HIGHER EDUCATION IN NEPAL:

Supporting Aspirations for Prosperity

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Introduction to the Book

In 2014, the then Secretary General of the United Nations, Ban Ki-Moon, wrote that "all regions and countries can benefit from progress toward a knowledge-based economy, which does not depend heavily on material resources, places less of a burden on ecosystems and is more sustainable than other economic models. By shifting to a knowledge-based economy, societies can move from the age of scarcity to the age of abundance. Knowledge does not deplete with use but rather increases as it is shared among people. Through technological innovation, we can help usher in a more sustainable future...". Against this background, Professor Joshi's new study, entitled *Higher Education in Nepal: Supporting Aspirations for Prosperity*, provides a timely analysis of the role and achievements of higher education in Nepal. The study not only assesses the performance of the higher education system and identifies the main challenges faced in recent years in a very candid way, but it also proposes bold steps to take the system forward and address the main bottlenecks with regard to access, quality, financing and governance. The measures outlined in the report offer an attractive roadmap for policy-makers and university leaders alike. This is a comprehensive and well-written report, which anyone interested in the contribution of higher education to economic and social development in Nepal should read carefully.

Dr. Jamil Salmi
Global Tertiary Education Expert

This is indeed a valuable book which provides an in-depth analysis of the state of higher education in Nepal. The essential value of this book lies in its international comparisons and the manner it presents a spirited and compelling arguments for rethinking the way we envisage and manage our higher education system. The deep insight that one gets from this book would be immensely useful to understand the complexity of Nepal's higher education and help shape our future higher education policies.

Kedar Bhakta Mathema
Former Vice Chancellor Tribhuvan University

In 1972, through the introduction of the New Education System Plan under the initiative of the Royal Palace, the higher education system was radically transformed. Higher education institutions accountable to the beneficiaries were made accountable to the government, which resulted in the decline of higher education. The Plan had to be abandoned within a decade after its implementation. Since then quality of and increased access to higher education have been issues of major concern for the academia and society at large. In the context of the growing global realization of the importance of investments in higher education for economic growth the idea of the importance of reforms in the higher education sector took root in Nepal. The launching of the Higher Education Project with support from the World Bank in 1994 was a result of this realization. The World Bank support for reforms in the

sector continues to date through the Higher Education Reforms Project. The need for documenting the results of the reform initiatives is being felt since long. This book fills the gap.

The author of this book, Prof. R. D. Joshi, began his career in higher education of Nepal as a faculty member of the Institute of Engineering of Tribhuvan University. He served as the Dean of the Institute. During his short tenure of four years as the Dean he implemented important reforms in the Institute including decentralization of the Institute and the improvement in cost-sharing practices aiming to promote quality learning and increase access to engineering education. In the beginning, students were reluctant to accept the cost-sharing reform and forcefully sought its withdrawal. However, Prof. Joshi was able to convince students about the importance of the reform. Reforms undertaken under his leadership helped the Institute to make progress in leaps and bound.

Working with the World Bank in Nepal, Ethiopia and other countries he has further sharpened his knowledge of the higher education sector. He has authored several publications related to higher education. Prof. Joshi has thus proved himself to be an authority of higher education in Nepal and abroad.

This book addresses the nation's vision of "Prosperous Nepal and Happy Nepalese" by providing important insights for development of higher education in Nepal. Chapter four to six of this book are dedicated to identifying today's challenges of Nepal's higher education and suggests policy reforms for addressing them effectively. Recommendations made in this book are expected to help Nepal in attaining the vision of prosperity and happiness. They are logical, comprehensive, expertly written, thoughtfully crafted and apt to be added to resource collections of relevant academicians, policy leaders and decision makers. The book provides logical approach to academic excellence and may prove to be an important asset for everyone engaged in higher education development in Nepal.

Dr. Kamal Krishna Joshi
Former Vice Chancellor, Tribhuvan University
Former Chairperson, University Grants Commission

About the Author

Rajendra Dhoj Joshi is a Citizen of Nepal. He holds Ph.D. in Electrical Engineering. He served at the Institute of Engineering for over two decades in various capacities including Professor of Electrical Engineering and the Dean. Subsequently, he joined the World Bank and worked for the education sector in Nepal, Russia, Ethiopia, Afghanistan, Bangladesh, Kazakhstan, India and Bhutan. He has the experience of the entire spectrum of the education sector. His key area of focus has been in enhancing the efficiency and effectiveness of education service delivery through reforms. He is associated with numerous critical reforms in the education sector, which include introduction of the full fee concept at the Institute of Engineering, decentralization in higher education, performance-based funding of schools and higher education institutions, opening textbook supply to the private sector, community-based management, per capita financing for schools, quality assurance and accreditation of higher education institutions, poverty-targeted financial assistance for students . He has authored a publication on higher education reforms in Nepal titled "Reforms at the Institute of Engineering, Tribhuvan University, Nepal" (2002) and coauthored a publication titled "Secondary Education in Ethiopia, Supporting Growth and Transformation" (2013), both published by the World Bank. At present, he is a member of the Board of the Policy Research Institute, a think tank, established by the Government of Nepal.

Foreword

The failings of the higher education system are well documented in reports of various education commissions. Yet most of them remain unaddressed. The purpose of this book is to trigger a serious debate on the dire state of higher education, which could provide an impetus for addressing these failings.

