year 2000 and undertaken by the National Organization for Examinations-NOE).
4. The selected experts were provided with a one-day training on important issues such as Principles and Techniques of Test Construction, Bloom's Taxonomy of Objectives, the new Education and Training Policy of Ethiopia and its Strategy.

5. Following training, the experts were provided with the necessary documents and advised to develop at least 50 items from the portions covered by each school during that period. The researcher and two senior experts from the National Organization for Examinations (NOE) reviewed the draft items thoroughly in order to ensure that the requirements of a test construction were adequately met.
6. The reviewed test was further pilot-tested in one school with 45 Grade 6 students (21 boys & 24 girls). The pilot test was used to identify the right items depending on item (discrimination) analysis. Forty items were chosen to constitute the final version of mathematics achievement test as per the discrimination index and level of difficulty index computed from the pilot-test results.
7. The final version of the test was administered towards the end of the first semester of the academic year. This time was chosen because of the reason that it was expected to minimize the probability of achievement differences due to differences in students' preparations. The researcher believed that all students had made sufficient preparations for their first semester classroom examination at the time of test administration. Further, extra care was taken to avoid information leakage about the achievement test until the administration of the test. In short, every effort was made to control the effects of extraneous variables and to ensure the quality of test.
8. The test papers were corrected by a group of experts with a help of appropriate software. To facilitate the ease of understanding for the analyses and to have a clear picture about the extent of relationship between the two constructs (viz., gender & mathematics achievement), a two-stage coding scheme was used. In the first stage, each individual's score out of 40 questions was transformed into 100 using appropriate formula. In the second stage, the old coding scheme was improved by recoding the original score out of 100 per cent. At this stage, a four-level performance coding system was created in reference to each individual's total score out of 100 per cent: **Poor**, **Low, Medium**, and **High** level of performance. This was done, based on the following formula: (a) **Poor** when an individual's total score is below 25 per cent; (b) **Low** when an individual's total score has fallen in the category of 25-49 per cent; (c) **Medium** when an individual's total score is bound to be in the range of 50 and 74 per cent inclusive; and (d) **High** when an individual's total score is bound to be in the range of 75 and 100 per cent inclusive.

Journal of Educational Planning and Administration
Volume XIX No. 2, April 2005

INDIAN JOURNAL OF INDUSTRIAL RELATIONS

CONTENTS | VOLUME 40 | NUMBER 4 | APRIL 2005

A Quarterly devoted to dissemination of knowledge in the fields of Industrial Relations and Human Resources, including relevant aspects of labour relations, personnel management and rural labour. Besides, communications from Managers and Union Leaders reflecting their views and Book Reviews are also incorporated.

EDITOR : RAMA J. JOSHI

Subscription Rates : for India - Rs. 600.00 for one year; Rs. 1500.00 for three years; Rs. 2400.00 for five years; and Rs. 160.0 for a single copy. For foreign countries (Air Mail) - $100 for one year; $275 for three years and $375 for five years. For foreign countries - (Sea mail) - $65 for one year; $175 for three years; and $250 for five years.

Draft payable to
SHRI RAM CENTRE
FOR INDUSTRIAL RELATIONS AND HUMAN RESOURCES
4, Safdar Hashmi Marg, New Delhi-110 001.
Phone : 23352410/12/14/15/26, 23351953 Fax : 011-23351953

Journal of Educational Planning and Administration
Volume XIX No. 2, April 2005, pp. 279-306

BOOK REVIEWS

Quality Higher Education and Sustainable Development – NAAC Decennial Lectures: 1994-2004, November 2004, NAAC – 2/4, Dr. Rajkumar Road, Rajajinagar, Bangalore-560010. Karnataka, India. Paperback, pp.184+viii. Price not mentioned

NAAC celebrated first ten years of its existence by publishing lectures delivered by educationists from diverse disciplines at different institutions of higher learning during 2004 on theme, having relevance in the present as well in the future, conveyed by the title of the book. NAAC deserves congratulations on making these lectures public almost immediately after they were delivered.

Introduction by V.S. Prasad and Latha Pillai has ably highlighted the gist of each lecture and thus made the task of a reviewer bit easy.

The first and the lasting impression gathered by me on reading these lectures is that they are thought provoking and insightful. Reading of the book is a 'must' for all interested in the issues of higher education and its development in the national and international context. I would like to go a step further and suggest NAAC to invite comments and suggestions from the selected academic fraternity to begin with which hopefully will be useful in charting a more meaningful education policy, particularly higher education policy, direction for future, at least for the next 15 years i.e., up to Vision 2020, if it has not been done it so far. Is it not a short period? The real question is: What is to be developed and for how long?

World Summit on Sustainable Development 2002 using three different time-horizons - (a) short-term (2015) goals of U.N. Millennium Declaration; (b) two generation goals (2050) of the sustainability transition; and (c) Long-term (beyond 2050) goals - has set three distinct sets of goals (pillars) – namely economic, social, and environmental. If empowerment of higher education is our immediate vision taking us to the path of sustainable development, then, setting a deadline of 2020 seems reasonable. All the lectures have highlighted the role of higher education in promoting sustainable development of the type described above without taking note of time-horizon.

The thrust of the theme is quality higher education and not the entire education system though it is beyond doubt that all the three levels of education are sequentially connected. And like a human body, one weak part (level or layer) pulls down the working of the whole system making hard to achieve the desired goals.

In this context, I fully agree with some of the authors of these lectures who have lamented upon the fact of not realizing in 1985 itself (20 years back) the recommendation of the Kothari Commission on Education (1964-66) of spending 6% of GDP on education. The end result of this is the accumulation of the backlog of under-investment in education all these years culminating in weak educational system, including higher education. This fact precisely has permitted the entry of the profit minded private enterprise in education

making it more a commercial thing. This type of privatization say, commercialization of higher education has been bemoaned by the authors as it cannot serve the wider societal needs and its expansion should be regulated and checked.

I have hardly come across the discussion on the issue of optimum utilization of what is provided by the State (amounting to the under-utilization of funds provided) in contrast to 'optimum' investment (given by 6% of GDP). Why under-utilization? Because of poor governance, absence of autonomy or other accounting constraints? Optimum investment and optimum utilization are the backbone of the well-functioning education system determining its quality.

Since Independence the thrust of education policy has been on access, quantity and equity and hardly on quality. Free and subsidized education, open door education policy (liberal/general education) and even reservation (positive discrimination – affirmative action) for the under-privileged or under-represented have been meant for achieving the goal of access, quantity and equity. Massification of general education did take place. If at all quality has gone down, it has declined where 85% of students are enrolled. The impact of reservation policy on quality and social well-being is an issue to be examined as it is constitutionally supported in India unlike in U.S. where it is voluntarily implemented in the universities and supported by the private sector to enable disadvantaged people as individuals to gain social capital.

Colleges and universities admit students who complete successfully secondary and higher secondary course. In a scenario of first generation learners, of high drop-out and failure rates, those who are admitted to colleges (or those who pursue higher education) must be above average or good performers capable of pursuing higher education. In that case, quality should have been either not allowed to deteriorate or should have been improved. Then, why has it fallen? Is it because of disillusionment of devalued higher education in the economy which has largely produced unemployables? This is labour market dimension of the quality of higher education. This has occurred even when only 6-7% of the relevant age-group, 17-23, are enrolled. What will be the situation when we propose to enroll 20% of youth of this age-group even with sustained high economic growth of 7-8% if it turns out to be job-less? It is argued that colleges and universities to an extent have played 'baby sitting' role, then how can one expect them to produce 'organic intellectuals'.

Is the affiliation structure of higher education, making autonomy difficult, to be blamed? Many affiliated colleges were shy of becoming autonomous when offered by the U.G.C. some time back. How have those colleges, which have accepted the challenge, performed quality-wise? Are they superior to affiliated colleges? Is it a viable alternative to affiliation?

We are bent upon converting the "*elusive triangle*" of access, equity and quality into reality to face challenges of the 21st century. In this context of the issue of quality, I quote below the following lines just to show how difficult it is to strike a balance between access, equity and quality.

"US has a much more diverse and egalitarian school system that holds out the promise of higher education to all, not just to the intellectual and economic elite. So, of course, it stands to reason that Asia's best perform better than America's vast mix of students" (Lawrence Hardy – The Future of Education – Not all we Hoped, had Hyped – in *The Education Digest* Vol.70, No. 7, March 2005). Massification of quality higher education in the era of the on-going process of commodification of education seems poles apart.