Initiatives for higher education reforms can come from the political level – the government and Parliament – and from the implementation level – universities and campuses. With exception of the initiative to implement the New Education System Plan in 1971 no significant initiative for higher education reforms has come from the political level. Among notable and difficult reforms undertaken at the implementation level are decentralization and internal resource generation initiatives, including implementation of the full fee system and phase out of proficiency level programs. Opening the higher education sector to private providers was another significant reform in terms of its consequences, which was implemented with little controversy.

Decentralization initiatives at Tribhuvan University remain largely an unfinished agenda due to the lack of commitment to push this reform at the university leadership level and the lack of realization of the importance of this reform at the higher levels. Considering that the initiative for resource generation initiatives came from campuses and institutes achievements made by this reform should be regarded as remarkable. Higher education reforms are politically difficult reforms. They can be

implemented successfully only when they are led by leaders with resolute commitment, competence and credibility. In a poorly functioning higher education system like the one in Nepal leaders with the above characteristics are rare. Therefore, for successful implementation of higher education reforms on a system wide basis it is important to develop a good understanding about the acute importance of these reforms at the political level and generate in politicians an unwavering commitment to undertake reforms.

Hitherto problems in higher education have been discussed in isolation without linking them to the broader agenda of national development. The author has attempted to make a compelling case for higher education reforms by presenting international evidence about the role of higher education in economic development. The book argues that the vision of Prosperous Nepal and Happy Nepali will simply remain a mirage unless the Government makes a resolute commitment to higher education reforms.

Problems in higher education are not easy to understand given that their manifestations are very broad and deep, and they are intertwined with the overall governance problems the country is facing. The book tries to distill out the root causes of problems from their symptoms and crystallize a priority reform agenda. Further it also proposes a sequence of policy reforms to be implemented.

The blame for inaction in the face of the dire state of higher education cannot be put on politicians alone. It will only be fair to apportion part of this blame to the academia. The academia has failed to fulfill its obligation by conducting rigorous objective analysis of the problems higher education has been facing and suggesting credible actions for addressing them. It is hoped that this book may incite the academia to engage more seriously in policy analysis.

Rajendra Dhoj Joshi

Acronyms

AAS	Agriculture and animal sciences
AFU	Agriculture Forestry University
ARWU	Academic Ranking of World Universities
BOG	Board of governors
BOT	Board of trustees
BPKIHS	BP Koirala Institute of Health Sciences
FWU	Far-Western University
GDP	Gross domestic product
GER	Gross enrolment ratio
GON	Government of Nepal
GNI	Gross national income
GPI	Gender parity index
HEI	Higher education institution
HERP	Higher Education Reforms Project
HIC	High-income country
HSS	Humanities and social sciences
ICOR	Incremental capital output ratio
ICT	Information and communication technology
IIT	Indian Institute of Technology
IOE	Institute of Engineering
IOM	Institute of Medicine
KU	Kathmandu University
KUSOE	Kathmandu University School of Engineering
LBU	Lumbini Bouddha University
LIC	Low income country
LMIC	Lower middle-income country
MIC	Middle income country
MOE	Ministry of Education
MOEST	Ministry of Education, Science and Technology
MWU	Mid-Western University
NSU	Nepal Sanskrit University
NUS	National University of Singapore
OECD	Organization for Economic Cooperation and Development
PG	Post-graduate
PokU	Pokhara University
PPP	Purchasing power parity
PU	Purbanchal University
QAA	Quality assurance and accreditation
R&D	Research and development
RDI	Research, development and innovation
SSDP	School Sector Development Program
S&T	Science and technology
SFAFDB	Student Financial Assistance Fund Development Board
STEM	Science, technology, engineering and mathematics

TU	Tribhuvan University
UGC	University Grants Commission
UIS	UNESCO Institute of Statistics
UMIC	Upper middle-income country
VC	Vice-Chancellor

Executive Summary

After more than six decades of people's struggle with the promulgation of the Constitution crafted by elected representatives of the people and creation of a conducive environment for a stable government Nepal's quest for political stability may have ended. In this context, the government, responding to the raised aspirations of the people, has articulated the vision of Prosperous Nepal and Happy Nepali. This note is aimed at analyzing how higher education can support the attainment of this vision.

The note begins with the articulation of the economic growth target compatible with the vision of Prosperous Nepal and Happy Nepali. Then it discusses the role of higher education in economic development based on international experience. Further, based on the analyses of higher education indicators of low income, lower middle-income, upper middle-income and high-income countries, it determines higher education outcomes to be attained by Nepal to achieve the economic growth target. The note identifies challenges for attaining these outcomes based on the analysis of the current state of higher education. Then it suggests policy interventions for addressing the identified challenges. The note ends with suggestions for implementing higher education reforms.

Country Context

Nepal has set a goal of becoming a middle-income country (MIC) by 2030. The World Bank threshold for transition from the status of a low-income country (LIC) to a MIC for 2018 is a per capita gross national income (GNI) of US$995 [World Bank. 2018], whereas the GNI/capita of Nepal for 2017 was US$790 [World Bank. 2018a]. All Asian countries except for Afghanistan are already MIC. The goal of becoming a MIC by 2030 is not compatible with the vision of Prosperous Nepal and Happy Nepali. For example, if Nepal is to aim at becoming a MIC by 2030 it will not be able to catch up with any of the Asian countries including Bhutan, which had GNI/capita of US$2,720 in 2017.

Nepal would not be able to fulfill people's aspirations for prosperity by perpetuating the status quo scenario of economic growth because Nepal is not only the second poorest country in Asia but it is also growing slower than others. The government is obliged to make utmost efforts for meeting people's aspirations because they have endured over six decades of hardships in the quest for establishing a democratic governance and created an environment for political stability. In this context, Nepal needs to set an ambitious but realistic developmental goal learning from the experience of countries, which have achieved prosperity in a short span of time. The GNI/capita of Republic of Korea was US$650 in 1975, which was less than that of Nepal of US$790 in 2017, became a high-income country (HIC) with per capita GNI of US$13,040 in 1996, that is within 21 years. The GNI/capita of Portugal was US$790 in 1969, which was equal to that of Nepal in 2017, became a HIC with per capita GNI of US$13,230 in 2003, that is within 34 years. Japan, Singapore, Spain and Greece were able to transition from a LIC with per capita GNI equal to or less than that of Nepal in 2017 to a HIC within 23 to 33 years. Based on the above experience setting a target of attaining the HIC status by 2050 that is increasing the GNI/capita from US$790 to US$12,056 in 33 years will be an ambitious but not an unrealistic target. This note suggests reform interventions in higher education in order to enable it to support Nepal's ambition for becoming a HIC by 2050.

Role of Higher Education in Economic Development

This chapter begins with the presentation of the historical evidence of knowledge and its use driving the economic growth. Then it shows that a high participation rate in higher education with a high share of Science, Technology, Engineering and Mathematics (STEM)[1] education is critical for competitiveness in the global market. Further it shows the relationship between research capacity and economic growth and concludes that the disparity in prosperity across countries is also associated with the diversity in the research capacity. It discusses about how economic growth is facilitated by turning research outputs into innovation, and the role of universities in innovation. It makes a case for development of world-class research-oriented universities and strengthening research capacity of other universities based on the observation that the time lag between invention and innovation is decreasing dramatically, which makes creation of new technology by developing countries critically important for catching up with developed countries.

Knowledge – Driver of Economic Growth

Creation and use of knowledge have been the key driving force behind the development of human race. The heterogeneity in development of different countries can be explained by the difference in their ability to create and use knowledge. There is a solid empirical evidence to support this hypothesis. In 1 AD contributions of India and China to the world GDP were around 32% and 25% respectively, which declined to about 3% and 5% respectively by 1970 [Economist.2018]. The above dramatic change in the prosperity of India and China corelates with the change in their ability to create and use knowledge. Around 1 AD India with University like Taxila was at the forefront of knowledge creation and use (Wikipedia. 2018) and the Chinese education system – the oldest in the world – was established two millennia ago [Asia Society.2018]. But around 1970 these countries reached the lowest point in terms of their ability to create and use knowledge.

The World Bank elaborates the role of tertiary education in socio-economic development in the following way, "Tertiary education institutions have a critical role in supporting knowledge-driven economic growth strategies and the construction of democratic, socially cohesive societies, tertiary education assists in the improvement of the institutional regime through the training of competent and responsible professional needed for sound macroeconomic and public-sector management. Its academic and research activities provide crucial support for the national innovation system. The norms, values, attitudes, and ethics that tertiary education institutions impart to students are the foundation of the social capital necessary for constructing healthy civil societies and cohesive cultures – the very bedrock of good governance and democratic political system [World Bank 2002]".

Enrolment Rate and Share of Science, Technology, Engineering and Mathematics

The technology of production is being continuously upgraded in developed and developing economies alike. In 1995, for the first time the value of high-technology exports from developing countries exceeded that of their low-technology products [World Bank 2002, p.55]. The ability of developing countries to continuously upgrade technology in order to ensure competitiveness of their produces in the global market is a precondition not only for attaining prosperity but also for sustaining their economy.

[1] STEM and Science and Technology (S&T) means the same thing in this note and are used interchangeably.

Technological sophistication of production entails higher demand for the work force with tertiary education. A scatter plot of tertiary GER and GNI per capita of 35 countries with GER of above 47.4% and GNI per capita of above US$19,020 shows a positive correlation between GER and GNI/capita, which implies that countries aspiring for prosperity need to significantly expand higher education. For example, GER of Republic of Korea and Finland increased from 7.2% and 13.1% respectively in 1971 to 99.7% and 95.6% respectively in 2010, which are at par with that of the US, which was the first country to aggressively expand higher education. In 1971, its GER was already 47.3%. The comparison of trends of increase in GNI/capita and GER of Korea, Turkey and Chile over the period of 1990 to 2015 glaringly shows the connection between the increase in the GNI/capita and GER.

Developed countries have been prioritizing science, technology, engineering and mathematics (STEM) while expanding higher education. The following statement in the US Federal Five-Year Strategic Plan 2013 eloquently articulates the importance of STEM education: "Advances in science, technology, engineering and mathematics have long been central to our Nation's ability to manufacture better and smarter products, improve health care, develop cleaner and more efficient domestic energy resources, preserve the environment, safeguard national security, and grow the economy" [NSTC. 2013, p. vi]. All developed economies have high shares of STEM graduates in the total number of higher education graduates, which is in the range of 35-50%. The shares of STEM of technologically advanced countries like Finland, Israel, Sweden and Republic of Korea are 51.5%, 49.5%, 48.6% and 45.3% respectively. The US, which has the share of STEM of 35% is facing the shortage of STEM human resources. According to McKinsey, 64 percent of companies have vacancies for STEM positions due to a lack of qualified applicants and by 2020, the U.S. will demand 123 million highly-skilled workers, but there will only be 50 million qualified people to fill these roles [ATT.COM.2018].