Views expressed by the authors in this book have one common strand of thought of raising the quality of higher education to achieve the social Sustainability which is in jeopardy. Quality higher education is viewed as a tool making the whole education system viable to that end. It is expected to nurture and cherish values representing and supporting sustainable development such as freedom, equality, solidarity, tolerance, respect for nature and shared responsibility. Let us initiate "changes in curriculum to impart education that makes a complete moral and character building social individual". (Robert W. Kates, Thomas M. Paris and Anthony A. Leiserowitz - What is Sustainable Development? Goals, Indicators, Values and Practice in Environment, Vol.47, No.3 April 2005). Amartya Sen in his recent article "The Three R^s – Reach, Range and Reason of Reform" (*Economic and Political Weekly*, May 7, 2005) has expressed the view that it is' 'extremely odd to pursue ethics-free reform'. But doesn't it seem too Utopian a goal to expect the education system, particularly higher education, to fulfil? Especially, when it is being politicized beyond repair, say in India, or when retreat from the emerging 'worldwide' materialistic culture' spreading like a wild fire is not in sight, the goal seems a distant dream. Can it serve as a panacea for all the ills facing the planet earth? Let us hope we succeed in developing a viable education system capable of making all students proficient and able to solve problems of the 21st century. Then certainly we are at the beginning of a new era in education. Undoubtedly, in this regard, education in general and higher education in particular, is at cross roads.

6/A, Sahajanand Apptt., Tarang Society
Productivity Road, Vadodara-390020

K.R. Shah
E-mail: krshah00@yahoo.com

Stella, ANTONY and A. GNANAM: ***Making the Most of Accreditation: Balancing the National and International Developments in Higher Education***, Concept Publishing Company, New Delhi, 2003. Hardbound, pp. 300.

Accreditation is one thing that has come a long way in the era of globalization and India needs to cope up with the situation, keeping the domestic socio-cultural prerequisites in mind. Accreditation in the form of quality assurance was there in Indian higher education system from the beginning but its institutionalization process started only in the 90's. National Assessment and Accreditation Council (NAAC) is the product of such a process.

The authors Antony Stella and A. Gnanam, being associated with NAAC, give us a clear picture of its evolution, elevation and the process of evaluation. The book has totally 13 chapters, divided into three parts. *Part one* deals with the process of accreditation in India and the experience from NAAC. *Part two* talks about the challenges that NAAC is facing from various fronts. *Part three* finally gives the picture of the development in quality assurance at the international level and also talks about the challenge of quality assurance in transnational education.

Information and Communication Technology (ICT) has revolutionized the delivery mechanism and focus of education. The shift can be seen from transmission of knowledge to skill competency; teacher-centered to student-centered; rigid to flexible curriculum; growth in non-traditional modes of education; shift from national focus to international orientation etc. With such a paradigm shift in the delivery and focus of education, it is sure that the quality assurance mechanism in higher education needs to be taken seriously. Favouring privatization in a big way, the authors opine that autonomous institutions with the provision to confer degrees in their name and thus owning the responsibility of providing quality education and being accountable is the best way of quality improvement. However, the modalities for arriving at such a system need to be dealt in detail.

While talking about the quality assurance mechanism in India, the authors point out that accreditation as the national external quality assurance agency was initiated only in 1994 with the evolution of NAAC, though UGC was responsible for the determination and maintenance of standards of higher education probably from its inception. With the expansion of higher education institutions through the growth of affiliated colleges (both Aided and Unaided), the role of academic leadership of universities has been reduced to a mere monitoring of minimum requirements. This has quality implications and NAAC, being the sole external quality assurance agency in India, needs to do a lot of groundwork. National Board of Accreditation (NBA) and Accreditation Board (AB) are the other accrediting agencies that are associated with All India Council for Technical Education (AICTE) and Indian Council for Agricultural Research (ICAR), respectively. However, it is the NAAC that qualifies for being a national external quality assurance agency.

NAAC follows the standard methodology for accreditation that includes two steps – Self-Study and Peer-Review. For the self-study by the respective institutions, NAAC gave seven-fold criteria that form the basis of assessment – Curricular aspects; Teaching-learning and evaluation; Research, consultancy and extension; Infrastructure and learning resources; Student support and progression; Organization and management; Healthy practices. The peer-group's job is to evaluate the self-study report that was prepared by the accreditation-seeking institutions on the basis of these criteria. Based on this, NAAC assigns the institutional grade on a nine-point scale. If any institution gets a grade more than or equal to 55 per cent, then it gets "Accredited Status" and less than that score will render it a "Not Accredited Status".

Accreditation by NAAC is voluntary and valid for a period of five years. It made the institutions analyze the benefits with open mind and at the same time, the stakeholders' decision to use NAAC's accreditation outcome has served as a catalyst. Whatever it is, presently NAAC's de-facto status of accreditation seems to be working and thanks to the UGC's repeated intentions to favour only the accredited institutions. More than 50 per cent of all higher educational institutions, as mentioned in the book, in the country have been influenced by accreditation, either directly or indirectly.

The authors point out that since only 6 per cent (though 20 per cent is considered to be essential for sustained economic development) of the relevant age group of 17 to 23 years is enrolled at higher education level, ensuring quality of education to this small percentage is vital to success of the nation.

While discussing about challenges that NAAC is facing, the authors raise the issues of professionalism and compliancy in accreditation. They point out that the institutions seeking accreditation see NAAC's accreditation as a product and not as a process. By suggesting measures for professionalism and against post-accreditation compliancy, the authors try to make us realize the potential of accreditation as a process. Another major challenge that NAAC faces is in the form of distance education, especially, when 16.5 per cent of the registered students at higher education level belong to distance education stream. Though the criteria employed for accreditation for distance education is basically the same but there are differences in detail. However, the philosophy and methodology used in accrediting the traditional universities may not be suitable for distance education. Considering this, NAAC and Distance Education Council (DEC) are working out strategies to have a better output.

In this era of globalization of economics, where education has been put under trade-in services, transnational education has emerged as an imperative to the Quality Assurance Agencies. The web presence often created problems to the Quality Assurance Agencies. Considering the expansion of transnational education in a big way, the authors talk about various concerns that the Government is facing like – licensing and regulation procedures, quality assurance for imported and exported education services, funding protocols, mutual qualification recognition, etc.

Here it is pointed out that although most of the transnational education offerings from India fall under just one or two areas of studies – especially under computer science and management - as a part of institutional activities they may have to be given a due place in the overall institutional accreditation.

While discussing about various International approaches to quality assurance, the authors consider four strategies given by Van Dimme Kirk – improve communication and exchange among quality assurance agencies of various nations; develop a soft validation and approval procedures; accreditation of accrediting agencies; and a real international accreditation agency. Though the strategy of accreditation of accrediting agencies does make sense when the platform is set for transnational education, a the authors point out that the acceptability will be more when there is greater cooperation vis-à-vis regulation.

Finally, dwelling on the issue of mutual qualification recognition at the international level, the authors talked about Bologna Declaration, among selected European countries that aimed at evolving a system of sharable higher education programmes. The Bologna process is leading to fundamental changes in the European higher education sector. It is expected that by the year 2010, there would be some kind of convergence between the different national systems of Europe. They also give a brief outline of certain issues that can be adopted from the Bologna experience for the Asia-Pacific region. However, the authors need to consider the fact that the countries of Asian region are much more diverse at socio-politico and economic level than the European countries.

Overall, the book will give us a good understanding of the system of quality assurance at national and international levels. Through this book, one could know the prevailing complexities in higher education and the issue of quality assurance for higher education. But there are few other issues that need to be dealt upon like the advent of contract lecturers, issue of teacher's lack of interest for evaluation and the legal aspects of private initiatives in higher education etc that have direct or indirect impact on quality assurance. It would have been a more comprehensive work if the authors could analyze the accreditation aspect management-wise too, like how many private unaided colleges are accredited (and also assessed and found not qualified for accreditation) vis-à-vis the Govt. colleges.

It is also found that the authors were not very particular about the dates of various events and the establishment of institutions, most prominent being the Bologna Declaration. In addition to this, there were few cases of loose editing and 'dropping of things'. Other than these gaps, it can be said that the book assures quality to the readers.

Doctoral Research Scholar
Zakir Husain Centre for Educational Studies
SSS, JNU, New Delhi - 110067

Sridhar Bhagavatula

Centre for Development and Human Rights (2004) ***The Right To Development: A Primer,*** New Delhi: Sage Publications, pp. 243. Price Rs. 395/-. ISBN: 0-7619-3212-7.

The literature on human rights classifies the right to development as representative of the third generation of human rights. The first generation consists of civil and political rights conceived as freedom from state violation of these rights. The second generation comprises of economic, social, and cultural rights, claims made against exploiters and oppressors. The third generation consists of solidarity rights belonging to peoples and covering global concerns like development, environment, humanitarian assistance, peace, communication and common heritage. Right to development works on the premise that development is itself a human right.

The book under review is an attempt to identify the content of Right to Development (RTD). The book is organized into two parts and each part consists of three chapters, in

addition to the introduction written by the human rights scholar, Stephen P Marks. The scholar highlights how issues of development have been transforming with the changing priorities from time to time. There has been a paradigm shift in understanding development – from mere 'economic growth' to the 'human development' approach advocated by Amartya Sen, where development is viewed holistically encompassing social, structural, human governance, environmental, macro-economic and financial aspects.