Research Capacity and Economic Growth

The higher the technological sophistication of production of a country the higher is its ability to add value to its produces and thus accumulate wealth. The technological superiority is achieved through the superiority in the research capacity, which is built by nurturing research in universities to begin with. Building research capacity of universities is critical because there is a relationship between the research capacity of country's universities and its prosperity. For example, all countries with GNI per capita greater than US$PPP37,400, which do not derive their wealth primarily from natural resources, have at least one university in top 100 based on Academic Ranking of World Universities (ARWU).

One of the main reasons behind the disparity in wealth of nations is their uneven research capacity. Top 100 universities are located in 18 countries and top 800 in 54. Any country aspiring to become prosperous should take an immediate initiative to build top ranking research-oriented universities. International experience indicates that relatively poorer countries can build research capacity competitive with that of richer countries. For example, the best university of China with GNI/Capita of US$PPP15,550 ranks 48th in the world whereas the best university of Finland with GNI/capita of US$PPP43,400 ranks 56. Research excellence of Chinese universities have played a critical role in the rapid economic growth of the country.

Role of Universities in Patenting

To generate wealth from research outputs it is important to patent the intellectual property developed. The number of patented technologies serve as a proxy for ability to develop new technologies. In 2015, the number of technologies patented in China was 365 thousand compared to that of the US of 298 thousand, which has helped making Chinese produces competitive in the global market. Patents per GDP reflects technology intensiveness of a country. Korea tops in terms of technology intensiveness of production with 647 patents per billion US$ of GDP compared to that of the US of 135. Considering the importance of innovation for economic growth countries are creating favorable environment for innovation as reflected in the following statement in OECD, 2008 "the state has also moved in a number of countries – starting with the USA – to make the development and patenting of technologies, as well as the licensing of their use, attractive for university researchers and universities, by granting researchers the intellectual property rights over scientific finding arrived at with the use of public funds "[OECD.2008].

Bulk of research takes place in universities but the role of universities in patenting varies from country to country. East Asian universities are contributing more in patenting compared that of the US. The experience of China and Republic of Korea shows that when university-industry linkage is carefully designed and facilitated by the government universities can contribute more to patenting. OECD 2008 emphasizing the role of universities in supporting economic growth in developing countries states, "this means changing the current paradigm to include (in addition to teaching and research) a third mission: service to the community and close cooperation with the public and private sectors to contribute to innovation and development.

Translating Research Outputs into Economic Growth

New technology developed through research helps companies to increase value addition to their produces by reducing production costs or by enhancing the quality of produces or by offering novel products. The first option enables companies to accumulate wealth by capturing a larger share of the market. It is through this option that industrialized countries displaced local producers in developing countries. Production of high-quality products enables companies to accumulate wealth by charging premium price for their produces because of the limited competition they face in the market. The ability of Toyota to charge higher price for their cars compared to say Mahindra is an example of this option. An example associated with the third option is iphones. Apple company, which is the wealthiest company in the world in terms of the market value, has been able to accumulate wealth of over US$1 trillion within a short span of time because of its ability to produce novel products, which did not have to face much of a competition.

The ability of producers to continuously upgrade the technology of production is critical not only for accumulation of wealth but also for even surviving in the market. Companies have been spending considerable amount of resources in research, development and innovation (RDI) to gain a competitive edge in the market. For example, Nestle – a commodity producer specializing on food items – spent 1.63% of the sales on Research and Development (R&D) in 2013 [Nestle.2013]. Volkswagen, famous for quality of its cars, spent 5.2% of its revenues on R&D. Intel, a company well known for innovation, spent 21.2% of its revenues on R&D in 2017 [eenewsanalog.com.2018].

The comparison of wealth generated by companies seriously engaged in RDI and Nepal helps to comprehend the potential of RDI in wealth creation. For example, in 2016, the revenue of Nestle was

about four and half times higher than the GNI of Nepal, and the profit of Apple was about five times higher than the budget of Nepal.

The Case for Strengthening University Research Capacity and World-Class Universities

Both the pace of creation of new knowledge and the time lag between its creation and use has been reducing over time, which has accelerated in the recent decades. In this context, technologies are becoming obsolete in relatively shorter period of time, and as a result when patent enforcement period ends the patented technology may not have much of a value. This implies that developing countries may have to keep paying royalty for technology to keep an up to date technology, and consequently, the profit margin for goods and services produced will be relatively small. Therefore, for catching up with richer countries the only option will be to get engaged in RDI.

The realization that research is one of the driving forces behind the economic growth has led developed countries to create or sustain research-oriented universities of the highest standard, which are recognized now as world-class universities. Intense discussion and actions on building world-class universities are underway since the nineties. Because of the intensification of research in developed countries the knowledge and technology gap between developed and developing economies are bound to expand further making more and more difficult to fulfill the aspirations of prosperity of developing countries. In this context, developing countries aspiring to catch up with developed countries should at the earnest take initiatives for building world-class research-oriented universities and strengthen research capacity of other universities.

Higher Education Outcomes for Prosperity

Higher education outcome attainment targets for transforming Nepal into a HIC by 2050 articulated in this chapter includes the enrolment rate, share of STEM, RDI capacity and quality and relevance. It is not possible to predict with reasonable accuracy how the technology of production and structure of economy and work force will evolve over such a long-time horizon. Therefore, the targets suggested here are meant to provide some guidance for higher education development rather than a prescription. These targets should be updated periodically based on the information available.

Participation Rate and the Share of STEM

In 2015/16, Nepal's tertiary GER of 14.6% is higher than the LIC average of 7.6% but lower than the LMIC average of 23.1%. To get up in the prosperity ladder it is not enough for Nepal to compete with LIC but it will have to compete with richer countries as well. Therefore, in spite of the relatively high GER compared to the peers in the income group increasing GER is a pertinent agenda for Nepal. Consistent with the goal of attaining the status of a HIC Nepal should aim at increasing the GER to 70% by 2050, which is close to the HIC average of 73.4% for 2016. The intermediate targets for GER for 2030 and 2040 respectively are 28.8% - equal to Vietnam's GER for 2016 - and 43.4% - equal to the GER of China for 2016 – respectively [UIS.2018].

There is stark inequity in access to higher education by income and social groups. In 2010/11, the share of the richest (fifth) quintile is higher than four poorer (lower) quintiles taken together [NLSS.2011]. While hill Brahmin-Chhetris and Newars are significantly over represented in the enrolment compared to their population share Janajatis, Madeshis, Dalits and Muslims are underrepresented [Bhatta P. 2008]. From the perspective of attaining the targets set for the participation rate significant efforts will be needed to reduce this disparity significantly.

In 2016, the share of STEM graduates in the total number of higher education graduates of 16.1% in Nepal was low compared to that of low-income Rwanda of 35.9%, lower middle-income India, Vietnam and Democratic People's Republic of Korea of 34.7%, 35.9% and 68.1% respectively, and high-income Republic of Korea and Finland of 47.2% and 50.4% respectively. Nepal should aim at increasing the share of STEM to about 35% by 2030 - close to that of Vietnam of 35.3% in 2016, about 43% by 2038 - close to that of Malaysia of 42.7% in 2016, and about 50% by 2050 - close to that of 50.4% of Finland in 2016 [UIS.2018].

STEM or Science and Technology (S&T) disciplines are broadly classified into the following clusters by UNESCO Institute of Statistics (UIS): engineering, manufacturing and construction; agriculture, forestry, fisheries and veterinary; information and communication technologies; health and welfare; and natural science, mathematics and statistics. Among these clusters the share of engineering, manufacturing and construction graduates of Nepal is especially low, which was 3.2% in 2016 compared to that of low-income Rwanda of 5.6%, lower middle-income India, Vietnam and People's Republic of Korea of 11%, 21.4% and 37.5% respectively. Nepal should aim at increasing the share of engineering enrolment to about 20% by 2035, which is close to Vietnam's share of 21.4% for 2016. In 2016, the share of agriculture, forestry, fisheries and veterinary graduates of Nepal of 0.5% was also very low compared to that of low-income Rwanda of 5.8%, and lower middle-income Vietnam and People's Republic of Korea of 6.2% and 16.3% respectively though around 63% of the population depend on agriculture for livelihoods and it contributes 28.2% to the GDP of Nepal [NPC.2016]. This share is also lower that of high-income Denmark and Finland of 2% and 2.3% respectively notwithstanding the very low share of this sector in GDP of these countries – 1.3% (2013) and 2.3% (2017) respectively - compared to that of Nepal [Statista.2018]. In this context Nepal should aim at increasing the share of agriculture group enrolment to about 6% by 2035, which is close to Vietnam's share of 6.2% for 2016 [UIS.2018].

Research Capacity, Quality and Relevance

The research capacity of Nepal can be judged from research excellence of its universities. In 2018, according to Cybometrics Lab the best university of Nepal ranks 2,045[2] in excellence whereas that of Uganda, which a LIC with lower GNI per capita than that of Nepal, ranks 910. India, a LMIC, stands out in terms of research excellence. The ranking of its best university of 478 is by far the best among LMIC. It is this capacity that is providing competitive edge for India, among others. Upper middle-income China's best university, which ranks 16th, is significantly ahead compared to best universities of high-income Singapore, Japan, Netherlands, Republic of Korea and Japan. This has provided competitive edge for China [Cybometrics.2017]. Nepal should aim at enhancing the level of excellence of its best universities to 700-900 rank in Webometrics ranking by 2025 at par with the ranking of best

[2] The ranking of HEIs used in this note refers to various dates. Hence, the ranking of the same HEI in various parts of this note may not match.

universities of Bangladesh and Uganda in 2018. The more longer-term goal should be its best universities to be ranked within top 500 in ARWU ranking by 2035 and top 100 to 200 by 2050.

Quality Assurance and Accreditation (QAA) and global rankings are two tools used for assessment of quality of HEIs. The main purpose of QAA are to guarantee compliance with (minimum) standards and to support quality enhancement. And the purpose of most rankings is to identify best HEIs in terms of excellence [Wachter B. et al.2015]. To date out of over 1,407 HEIs only 26 have been accredited so far, and the QAA covers only campuses but not the universities, which control their curriculum and examinations. Therefore, there is no basis to claim that HEIs in Nepal meet minimum standards. The immediate goals in terms of quality and relevance of HEIs should be to implement mandatory accreditation of all HEIs including universities within 2023 as per the decision of the University Grants Commission (UGC).