RTD is composed of three dimensions: first, the political dimension which aims at contending perspectives and interests that seek to influence in the formulation of general principles at the commission of human rights. The second focuses on equity and poverty reduction in the policies and the practices of the principal actors of development. The third dimension concerns about the willingness of several development agencies to integrate human rights concepts but have not yet done so in concrete ways with respect to RTD.

Following the introduction we have three chapters presenting an overview of RTD in the global context. Part two of the book comprises of the rest of chapters with an overview of the RTD in Indian context. Chapter one introduces the Right to Development and defines RTD as 'an inalienable human right by virtue of which every person present has a human right and all the people are entitled to participate in, contribute to, and enjoy economic, social, cultural and political development' (p.48). This chapter also deals with the question of what the Right to Development entails and discusses various approaches to achieve RTD. Constraints (economic, political) associated with securing the RTD are also dealt with in detail. The chapter concludes that 'right in RTD framework is not enumerated merely in terms of outcomes; an equal emphasis is placed on the process of realization of rights' (p.71).

The second chapter identifies the rights to food, primary health care, and primary education as important rights necessarily for the realization of RTD and sets out the theoretical framework of the above rights. This chapter argues that right to development is a right to a process of development in which all human and fundamental rights are totally realized. It further agues that it is not enough for each of the rights to be realized separately. All the rights should be realized simultaneously since they are interdependent of each other. In the end, the relation between the rights to food, primary health care and primary education is examined.

The third chapter briefly addresses the legal and institutional mechanisms for the protection of women's rights at the international level. Major emphasis has been laid on the role of women in the realization of RTD. The chapter highlights different international conventions conducted on women and their rights resolution calling for the end of gender discrimination and emphasizing the equality of women with men in all respects. It discusses the Convention on The Political Rights of Women 1953, Convention on the Nationality of Married Women 1957, Declaration on the Elimination of Discrimination Against Women 1967, Declaration on the Protection of Women and Children in Emergency and Armed Conflict 1974, Convention on the Elimination of All

Forms of Discrimination Against Women 1979, and Declaration on the Elimination of Violence Against Women 1993. All these conventions highlight the problems of women, and discrimination against women in every day life and demand greater emancipation and equal status and opportunity for women on par with men. It argues that merely writing on the paper would not help in the actual implementation of women's rights. It points out that adequate attention should be paid in changing the social and cultural practices that are based on an assumed inferiority of women in society (118).

Chapter four examines the role of India in global human rights conventions and also outlines the measures, both constitutional and statutory, necessary in promoting and protecting diverse groups and citizens of India. The active role of judiciary in protecting and safeguarding the rights of the citizens is discussed in detail with the illustration as to how the Supreme Court has given directions to different organizations for protecting the human rights. The scope of human rights is also significantly broadened, according to the contemporary institutional demands. As part of institutionalization of human rights in India, the government evolved and initiated different measures and programmes that led to the formation of Human Rights Commission set up by the promulgation of the protection of Human Rights Act. Special emphasis is on the women's rights in India, focused on the constitutional provisions related to their equality before law, discrimination against women, and reservation of seats for women (33%) at grass-root electoral bodies. The chapter establishes that there was significant change both in terms of recognizing the problems of women and in implementing the policies for their empowerment leading to a paradigm shift in understanding the development of women.

The concept of development has been reconfigured from the 'welfare' model and from development model to 'empowerment model' since the time of Independence. The initiation of policies for empowerment of women was attributed to the consistent struggle of the women's organizations, which had highlighted the institutionalized forms of discrimination against women in different forms in every day life. The chapter has also pointed sociological factors for the growing inequalities in sex ratio in Indian states in general and some specific districts within the particular states.

Chapter five delineates on the rights to Food, Education and Health in the Indian context. Although the human rights encompass several different rights, the book identified the above three rights as the basic rights for development. This chapter highlighted the role of judiciary in taking an active part in the distribution of surplus food to people starving in different states. Further, the court came out with an interim order, which enjoin upon the states the need to implement the relevant central government measures, which were aimed at providing food to deserving groups. The large number of cases in courts and consequently the judgments in favour of distribution of food, promoted the right to food as a constitutionally protected right for selected vulnerable groups. Further the book identified the problems associated with the food i.e. lack of food or inadequate food, which ultimately leads to malnutrition in India. The malnutrition rate tends to be high among women when compared to men due to the culturally constructed gender bias, which is institutionalized over a period. However, the right to food campaign

has yielded significant results due to the intervention of Supreme Court and consequent direction to all state governments to provide cooked mid-day meal in primary schools. Economic feasibility is a major constraint in gaining access to food. Further, it advises state government to provide 'appropriate employment' to those who have registered in the employment exchanges.

The second component of the RTD is the right to education. The Supreme Court judgment on primary education fundamentally changed the relation between the state and education. Primary education as fundamental right has been renewed by the 93rd constitutional amendment (2001), which states that state shall provide free and compulsory education to all children of the age of six to fourteen years. Further, 'the state shall endeavour to provide early childhood care and education for all children until they complete the age of six years'. The chapter also points out that the major thrust of primary education is to advance the enrollment, retention and achievement of children of the relevant age group and reducing disparities among diverse sections of the society.

Although a number of programmes have been announced since the time of independence, the performance of primary education and access pattern shows a dismal picture. India has failed to achieve the longstanding goal of universalization of primary education although the enrollment rate has increased significantly. The reason for the failure is attributed to the large number of dropouts particularly in less developed states in India. The other causes are less number of girl children in primary education due to age-old gender discrimination, and the socio-economic backwardness of the disadvantaged sections of a society. The chapter points out that in spite of the phenomenal growth in secondary school education, disparities in access to education between the urban, rural and tribal areas apart from gender discrimination nevertheless continued to exist. Although the higher education had expanded at phenomenal level, hardly 6% of the population had access to higher education. The quality and relevance of the Indian higher education are most critical to understand its role in training the younger generations. The major flaw in public education system is failure in anticipating the future trends at the national and global levels, and consequently reshaping it according to the demands.

Right to health is another important component of RTD. The overview of the health indicators such as the life expectancy, mortality, infant mortality rate, maternal mortality rates and morbidity rates implies that although there is tremendous improvement in health care at different levels compared with the early independent days, the country's longstanding goal of health for all is far beyond the imagination of the large sections of the society. The organization of health care system is also biased in favour of the private sector particularly at the level of primary health care.

The health sector has been classified under the concurrent list i.e., both the state and central government are responsible for promoting health care. The study points that, despite active role of the public sector in improving health care, fund allocation to this sector is dismal. Preventive health care is exclusively provided by the public sector. But, almost 80% of the population, both rural and urban in India, is subscribed to the private health care services. The study has pointed that most of the practitioners in the rural

villages are unqualified and under-qualified without any formal medical education. Though constitution expects the state to take relevant measures to improve the health-care condition of people, the state has failed in providing healthcare service to most of the social groups in the country. Consequently, the judiciary has played an active role in promoting the health status of the people. For instance, the Supreme Court order that the central government should take appropriate steps to curb the commercial blood banks and enact legislation regulating collection, processing, storage, distribution and transfusion of blood.

The concluding chapter deals with the Public Interest Litigation (PIL) as a tool for social justice. According to it, PIL is basically designed to provide speedy justice to the marginalized and poorer sections of society and to address the issues of utmost importance. This chapter has reviewed some of the PIL related to food, education and health care. It has pointed that the PIL is an alternative mode of justice, which is easier to access and simpler in nature. However, there are some drawbacks limiting access to PIL in India, and it needs to be de facto in enforcement of the law and not act merely *de jure*.

The work could have been strengthened by demonstrating the access pattern of the basic right to the most disadvantaged and marginalized sections particularly with reference to the Dalits and tribal groups. In fact, major limitation of the book lies in its inability to identify the 'reference group' of RTD beyond merely categorizing women as the most vulnerable group. The book ignores the human rights of Dalits and tribal groups who have been socially, economically and politically marginalized historically and continue to be excluded from the mainstream even after fifty years of Independence. The book also does not come to terms with the extent to which marginal groups have become successful in accessing the right to development. Without addressing the core issues of human rights such as the right to dignity and recognizing all caste categories as equals, it may not be possible to formulate the ground for understanding the problem of discrimination and historical marginalization.

Nevertheless, the present work enriches the existing literature on issues of development and human rights. The book is well organized; tables and annexure are extremely helpful in understanding the terminology of the text. The book throws light upon the issues of human rights in general and right to development in particular. The richness of the book lies in illustrating the three Rights i.e. Right to Food, Education and Health and related PIL that are extremely useful to take stock of the issues of development from the human rights perspective. Those who are interested in Human Rights and Development Studies will find the book extremely important. The practitioners of economics, political science, sociology and law too can use this primer (in addition to the activists, policy makers, scholars and researchers) to have a broader understanding of development from the human rights perspective in general and in India in particular.