Webometrics Ranking of Universities is the only ranking, which enables comparison of over 28,000 HEIs. Twenty-nine Nepali HEIs are ranked by it. In terms of overall ranking only two universities Tribhuvan University (TU) and Kathmandu University (KU) are ranked within top 4,000. In terms of excellence ranking only five HEIs – KU, TU, BPKIHS, PokU and PU - have rankings better than 6008, which is the lowest rank for excellence [Cybometrics. 2018]. This implies that no meaningful research is being conducted in twenty two out of twenty-nine HEIs ranked. Nepal should aim at enhancing the excellence ranking of its best universities to 1,000 to 1,500 by 2025 at par with that of Bangladesh and Uganda in 2018. The more longer-term goal should be its best universities to be ranked within top 500 by 2035 and top 100 to 200 by 2050.

Challenges in Higher Education

This chapter describes the higher education system with a view to crystallize challenges for attaining the higher education outcomes needed for supporting the country's transformation into a HIC. It begins with the description of higher education institutions and their enrolment followed by financing, higher education system governance, internal governance of HEIs and reform initiatives in the area of internal governance of HEIs.

Higher Education Institutions and Their Enrolment

In 2015, higher education programs were offered by nine universities with powers to affiliate campuses and four degree granting institutions without powers to affiliate campuses. Tribhuvan University – the first university – accounts for 79% of the total higher education enrolment. Two third of higher education students are being catered to by the non-public provision – community (30.8%) and private (35.5%) campuses. Out of 1,407 campuses only 67 campuses have enrolment of over 1,000 students. The share of post graduates (PG) students in the total enrolment is low – 11.7% for PG and 0.3% for PhD. The share of S&T enrolment in the total enrolment is 20.4%, and in the enrolment of constituent, community and private campuses are 30.7%, 27.1% and 1.4% respectively [UGC.2017].

Financing

Higher education is financed by the government on a cost sharing basis. The allocation for universities towards recurrent expenditures are made based on approved staff positions. In 2015/16, the public subsidy per student in constituent and community campuses amounted to around Rs.49 thousand and around 3 thousand respectively [UGC.2015] Students in private campuses do not receive public subsidy. The cost sharing rate varies across universities and campuses. From 2003 to 2015 public financing for higher education fluctuated between 0.29% to 0.41% of GDP. It was 0.32% of the GDP in 2015 [MOF.2018].

To cope with the underfinancing of higher education constituent campuses have been offering programs in high demand on full fee basis. Even with such initiatives the constituent campuses continue to face serious financing problem. For example, per student expenditures at the Institute of Engineering, where more than 50% of students are charged full fee, are 11 times lower than that of Indian Institute of Technology, Kanpur (IITK).

Higher Education System Governance

Though universities are established as autonomous entities through individual acts they do not have required autonomy from the government to deliver on their mandate. The major factors constraining the autonomy of universities are: a. universities are not able to frame their Rules independent of the government. University councils, which are responsible for approving the Rules, are chaired by the Prime Minister and a large number of government representatives including the Minister of Education seat on the councils; b. university leadership is appointed by the Prime Minister; c. the university councils are handicapped in fulfilling the oversight role with respect to the university management because the law does not establish accountability of the university management to the council and of the council to the government. The accountability structure for university is blurred; d. the acts prescribe internal management structure and procedures of universities in a detailed manner, which constrain the ability of universities to undertake management reforms; and e. the blanket provision in the law allowing the government to issue directives to universities have also compromised the autonomy of universities. The MOEST, based on the Basic Policy on Operation of Technical Colleges (MOE, 2006), issues permission for establishment of colleges through private investment – national and international - subject to affiliation by universities though TU Act grants the mandate of issuing permission for establishing private campuses to TU [GON. 2010]. This is an example of an encroachment in the areas of university competence by the government.

The affiliation system akin to that of Nepal exists only in India, Pakistan and Bangladesh. It is one of the most significant weaknesses of the higher education system that is holding back excellence. It relies for academic leadership of a small group of faculty participating in the process of curriculum formulation, teaching materials development and final examinations, and thus virtually disenfranchises a large group of faculty from contribution to academic excellence. The purpose of the affiliation system is to extend academic supervision to campuses, which have not developed capacity to offer their own programs, and strive towards graduating them to degree awarding status at the earliest. But in the Nepalese affiliation system is designed to perpetuate the affiliation closing the academic growth path for affiliated campuses. The current state of Tri-Chandra Campus, the first higher education institution established over a hundred years ago, is a glaring example of the damage the affiliation system has inflicted on higher education.

Nepal is one of the few countries without private universities – both not-for-profit and for profit. The rationale for not allowing private universities is weak since it does allow operation of private campuses. The reluctance to allow universities in the private sector appears to be more about the tendency of centralization of degree awarding authority rather than about the reluctance to allow the private sector in higher education. While the legitimacy of for-profit universities has been proven by the demand for them, the value of not-for-profit universities has been proven by the existence of many world-class universities of this type like Harvard, MIT, Caltech and Cornell. Private not-for-profit universities in India and Pakistan are also demonstrating that they can excel. In terms of excellence ranking Vellore Institute of Technology, a private not-for-profit HEI, ranks 696th, which is comparable to the ranking of the highest ranked public HEI - IIT Mumbai of 529th [Cybometrics.2018].

Nepal does not have a Higher Education Act, which has denied an instrument for implementation of policies recommended by various education commissions as well as the Higher Education Policy, 2015.