Dept of Sociology
University of Hyderabad, Hyderabad – 500046

Nagaraju Gundimeda
E-mail: ngss@uohyd.ernet.in

Ingemar FAGERLING, Gorel STROMQVIST (eds): ***Reforming Higher Education in the Nordic Countries***, International Institute for Educational Planning, UNESCO, 2004, pp. 365. ISBN: 92-803-1267.7.

Five countries, namely Danmark, Finland, Ireland, Norway and Sweden are the Nordic countries. The title of the book shows to indicate that these countries have adopted policies in higher education with the changes factored by technology, expansion, diversification, accountability, quality control, competition, internationalization and globalization with particular reference to developments of European and regional economies.

Before 1990s, the Nordic countries had a tradition of state control of higher education and the participation has been free of charge due to the view of higher education as a 'social good' but from late 1990s, the debate has been to categorize higher education as 'merit good' causing a recovery price from the beneficiary. This change in the concept has brought new dimension in providing physical access to its beneficiaries. Further, technology has impacted on the functioning of institutions in the market place and consequently it has reshaped teaching-learning process (pedagogy and teaching). Internationalization and the benefit of communication in English in these countries have brought new advantages as these countries have been benefited by EU-sponsored programmes such as ERASMUS and SOCRATES.

For example, Finland has diversified and developed advanced vocational education programmes offered in new types of polytechnics. With the Human Capital Approach, life-long learning and life-wide brought heavy investments in higher education to provide knowledge-centered production system in the economy; mass higher education is becoming the norm in industrialized countries which leads to economic growth and employment. This process is deep and higher education is being restructured through educational differentiation, ensuring life-long learning; equality of opportunities, close cooperation with industry, broadened use of new information evaluation, assessment and monitoring. The role of universities has been redefined in the contemporary world. It must provide undergraduate education, pursue the search for new knowledge, train researchers and participate in official investigations in society through consultations and contracted research (Stromqvist, 1998). In case of the Nordic Countries, there has been a tradition of cooperation in Education sector. Since Spring 1995, the whole Nordic region is being considered a joint community for higher education. It is now possible for prospective students from throughout the region to apply for admission at any higher education institution in the Nordic Countries on the same conditions as students from the country concerned (p 43).

The Nordic model in higher education is characterized by:

- Small size, creating restricted markets
- Strict centralization of control of resources
- Formal institutional uniformity, with no hierarchy ostensibly recognized

- Restricted competition, exercised with respect not to markets, students or business but to State-controlled resources
- Low institutional initiative, since conditions of strict centralization inhibits the taking of initiatives, the challenge of bureaucratic rule in the universities or the development of an entrepreneurial spirit (Kivinen and Rinne, 1990).

But in recent years, universities are developing more autonomy at the same time as there is an increasing emphasis on the professional role of university staff.

Tracing the recent changes in Danish Higher Education, Palle Rasmussen records the development from the standpoint of: (i) segmentation and its discontents; (ii) higher education in society; (iii) educational structures; (iv) provision for life long learning; (v) governance and finance; (vi) staffing higher education; (vii) quality assessment; (viii) providing knowledge; and (ix) the ambiguities of differentiation. He concludes that '*Changes in the higher education system initiatives and its practices will always be linked to changes in the society in which education is embedded'*. Similarly, in case of Finland, Risto Rinne attempts to analyze the situation and terms his analysis 'as searching for the rainbow', for Finland is geographically located in the northern–most periphery of Europe, with Russia as its neighbour. Its social, cultural and geopolitical history is strongly linked to Sweden (until the year 1809) and after that to Russia (until 1917) as a Grand Duchy or autonomous province with its own legislation (p89).

In the 1990s, the major central notification was the radical change in the funding and steering mechanisms of universities. The funding system has been developed to support management by results by means of a better link between objectives and appropriations. Study by Jon Torfi Jonasson for Iceland traces the transition process of higher education into the Twenty-First Century. The 1997 Higher Education Act is the postmark for changes in higher education in the process of decentralization, financing, quality control, and administration. He concludes that in Iceland, there is no serious discussion for seeking an alternative model by synthesizing the process and structures between the entrepreneurial university and the other, the service university.

The Norwegian quality reform in higher education analysed by 'Tove Kvil' speaks – students will be given increased rights both in relation to the quality of course and the financing of studies. In accordance with the Lisbon Declaration, all higher education institutions in Norway are obliged to use the European Credit Transfer System (ECTS) and to issue Diploma Supplements (DS) to all students. All higher education institutions, with a few exceptions, have been responding to the demand for transparency and transferability as to courses and degrees since August 2003. Lillemor Kim examines the Swedish Dilemma - due to massification in a uniform system of higher education, is higher education policy in a deadlock?

In European countries, the dual binary, multipurpose and integrated systems have been tested and changes continue. Sweden adopted an integrated system comprising the entire post-secondary sector. Research studies show that ample evidence is now at hand indicating that the Swedish nation of 'enhetlighet' (uniformity) may be hindrance to continuous renewal and adaptation. Binary systems provide a better guarantee to

(maintaining) diversity than uniform or unified systems. Sweden will change in the same direction as other European countries. It is a matter of circumstances.

The volume is quite informative and provides a critical analysis of higher education in five countries of the Nordic region with a focus on recent reforms against the backdrop of historical development in the region.

Consultant
DEP-SSA, IGNOU
New Delhi

V.P. Garg
E-mail: ngss@uohyd.ernet.in

PURI, MADHUMITA and ABRAHAM, GEORGE (eds.) (2004): ***Handbook of Inclusive Education for Educators, Administrators and Planners.*** Sage: New Delhi, Paperback, pp. 309. Price Rs.450.00. ISBN: 07619-3266-6.

The book is an honest attempt to make the policy makers, planners, administrators and school teachers aware of the needs of the disabled of different types and how these can be met through inclusive education in mainstream schools. It is seen as the most practical and logical program required developmentally and socially to bring about the participation of the impaired of all kinds along with the non-impaired in the same schools and classrooms without upsetting the apple cart. The authors have visualized the practice of inclusive education in the mainstream schools as a facilitating venture towards the development of all, as it promises to make them fully aware of the diverse dimensions of their environment.

The book is an edited volume that includes a total of 16 chapters followed by Appendices, Glossary, Information about Contributors and Index. The Chapters are grouped into three units. Unit I is titled Inclusive Education: An Overview, and has five chapters - Historical Perspectives, Why Inclusion, Current Provisions of Law and Policy, Special and Inclusive Educational Services in India, and An Inclusive World. Unit II - Innovations in Implementation includes eight chapters Hearing Impairment, Vision Impairment, Orthopedic Impairment, Learning Disability, Cerebral Palsy, Intellectual Impairment, Autism Spectrum Disorder, and Schools in Rural Areas. Unit III – The Way Forward has three chapters: The Role of Special Schools, Amendments in Law and Policy, and The Real School.

The first two chapters are written by the editors themselves. Chapter1 takes note of various Conventions, Declarations and Action Plans accepted by the governments in various countries and non-governmental organizations. Chapter 2 looks into the why of inclusion and the challenges it poses to the individual and administration. It adopts the definition of inclusive education of UNESCO document Education for All 2000, and adds to it the dimensions of togetherness and breaking of barriers. It advocates the school reform to face the challenge of inclusive education by removing four types of barriers physical, pedagogical, assessments and attitude related. Chapter 3, written by Shruti

Pandey, has examined the current provisions of law and policy derived from the Constitution of India. It is felt that Indian legal system needs to adopt a holistic approach to education of the disabled and the non-disabled, and put them under one ministry only (MHRD). Sushil Goel and Indumathi Rao, are the authors of Chapter 4, review the Special and Inclusive Educational Services in India from inception, when Anne Sharpe established the first school in Amritsar to now with more than 1200 schools in cities and towns. They recognize the need of adopting Community Based Rehabilitation as a practical strategy to reach the rural and urban disabled. The absence of data on disabled has been considered a major obstacle in planning the resource allocation for their education, besides the problem of unwillingness of parents, lack of awareness and location of residential schools. It is observed that since 1975 the general and special education have functioned as separate types in separate schools than in an integrated manner. Renu Singh has lifted the argument to an inclusive world level in chapter 5 by emphasizing that inclusive education cannot take place till those historically locked out are invited to become active partners in the system. Schools have to work to reduce inequalities arising from its own structure, and move from obsession with individual learning difficulties to an agenda of finding solutions. There has to be a paradigm shift in which the system rather than the individual would be under scrutiny. Education has to reinvent and reconstruct itself so that it is built more to change than to last on the time dimension.