University governance

Despite heterogeneity in the enrolment size, location, program profile and public subsidy level university acts are similar to that of Tribhuvan University (TU) except for Kathmandu University (KU), which is a defined as a university in the non-government sector. The internal governance framework for TU as defined by the TU Rules severely restricts the freedom its campuses – constituent, community and private – though they have to shoulder the burden of operation. The main factors constraining the autonomy of campuses are: a. centralized Rules for 60 constituent campuses; b. centralized curriculum and examinations for over 1,100 campuses; c. centralized personnel management of constituent campuses; d. centralized determination of tuition fees of constituent campuses; and e. encroachment on financial and administrative autonomy of affiliated campuses.

TU constituent campuses, despite their heterogenous nature in terms of the origin, enrolment size, location and program profile, are governed by the same set of Rules. Autonomous campuses – seven out of 60 – have powers to frame Working Procedures within the Framework of the Rules. But this has not given meaningful freedom to autonomous campuses because the freedom within the Rules is very limited and the tendency of the central management to deny autonomous campuses their rights to exercise provisions of the autonomy as defined in the Rules.

Centralized curriculum and examinations have restricted the role of the faculty and campuses to delivery of programs following the prescribed textbooks leaving no space for them to innovate for better meeting the demand of the work place. As a result, neither the central university administration nor the campuses and faculty could be held accountable for the delivery of the programs. This is one of the reasons behind the poor accountability of the universities.

Centralized personnel management has severely restricted the ability of campuses to manage its faculty and administrative staff. It also does not help building campus ownership of the faculty and administrative staff. An institution without ownership of its staff cannot excel.

Due to the serious shortfall of public funding constituent campuses are left to generate resources on their own. At present, public funding does not cover even full staff costs in most campuses. The ability of campuses to generate internal revenues are a function of the quality of their delivery of programs,

which differ from campus to campus. Centralized determination of tuition fees has denied the opportunity of and incentives to campuses for generating more revenues by enhancing the quality of delivery of programs.

Affiliation of campuses to universities is about academic supervision of campuses because they are deemed not to have developed capacity for delivering their own academic programs. In this sense affiliated campuses are supposed to have full autonomy with respect to financial and administrative matters. But TU Rules require Chairpersons of affiliated campuses to be appointed by the Vice Chancellor. In the highly politicized environment of TU this provision has opened a window for extending political influence to affiliated campuses, which has at times made smooth operation of affiliated campuses challenging. TU Act gives the mandate for determination of tuition fees to the Executive Council. In spite of this provision affiliated campuses have been allowed to determine fees on their own until recently, which was logical since TU does not fund affiliated campuses and they depend for their operation on tuition fees. But in 2017, TU has approved a Working Procedure requiring affiliated campuses to get their fees approved by the Executive Council [TU.2017]. This provision, if implemented, risks the demise of affiliated campuses. Even if TU wanted to strictly adhered to its act it had the option of delegating the power for determination of fees to affiliated campuses. But it did not do so, which indicates at the tendency of TU to centralize power.

The hurdles for building internal and external accountability of constituent campuses to safeguard public interests is also holding back the progress of campuses. While autonomous and decentralized constituent campuses have supervisory boards, others do not. External stakeholders are not able exert meaningful influence on supervisory boards – management committee or board of governors – because these boards are chaired by internal stakeholders – mostly campus chiefs. The say of internal stakeholders in campus operation is also limited because campus chiefs are appointed by the Executive Council. The accountability of campuses to stakeholders is poor as evidenced by their inability to produce even annual reports and disclose information of public interest.

The public accountability of community campuses in the other hand is reasonably good. Their supervisory (governing) boards are chaired by external stakeholders and these boards play the role of trustees of the community, who has established the campuses. Campus Chiefs are appointed by and accountable to the supervisory board.

University Governance Reform Initiatives

Two major initiatives towards decentralization undertaken in TU are approval of Decentralization Rules in 1998 and Autonomy Rules in 2006. Four Institutes and 34[3] constituent campuses were decentralized. But decentralization was not extended to campuses under the Institutes. The major features of decentralization were formation of campus/institute management committees and the power for utilization of internal revenues generated. Decentralization has significantly contributed to generation of internal resources helping to alleviate financial hardship albeit modestly. Another achievement of decentralization was initiative of decentralized campuses and institutes to offer academic programs in demand on full fee basis. The potential of decentralization could not be fully

[3] Excluding campuses under decentralized Institutes, which have not been decentralized.

tapped because of the reluctance of the TU management to honestly adhere to the spirit of decentralization. As a consequence, this initiative has lost steam.

After thirteen years of implementation of TU Autonomy Rules only seven out of 34 decentralized constituent campuses have received governance autonomy. The key features of the autonomy are power to frame working procedures within the framework of TU Rules, guarantee of formula-based funding in form of block grants, provision for recruiting campus financed staff and academic autonomy. Achievements from autonomy have been mixed. This reform initiatives have been mired with autonomous campuses blaming the TU management for not implementing the provisions of the Rules in full and TU management blaming the campuses for lack of accountability. This reform has essentially stalled with respect to constituent campuses with no new demand for governance autonomy and not a single campus applying for academic autonomy. But with respect to community campuses there have been some progress albeit with difficulties. The experience of both decentralization and autonomy indicate at the reluctance of the management to sincerely move forward these reforms in spite of the fact that TU act gives ample scope for decentralization. It appears that decentralization within TU, and may be in other universities are unlikely to succeed without a strong push from the government.

Challenges

The challenges associated with the attainment of higher education outcomes necessary for supporting the goal of Nepal becoming a HIC by 2050 based on the status of higher education described above are presented here.