In Unit 2, Sandhya Limaye talks about hearing impairment as it impacts parents and poses challenges to the students. Hearing impaired students in inclusive schools can get the exposure to an environment they cannot gain otherwise. They can also get better quality, more valued education and enhanced opportunities for future, although they would face the challenge of language and communication in relation to teachers and peers, and of meeting their cultural needs as a prerequisite to develop positive self-concept. The process of inclusion necessitates a consideration of the personality, and emotional characteristics of these children, such as acceptance, fear of managing a new situation and knowledge of new responsibilities. It is necessary to get parents involved by giving them some guidance and help to access the preschool programs. Anjilee Agarwal focuses on inclusion of students with orthopedic impairment, which requires the removing of the physical barriers by redesigning buildings, parking spaces, fittings, accessories and furniture in a way that those using wheel chairs and walkers can have easy access. Care should be taken to provide directional/tactile maps at the entrance and guiding and warning blocks, wherever necessary. In addition to classroom and library seating arrangements, their safety has to be ensured on stairs, in playground, and in toilets. It may also be necessary to review the needs of students and available arrangements periodically as some may have their condition changed following surgical procedures, and/or may have other associated conditions requiring additional support. They should enjoy their learning experiences as much as the non-impaired do, since they do not have a sensory impairment. Mallika Ganapathy and Lakshmi Krishnakumar discuss the issue of inclusive education for students having learning disability. Learning

disability has been defined as a condition having neurological origin and interfering with a person's ability to store, process or produce information, creating a gap between one's ability and performance. It runs often in families and never goes away, but early diagnosis and appropriate intervention and support are critical to the person. It is recognized that though LD can affect the child from many angles, but it does affect self-esteem and self-confidence.

Unit III focuses on the way forward, and all the three chapters are written by Madhumita Puri and George Abraham. In the chapter on the role of special schools, it has been argued that in the present context when more and more disabled children have begun to find places in mainstream schools, the roles of special schools and their teachers would need redefinition. While fears are expressed, the special contribution of these schools is recognized. It is felt that the focus of teachers would extend from mere pedagogic to strengthen inclusion by undertaking tasks of development of curriculum, tools, training programs for teachers, surveys to identify the disabled, their assessment and classification etc, and get every child with disability into the mainstream educational system. Special schools can be used as places for preschool interventions. In the last chapter, the authors have painted the picture of the real school, which may get established gradually over the years through well-coordinated efforts. Policy makers should pay attention to the mandatory implementation of clauses in PWD Act related to education by the boards of examinations. The administrators should see the preschool and play schools as essential aspects of educational journey and look at issues of admission, orientation, resource room, support teachers, co - and extracurricular activities, participation in competitions, homework and assignments/assessments and examinations. In the long term, the teacher training has to be given priority. Library and other facilities need to be augmented and students be oriented towards collaborative effort.

The book is a very commendable and honest attempt of the authors to make the policy makers, planners, administrators and school teachers and all types of readers recognize the differences in the types of needs of the disabled of different types and the likelihood of meeting these best through inclusive education in mainstream schools, rather than segregating them into special schools. Such an experience would be beneficial to the teachers and children as well both developmentally and socially, as this offers to bring out the best qualities without upsetting the apple cart. The book is a welcome contribution since inclusion remains a hot topic of research and a challenge to the educational enterprise as such. Inclusion is indeed hardly understood so far in entirety, not sincerely translated into policy planning and not implemented in educational practices and training. The compilation of variety of contributions and of the documentations in the recent past in a simple idiom meets the need of the hour. The inclusion of examples, cases, drawings and fact sheets has made reading interesting and easy to comprehend for the specialists and also to the common reader. The contributions are well written in easy to understand form and well-illustrated and edited. It presents state of art information in the area to be used as a reference. One thing where it does fall short of the level of expectation is on elaboration of the vision for way ahead, and how to take the students

beyond school either to higher education or to the world of work. Nevertheless, it should be highly useful to the audience it is addressed to.

B-194, Mount Kailash
New Delhi-110065

Sushila Singhal
E-mail: sushilasinghal@hotmail.com

Arora, GULJEET KUMAR (2004) ***Globalisation and Reorganizing Indian States: Retrospect and Prospects,*** New Delhi, Bookwell Publishers and Human Development Research Centre, Hardbound, Pages 187. Price Rs. 495/-. ISBN: 81-85040-64-8.

In India the early 1990s saw a major shift in its policies towards economic reforms for which the country reframed its macro-economic policies in order to adopt the process of liberalization, privatization and globalisation. With the passage of time, the process of globalisation is taking into its fold almost the entire society by influencing each and every sector of economy, all government institutions and the related political and social structures. The book under review aims to combine trends in globalization with the socio-economic and political developments taking place in the country to indicate future outcomes. It shows how globalization induces changes that produce economic frustration among people and how these are easily exploitable into the demands for smaller states by the political class given the dynamics of change and their inter-relationship which are taking place in socio-economic and political structures of the Indian society. The book attempts to examine how globalization can affect the geographic boundaries of political and administrative units which constitute a country. The specific focus is to identify globalization induced economic pressures and frustrations, which are particularly likely to give way to demands for smaller states in a country like India.

Globalization, according to author, follows a process which is associated with a general direction of change towards cross border economic transactions and increased interdependence navigated by conscious human decisions. It, therefore, becomes necessary for the national governments to redesign their economic policies, which would help in economic deregulation, promote privatization of public sector and affect fiscal retreat. This ultimately has far reaching implications for the administrative and socio-economic political structure of the country.

As a result of globalization and with movement towards a market oriented economic environment based enterprise economy, the states in India have to compete more intensely than ever before in the market for human, physical and financial resources. In such a situation, the already developed states are likely to do better both in terms of attracting new investments and protecting their weaker sections of population and geographic areas. This is not possible for relatively poorer states given their meagre resources, lack of competitiveness to attract new investments and declining fiscal transfer from the Centre. This inter-state disparity would ultimately give rise to people's frustration.

Analysis of impact of globalisation presented by the author leads to infer that (i) Economic changes in general and globalisation induced transition reviewed in terms of growth, poverty and employment both at national level and in the regional context do not offer very optimistic picture; (ii) The Fiscal scenario is rather bleak, federal distortions are serious and fiscal crisis is looming large; (iii) Federal institutions have failed to meet the intended objectives; (iv) Pressures on local cultures are rising, regional consciousness and aspirations have grown substantially and people are getting divided further on the basis of language, caste, religion etc; (v) The political climate is unduly frustrating, political institutions and political culture are decaying and political class lacks sensitivity and farsightedness; and (vi) The advent of 'coalition politics' have influenced the overall decision making process.

Presenting a historical perspective of the states' reorganisation in India, the author comments that the British government was mainly governed by the considerations of administrative convenience, economic benefits and by the reason of military strategy and security. While pursuing the language principle, they ignored the actual needs, development of areas, cultural homogeneity and natural affinities of people. However, in the post-independence period, the Congress, while taking into account the language principle, gave an overriding consideration to stability of the country. Since the issue of provincial boundaries continued to be important even at the time of making the Constitution, the government appointed several committees to look the entire question of state boundaries.

The process of reorganizing or altering or even merging and integrating of state or regional boundaries is a very complex process. Focusing on language as a determinant for reorganization of states, the author says that it provides the important bases for redrawing the political map of the country or reorganizing states as it is one of the most important vital instruments for expression of people's feelings and their culture. The language as a determinant of states' reorganization has got both favourable and unfavourable arguments which arguments have been elaborated in the book. Further, the culture has to be given a consideration while reorganizing states. It is more so if the people having varied cultures constitute a recognizable group and such a cultural individuality is capable of being expressed in terms of defined geographical entity.

Keeping in view the sensitivity of the issue of states' reorganization, the author argues that alteration or adjustment in state boundaries be made only if (a) economic reasons are clear and compelling; (b) the recurring economic and gains emerging from socio-economic and political changes are likely to exceed the losses of dislocation; and (c) the suitable administrative machinery is designed to deal with administrative consequences. However, if change is certain to create distinct improvement in the existing level of welfare, it must be accepted as a challenge, even if the Constitution does not prevent effecting such change.

Details about the process and formation of the three newly created states namely Chhattisgarh, Jharkhand and Uttaranchal have been presented in the book. This is the latest reorganization of states that took place in 2000. Commenting on the future prospect

of Chhattisgarh, the author says that this state has a major potential of turning out to be one of the most industrially advanced and prosperous states. It can use its mineral resources including diamond mining, industrial base knowledge and even cultural capital to remove poverty and unemployment problem by developing and implementing people-oriented development strategies. Similar comment has been made for Jharkhand also but with the caution that it would not be possible until and unless people are motivated, political and social stability is ensured, quality of governance is improved, serious economic planning at the micro level is undertaken and people-oriented community development programmes are followed.

For Uttaranchal, the author shows concern as according to him economic viability in this state appears to be worrisome. The region, though endowed with rich bio-diversity natural resources, has not been tapped to its maximum advantage. As a result, a vast majority of its population lives below poverty line. Some suggestions have also been presented in the book to expedite socio-economic development in this state. While presenting the basic data about Uttaranchal, the author mentions that the state occupies 16 per cent of India's total land area. This is a factual error as the area of this state (53483 sq. kms.) is hardly 1.6 per cent of the total area of India.

Regarding the reorganisation of Indian states, some important points made are: (i) Demands for separate statehood have been quite old and people have been agitating for years; (ii) The people seek justification on account of historical exploitation, biased treatment by central and local level governments and economic disabilities etc.; (iii) People belonging to different ethnic and cultural backgrounds can sink their differences and join hands to seek separate statehood; (iv) The political will and expediency continues to be the most important factors behind granting statehood; and (v) The Constitution of India does not come in the way of carving out new states.

The author concludes by arguing that India's future as a nation, its economic growth and social transformation in a democratic federal polity, and achievements of goals as envisioned in the Constitution essentially depend on the growth, form, composition and configuration of the constituent units and development of long term socio-economic political forces. But this process of change, to a large extent, is in the hands of political leaders as a class. Accommodative policy, as prescribed in the past, according to the author, will not provide an everlasting solution. The quality, skill, efficiency, approach and vision of political class would inevitably play the most vital role. It is, therefore, argued that the political class must maximize its utility function while helping the nation create socio-economic institutional structures, which are people-centered, people-friendly, people-sensitive and people-participatory at all levels.

NIEPA
New Delhi -110016

S.M.I.A.Zaidi
E-mail: smiazaidi@niepa.org

SINGH, R.P. (2002): ***A Critique of Indian Education: Developing Insights***, Delhi, India, Ravi Books, Hardbound, pp. 318. Price: Rs. 650/-. ISBN: 81-88276-00-6.

In "*A Critique of Indian Education: Developing Insights*", professor R.P. Singh, a leading educationalist, who has been joint Secretary in the Human Resources Development Ministry and Dean of Research at the National Centre for Educational Research and Training, provides an insider, and often highly colourful, reflection on various issues pertaining to Indian Education. The topics covered in the twenty chapters are extremely diversified, one could even say, in some instances, too diversified. Around one third of the book is devoted to historical subjects (among others, 1857 A Re-assessment; Language Policy during Company Rule; Modernity of Tradition in Indian Education), while the rest is divided, roughly equally, between philosophical contributions (such as Nehru on Education; The Nature of Teaching; A Lesson in the Vedas) and position papers on practical, and often controversial, issues (among others, Education of the Deprived Groups; Non-Governmental Effort in Education, Teacher Education in India in the Third Millennium).

For an outsider, especially a foreigner, many of the chapters offer interesting perspectives, as well as relevant factual information, on educational challenges faced by India, often experienced in other countries to various extent. Particularly well illustrated are the roots of present problems in the colonial legacy, notably its inconsistency and lack of recognition of Indian languages, the relevance of Indian thinkers, from the Vedic past to the freedom fighters of the 20th century, to the current international questioning about values in education, as well as the necessity of a comparative perspective to fully understand the Indian situation, especially as it regards Russian influence. People familiar with current issues in teachers' recruitment, training and recognition, will also certainly recognize many of the trends identified in the book, notably the low attractiveness of the profession for well-qualified youth, the theoretical and non-skill-oriented nature of most Teacher Education as well as the system's lack of sensibility for the specific problems faced by women teachers. But professor Singh is at his best as a polemist, when he criticizes the contradictions of Indian political and bureaucratic culture (a country "where secularism can be promoted only as communalism... and where the only relevant agenda... is to make money") and its relationship with the failed promises of "education for all". Although one can question the voluntary perspective he adopts ("poverty of governance is the only problem we have"), his overall assessment of the current situation of literacy in India is surprisingly refreshing, miles away from the politically-correct language one would expect from a former bureaucrat: "The surprise is not that India has survived the politicians but the wonder is that we made some progress too on almost all fronts".

However, the book is not without shortcomings. Its major weakness lies in the lack of integration of the different subjects being discussed. As the title and the introduction promise "A critique of Indian Education", the reader would expect to find a unique and articulated vision – which the book is not. The final product is merely a collection of

twenty papers previously written by the author for other purposes, with no conclusion or common perspectives. This would not be problematic, in itself, if the stated endeavour had been more modest and, most of all, if the specific context in which each article was written was better specified. This would keep the reader from wondering why, for example a report, described as shelved and *passé* in some parts of the book suddenly become *promising* later or why education statistics are not consistent throughout the volume. The uneasiness one experiences with the different depth and quality of each of the chapters would also have been attenuated (obviously, a discourse written for an official function, such as the attribution of Teacher Awards cannot be of the same nature as an academic paper with a full bibliography, probably published in a refereed journal). Another limit of the book, which is negative coin of the lively style and approach of the author, is his tendency to overuse assertions, instead of demonstrations, especially when discussing controversial issues. Indeed, while he is generally cautious to base his analysis on data and research when he treats historical or technical subjects, he often gets carried away when he takes stands on current debates and relies mostly or exclusively on his long-time expert, or older statesman status. It makes for a good read but often at the expense of rigour and reliability of his analysis, especially from an academic point of view.

Notwithstanding these reservations, I would recommend "A Critique of Indian Education" to a wide readership. Current Indian academics, educationists, or even simple citizens, who are more knowledgeable of the success and failures of the last fifty years, of which professor Singh has been both an actor and a witness, will certainly enjoy his critical insight, expressed candidly and colourfully. Foreigners, like myself, interested in Indian education, will also learn a lot, although they probably wished a more systematic and coherent approach. And, for the young generation, especially in India, the book will provide an interesting opportunity to get acquainted with some of the recurrent issues and debates in education that will certainly be with us, and mostly with them, for the coming decades.

Faculty of Education, University of Montreal
C.P. 6128, Succursale, Centre-ville Montréal,
Qc (Canada) H3C 3J7

Marie McAndrew
E-mail: marie.mcandrew@umontreal.ca

POLLOCK, Mica (2004): ***Colormute – Race Talk Dilemmas in an American School***, Princeton University Press, Princeton & Oxford,; Hardbound, pp. 268. Price given in code. ISBN: O-691-11695-4

American schools exhibit a racial problem whose roots are embedded in the nation's social history. Much against their national effort and desire, it is difficult to stop 'racial' identities being brought in their day-to-day conversation. Irrespective of its condemnable nature and content, the involved reality is a sore point that is widely targeted to hurt the

American pride. The dilemmas of race have commonly been understood in terms of abstract notions of equality and justice. But the author in her insightful study provides a critical answer by taking the reader inside the classroom to show how categories of race are wielded at times by their very absence in public conversation. It is the fear of being misunderstood that drives one to hide the issue under cover. What happens everyday in America is certain to recur in many more countries that open their doors to diverse ethnic groups to settle down.

The author was a teacher in Columbus and it is her association with the school's multi-racial identity that she started taking interest in the problem. The present publication is the result of this association and an attempt to find a solution to this very complex social reality. In fact, the book concludes (Moving Forward) by offering possible solutions to these dilemmas. She argues to suggest that people become proactive and critically conscious about race talk. Her suggestion is: "we must learn to discuss fruitfully not just our racial inequalities, but also the very question of when and how to use race talk strategically to address particular problems". In the last chapter, the concluding part is titled 'Practically Speaking', which addresses educators in particular. In fact, it is the content of this part of the chapter that the book basically is all about.

Presented in six chapters the book adopts case study technique to address a problem. In fact, this is a model for studying social problems that can be adopted by researchers in this country, since we too face identity-related problems. While in India we have adopted a highly restrictive legal approach, the Americans being more open have gone beyond legal provisions.

The opening chapter addresses the issue squarely. Instead of denying its existence, it accepts reality. The next chapter "Race doesn't matter, but it does" defines both-- the book as well as the author's attitude towards the problem. This chapter focuses on talk of social relations at Columbus. Here the talk is in easy racial terms. But what they seem to notice particularly is that racial differences have not prevented them from 'getting along'. Talking racially about these relations was viewed as a necessary and positive step toward solving conflicts and equalizing power between "the races".

Chapter 3 talks of de-raced words that "we use when discussing plans for racial equality can actually keep us from discussing ways to make opportunities racially equal." In fact, it is the title, which explains the nature of the chapter's content. Towards concluding the chapter, the author remarks, "educators, policy makers and lawyers believed they were somehow achieving equality by the very speech act of referring to opportunities for 'all'. Yet speaking of all students does not in itself produce equality. Neither, of course, does speaking of 'all students' in itself becomes an analysis of inequality. "On the contrary, the aggregated school reform-talk of serving all never allowed for serious discussion of the opportunities. Chapter 4 demonstrates the widespread resistance to racially targeted reform language in California City indicated not only political or pragmatic preferences for aggregated reform-talk, but also a deep uncertainty about how race actually mattered to educational inequality. The title of the

chapter 4 says it all. "The more complex inequality seems to get, the more simplistic analysis seems to become."

Chapter 5 is titled "The questions we ask most about race are the very questions we most suppress." What then are these questions? The first question people generally ask is: How do these groups perform and achieve in relation to each other? This comparative question, which often seems to shift to fit the "raw group" locally available, demonstrates both a fundamental correlation in the United States between race and school performance and a fundamental assumption of this very correlation (p.147) Part 2 of this chapter deals with how this link is buried and yet in some public contexts, adults in the California City Unified School District indicated that counting achievers in racial terms was a basic procedure of the district's everyday objective: evaluating student performance.

Chapter 6 "Making Race Matters" is all about a typical hypocrisy in which "although talking in racial terms matters, not talking in racial terms can make Race matter too." The last part of the chapter 6 titled 'Practically Speaking' suggests ways and means of discussing the racial problems and thereby implies that being colormute is no good for the social health and personal relations.

There are a few subtle implications for us too in this country. Although ours is not a multi-racial society the way American society is, but we too have religio-cultural and caste prejudices and we too need to diagnose our malady and come up with some practical suggestions.

A well researched booked, indeed.

Pocket A-4/206
Kalkaji Extension
New Delhi-110019

R.P. Singh
E-mail: rpsingh2@vsnl.net

Karuna CHANANA (ed.): ***Transformative Link between Higher and Basic Education – Mapping the Field***. SAGE Publications New Delhi/Thousand Oaks/London, 2004, Hardbound, pp. 355. Price Rs. 650/-. ISBN: 0-7619-3206-2

The World Conference on Higher Education proclaimed in its Article 1 as one of the missions and functions of higher education: 'to contribute to the development and improvement of education at all levels, including through training of teachers'. The University Grants Commission (UGC) in India has given extension programmes to promote linkage with the community through various means including lower levels of education, the same status as instruction and research. In principle, contribution to the development of basic education should, therefore, be one of the responsibilities of the higher education system. However, in reality higher education has been concerned mainly with human resource development, for the modern economic sector has served the elites of the society and has produced elites. It has hardly concerned itself with other levels and types of education, except through some ad hoc individual efforts without any

institutional mechanism. Paradoxically, the foundation of education, which lies at the basic education level, has been ignored to make the whole education system weak and fragile.

In this context, the book under revised is a welcome Volume. The objective of this volume is to provide a collective mapping of the works of the individual scholars, activists and practitioners engaged in the different agencies and institutions directed towards 'mediating or forging the links between higher education and basic education' (p. 13). The context is restricted to India.

The book starts with an excellent foreword by Professor Yash Pal, former Chairman of the University Grants Commission and an equally good introduction by the editor herself. However, Professor Pal's definition of basic education is too broad. For him, basic education is 'the enormously large, subterranean learning system...unrecognized, un-funded but exploited system embedded in the folds of our society' (p.8). The editor uses a more restricted but manageable definition. For the editor, basic education 'broadly includes elementary education, non-formal education, pre-school education, literacy and alternative education *so long as all those converge towards elementary education and mass education'(p.17) (italics mine).* In that sense, the book has dealt well with the task of a collective mapping of the works undertaken in the area.

The editorial introduction gives an overview of the role of higher education in the society outlining 'the contours of the debate surrounding the interface of universities with society', at the same time highlighting 'the crises in higher education and the dilemma faced by it because of the choices that are put before it'. The reader is reminded about the conflict between the issue of economic liberalization accompanied by the privatization of higher education and gradual withdrawal of the state funds, on the one hand, and the issue of linking higher education with basic education within the broader framework of social progress, equity and justice, on the other. One is rightly concerned about the widening gap in the link between higher education and basic education. The first paper written by the editor herself explores the direct and indirect links between higher and basic education, identifies the existing problems and suggests measures to do better. Among the indirect links, the role the academia plays in the linkage through the non-governmental organizations, international and bilateral donor agencies is important. The areas they contribute are mostly in the field of action research e.g. in conceptualization, operationalization, monitoring and evaluation of projects of the linkage, curriculum and material production, quality improvement and evaluation of programmes.

While there has been a lot of activities promoting the linkage between higher education and basic education in India, the author points out the lack of: (i) adequate training facilities for basic education teachers in universities and HEIs; (ii) an information base of the different programmes; (iii) a coherent policy in this respect from the central and state governments; (iv) coordination of the different stake-holders, agencies and actors; (v) funds for research to competent institutions and sensitivity of HEIs on basic education issues; (vi) link between HEIs and policy makers in training, research and extension activities; (vii) infrastructure to forge a partnership between researchers and

policymakers; (viii) understanding between official functionaries and academics; and finally, (ix) a management information system as obstacles for a coherent transformative linkage between higher education and basic education.

The chapters that follow in the first part are more concerned with the problems of linkage with the existing sub-systems of both basic education and higher education.

Anil Bordia cites some outstanding examples of institutions of higher education which have successfully linked higher education with basic education. He suggests for research to identify the reasons for the universities not being able to do enough for the well-being of the common people in spite of the urge existing among the students and the teachers.

Jalaluddin gives an interesting historical perspective of higher education in India and the evolution of disciplines like psychology and sociology. The author laments at the failure of the university subject-based departments and the departments of adult and continuing education responsible for extension programmes 'to promote a fusion'. The absence of multi-disciplinary approach to educational reform has also stood in the way of successful linkage between higher education and basic education. He emphasizes on structural reform across the sector. Like Bordia, he is also optimistic that the vision is there, 'What is needed is the political will to push it further' (p.90).

The second part of the book deals with conceptual and theoretical concerns in the linkage phenomenon and provides two papers. P. Sarangapani identifies the problem of separating elementary teacher training from the universities by government policy, thereby depriving the teacher from 'understanding how literacy is acquired by a first generation learner, or organizing teaching and learning materials for multi-grade classrooms, or moving from dialect to standard language, or the culture of the community in which the school is located, the skills that are available in the university milieu to provide 'a good basis for professionalizing her/his activity' She is also concerned about the fact that NGOs are turning away from HEIs, SCERTs and 'various teacher training institutions and university departments' by their preference to 'learning from the field'. According to her, both government policy and NGO actions avoid basic concepts in education theory at the detriment of both higher education and basic education and consequently obstruct sustainable linkage.

The paper by Parthasarthi Banerjee is too theoretical in concept and difficult to read. The basic message is, however, simple which is found at the end of the paper: 'Serving basic education cannot be reduced to catholicity of alms-giving or to acts of ablution or to ideological indoctrination. By linking basic education with university science, the latter redeems it'.

Part III of the book deals with seven case studies, four providing direct links between institutions of higher education and basic education of various types and, three providing indirect links.

Indirect links between higher and basic education are also important. A joint effort made by various university departments like psychology, anthropology and linguistics can develop pedagogical methods and textbooks keeping in view the socio-cultural

context to make mathematics a popular subject among tribal first generation school children. However, care should be taken that this new strategy does not marginalize the tribal groups, further depriving them the opportunity to learn 'standard mathematics'. The educational policymaker faces a dilemma here. To promote basic education, it may be useful to adapt textbooks in local dialects and local culture for specific target groups but there should be a limit so that these groups do not miss the opportunity to socialize with the mainstream and move to higher levels of education. However, the research of Minati Panda of the Zakir Hussain Centre for Educational Studies gives useful insight how a tribal community inhabiting the forest regions of Southern Orissa uses mathematics in their day-to-day life. It will, however, be too much to say that their impoverished language can capture the entire range of mathematical expressions[1], as claimed by the author.

Janaki Rajan shows how partnership between an autonomous government agency like the State Council of Educational Research and Training (SCERT) of the Government of Delhi and a number of Non-Governmental Organizations in the state could increase manifold the access to the primary schools of the Municipal Corporation of Delhi (MCD) through setting up of a number of community watch groups.

The last paper in this part gives the experience of the Centre for Education Management and Development (CEMD), an NGO of Delhi, as one of the four core partners of the Aga Khan Foundation managed "Programme for Enrichment of School Level Education (PESLE)".

The last part of the volume deals with case studies on directions of research and action with five papers.

The first among them by Jacob Aikara on 'Role of Research in Promoting Basic Education' 'discusses the nature and scope of intervention in basic education through research....it presents certain substantive and methodological issues of research in the area of basic education, with special reference to evaluation research'[2]. His impressive list of further research is almost exhaustive. He has, however, omitted the important issues of management and political dimensions of basic education which have been handled in some papers in the volume.

Sabyasachi deals more with the theory of learning than linkage between higher and basic education and could better be placed in part II.

Renu Malavya rightly emphasizes both horizontal (across departments) and vertical inter-linkages (across departments of higher education and primary education). This, according to her, will 'enable not only the flow of knowledge in one direction but rather facilitate the creation of knowledge at both ends and then transmission to each other.

Anita Dighe identifies several problems for universities undertaking basic education work from her experience at the Jawaharlal Nehru University. These are: confusion of terminologies, marginal status of adult education and absence of appropriate

---

[1] Minati Panda: Culture and Mathematics: A Case Study of the Saoras in Orissa, ibid, page 210.

[2] Jacob Aikara: Role of Research in Promoting Basic Education, ibid, 256.

organizational structure of adult, continuing and extension education in universities. She suggests corrective measures in the organizational structure by augmenting the importance of teaching and research functions in these programmes to make any linkage successful. The problem with this paper is that in most part it deals with adults and not enough with basic education as defined.

Usha Menon reviews critically the existing transformative linkages between higher and mass education through visualization, planning and training and suggests an alternative emphasizing a process of 'enculturation' having two phases: first, formation of a new community, based on teaching with comprehension and second, 'multiplication of the communities by providing the possibility for newcomers to be encultured through a process of 'legitimate peripheral participation'. The paper is highly theoretical in nature, sometimes difficult to understand.

To conclude, in spite of some shortcomings identified in some of the papers and some missing themes, such as the national service scheme and the role of planning in the linkage, the volume makes an excellent contribution to the knowledge on linking higher education with basic education. The editor has done an excellent job in clarifying concepts, defining the terms used and the scope of the volume, summarizing each paper and grouping them into broader themes.

Excepting a few papers, the volume makes a very easy and enriching reading. The case studies constitute a mine of information for educational managers, planners and researchers. The large lists of references and extensive explanatory notes attached to each paper and the index provide useful intellectual material for stakeholders in linkage between higher and basic education.

Adviser, IIEP,
UNESCO, Paris

Bikas C Sanyal
E-mail: b.sanyal@iiep.unesco.org

Miguel Palacios LLERAS (2004) ***Investing in Human Capital – A Capital Markets Approach to Student Funding.*** Cambridge University Press, pp.224 hardbound ISBN: 0-521-82840-6

With public austerity in funding of higher education, there has been a continuous search for alternative methods of financing in many countries – developing and developed. The book under review is about one particular mechanism of funding higher education, viz., human capital contracts. What is the Human Capital Contract? It is similar to student loans, particularly the income-contingent loans. A student signs a contract with an investor in which he or she commits to pay a fixed proportion, x (say 10 per cent) of his or her income for the next n (say 20) years after graduation in exchange for a sum, y (say $100,000) to pursue higher education. The investor gets x per cent stake in n years of student's income. This equity-like instrument is the contract – 'the human capital contract.' This contract is also supplemented by the author, by what he calls 'human

capital option,' an option which ensures the graduate against overpaying if he or she turns out to be a high earner. The mixed instrument of human capital contract and the human capital option is claimed to be an important mechanism of financing higher education. The book deals with this seemingly new method of financing higher education. The concept is not as new as it is made to appear, though the concept has not been in much use. The author however does not claim that this is altogether a new idea. He traces the origin to Milton Friedman.

The book is organised in 11 chapters grouped into three major parts: the first part containing three chapters gives a very brief overview of the problem of financing higher education; the human capital contract is the theme of the four chapter part II; and the final part deals with implementation of the method of human capital contract.

The author traces the origin of the idea of human capital contracts, and describes the benefits of this method that the students get and the benefits the markets get, though not in comparison with alternative methods, and pleads for adoption of the method. How far is it different from student loans? Not much, but for the details, for example, include, that there is no reference to any interest rate in the human capital contracts. Surprisingly, the author feels that there is no 'debt' that the student has to feel, unlike in case of loans. But it is not clear how does the student feel no burden of debt or repayment? More importantly, it is not clear, why the investor would like to invest a huge sum in the education of a student. After all, the problems, the lender feels in the education capital markets – asymmetric information on the value of human capital, uncertain value, illiquid investment and absence of collateral, etc., that the author describes in chapter 2 - would remain. In the same way, the constraints that the students feel in taking loans would remain in case of the human capital contracts too – the benefits are unknown, the value of benefits is uncertain; education is an illiquid investment, and it cannot be collateralized.

The book makes an interesting reading and the proposal made is worth serious attention of the educational planners and policy makers.

But there are some disappointments, if not weaknesses, of the book. A student of Economics of Education, or those familiar with the literature on Economics of Education might feel disappointed with the book, for an important concept, viz., human capital and an issue, viz., financing of higher education, in Economics of Education is discussed and analysed not in the framework of Economics, but more in the framework of theory and practice of finance. Basically, 'human capital' is a concept developed by economists. The concept has led to a 'human investment revolution in economic thought'. The author does not spend time in discussing the concept much. While this may not be necessary, given the main title one might expect a good discussion on it. A cursory overview of value of education is presented in Chapter 1, which does not do justice to the volume and richness of the literature in the area. So are the second and third chapters that present brief and incomplete accounts of market failures in education, and need for alternative methods of financing. The author does not feel the need to discuss the existing methods and what is the need for searching alternative methods.

Human capital contract is a method of private financing of higher education. The author does not feel the need to discuss the relative strengths and weaknesses of private (versus public) financing of higher education, or the relative strengths and weaknesses of the human capital contract in comparison with taxes, student tuition, etc. The investor can be a private one, or can, in principle, be the government itself, as the author observes, which case it is more important to know how is it preferable to conventional methods.

On the whole, this is one book that goes into details on several aspects of the human capital contract, and its implementation, and hence, one might find it useful and the idea proposed in the book is worth pondering on.

NIEPA
New Delhi 110016

Jandhyala B G Tilak
E-mail: jtilak@vsnl.com [or] jtilak@niepa.org

Journal of Educational Planning and Administration
Volume XIX No. 2, April 2005

The Asian Economic Review

Journal of the Indian Institute of Economics

Volume 47	April 2005	No.1

CONTENTS

Subscription rates			
Category	**1st yr**	**2 yrs**	**3 yrs**
Indian (Rs	300	575	850
Foreign (in$US)			
Airmail	80	150	--
Seamail	57	105	-

The Indian Institute of Economics, FEDERATION HOUSE, 11-6-841, Red Hills, Hyderabad-500 004.(India).Phone:(O) 23393512,Fax: 91-40-23395083.
Email: iieaer@yahoo.com

Journal of Educational Planning and Administration
Volume XIX No. 2, April 2005

INDIAN JOURNAL OF AGRICULTURAL ECONOMICS
(Organ of the Indian Society of Agricultural Economics)

Vol. 60	APRIL-JUNE 2005	No. 2

CONTENTS

Annual Subscription Rates

Individual Membership Fee	: Rs. 300.00; £ 35.00; $ 63.00.
Life Membership Fee	: Rs. 3,000.00; £ 350.00; $ 630.00
Institutional Subscription	: Rs. 600.00; £ 54.00; $ 125.00.

Please address correspondence to the Hon. Secretary & Treasurer, The Indian Society of Agricultural Economics, 46-48, Esplanade Mansions, M.G. Road, Fort, Mumbai-400 001 (India).
Telephone : 022-22842542 Fax : 091-022-22838790 email : isae@bom7.vsnl.net.in

Subscription Form for the

Journal of Educational Planning and Administration

Please enroll me for the subscription of the
JOURNAL OF EDUCATIONAL PLANNING AND ADMINISTRATION

Name and Address
(in Capital Letters) _____

_____

_____

_____PIN_____

Subscription for the calendar year _____. Annual Subscription commences with January and ends with October every year.

[Please tick mark (✓) the appropriate one]

- ☐ Rs. 150/- Subscription for individuals in India
- ☐ Rs. 350/- Subscription for Institutions in India
- ☐ US$ 60 Subscription for individuals (By Air Mail) outside India
- ☐ US$ 85 Subscription for Institutions (By Air Mail) outside India

NIEPA offers 20% discount on subscription for three years and above. Please make the payment by Bank Draft in favour of **National Institute of Educational Planning and Administration** payable at **New Delhi**.

Details of the Enclosed Bank Draft:

Bank Draft No. ..... Dated..... Drawn on .....

Date_____ Signature _____

Please mail this subscription order form along with the Bank Draft to:

The Deputy Publication Officer
National Institute of Educational Planning and Administration
17-B, Sri Aurobindo Marg, New Delhi-110016 (INDIA)

Tel: 91-11-26861635, 26962120 Fax: 91-11-26853041
E-mail: publications@niepa.org

Journal of Educational Planning and Administration

Regarding subscriptions, advertisement, circulation, missing issues, etc., please contact

Deputy Publication Officer
National Institute of Educational Planning and Administration
17 B Sri Aurobindo Marg, New Delhi 110016
Tel: 26861635(D) or 26962120 Extn. 316 and 313
E-mail: publications@niepa.org

Regarding exchange of the Journal and missing issues, please contact

Librarian
National Institute of Educational Planning and Administration
17 B Sri Aurobindo Marg, New Delhi 110016
Tel: 2686 2507 or 26962120 Extn. 111
E-mail: deepakmakol@niepa.org [or] niepalib@vsnl.com

Only editorial matters be addressed to the Editor, JEPA

Tel: 26861320 or 26962120
E-mail: jepa@niepa.org

For more details please log on to our website **www.niepa.org**
Also see http://niepalib.freeyellow.com