The challenges for attaining the attaining the GER of 70% by 2050 are as follows: a. the per graduate cost to the public in constituent campuses is significantly higher compared to community campuses yet the government is reluctant to increase its support for community campuses; b. private campuses produce graduates at no cost to the public yet the policies and practices are not conducive to enrolment expansion in private campuses; c. private campuses account for over two third of engineering enrolment and over three fourth of medical enrolment yet the private sector is facing hurdles for enrolment expansion in these areas in spite of the high demand for engineering and medical education; d. the low level of public funding for higher education; d. funding for HEIs are not linked to output or outcomes, which neither provides incentives for better performance nor penalizes for poor performance; and e. access to higher education for students from low income families is severely restricted.

The challenges for attaining the share of enrollment in STEM areas of 50% by 2050 are as follows: a. adequate public investment has not been made for expanding STEM education; b. there is a reluctance to fully tap the potential of the private sector; and c. no efforts have been made to tap the potential of community campuses to expand STEM enrolment.

The challenges for attaining the goal for quality and relevance set for 2050 are poor governance of the higher education system, inadequate public financing and the poor progress with QAA.

Addressing the Challenges

Policy interventions proposed for addressing the challenges for attaining the higher education outcomes to support transformation of Nepal into a HIC are as follows:

a. Dismantling the affiliation system
b. Promoting autonomy of campuses
c. Putting in place a clear accountability framework for HEIs
d. Freeing appointment of HEI leadership from political influence
e. Giving decisive role to external stakeholders in governing bodies
f. Expanding science and technology education
g. According a high priority to generation of new knowledge and technology
h. Accelerating quality assurance and accreditation of HEIs
i. Articulating clear policies on non-government provision
j. Increasing the share of higher education in public expenditures
k. Shift from input-based financing to output/outcome-based financing of HEIs
l. Setting a clear policy on student fees
m. Mainstreaming and expanding needs-based student financial assistance
n. Establishing few new HEIs designated to be developed as world-class universities
o. Higher education act
p. Aligning the higher education system with the federal structure

Dismantling the Affiliation System

Since the affiliation system is the most significant factor holding back the excellence of HEIs a higher education act should be promulgated with a provision for dismantling the affiliation system. As dismantling of the affiliation system is an urgent agenda, initiatives towards this end should be taken without waiting for the promulgation of the higher education act. The first step in this direction should be a policy decision to stop establishing new affiliating universities.

The current model of constituent campuses is in essence an affiliation system. Therefore, no new constituent should be established under the current model. All new constituent campuses should be established as autonomous campuses with powers to formulate curriculum, deliver instruction consistent with the curriculum and administer assessments. The role of the university should be limited to supervision and certification of the degree. A policy decision to this effect can be made through amendments to university rules. A similar decision needs to be made with reference to establishment of new affiliated campuses.

The next step for dismantling the affiliation system should be gradual conversion of affiliated and constituent campuses into autonomous campuses. Rules of TU and MWU allow granting autonomy to constituent and affiliated campuses. Similar Rules should be introduced in all universities.

Promoting Autonomy of Campuses

Existing campuses do not have adequate autonomy to hold them accountable for their performance. Academic excellence cannot be expected from such campuses. Hence, granting autonomy to campuses – constituent and affiliated alike - is neither a matter of choice for the campuses nor for the universities. Universities together with campuses should prepare a time bound action plan for granting autonomy to all campuses, except for those few to be administered by the university management as university campuses, and the government should help implementation of the plan by funding it as necessary. The Rules governing autonomous campuses should have provisions for the following:

a. To form governing boards in all constituent campuses with majority of external stakeholders and chaired by external stakeholders. The boards should have authority to appoint its leadership.
b. To grant full administrative and financial autonomy to all constituent campuses, and channel funds from the UGC directly to the campuses.
c. Granting academic autonomy to constituent campuses.
d. Granting academic autonomy to all accredited affiliated campuses.
e. Amend universities Rules to remove provisions compromising administrative and financial autonomy of community and private campuses.

Putting in Place a Clear Accountability Framework for HEIs

The clear accountability framework is about a supervisory entity not getting engaged in operations of a supervised entity so that the supervised agency could be held accountable to the supervisory agency. Consistent with this concept the governance framework for universities should include the following provisions:

a. A Board of Trustees (BOT) accountable to the Government and responsible for supervision of a university is to be appointed by the Government.
b. The BOT, to be chaired by non-government trustees, is to consist of mainly non-government trustees and few government and university representatives.
c. The BOT's responsibilities should exclude engagement in day to day operation of the university and its function should be limited to appointment of the university head accountable to the BOT, approving Rules, approving annual work plan and budget, approving audit report and monitoring performance of the university among others.
d. To give to the BOT the flexibility for reforming the governance and management of the university the university act should not prescribe internal university governance and management framework of the university in detail.
e. All executive powers of the university should be vested on the university head.

A clear framework for accountability also needs to be formulated for campuses under universities following the same principles as for the universities.

Freeing Appointment of HEI Leadership from Political Influence

The appointment of the university leadership based on political expediency has been one of the most damaging factors for university excellence. The provision for the appointment of a non-political BOT proposed above should mitigate this problem. But the appointment a non-political BOT remains a challenge since for public universities it will have to be appointed by the government. Therefore, the government may entrust recommendation of BOT members to a non-political Search Committee comprising of three or five members. It may easier for the government to form a non-political Search Committee than a BOT if qualifications for the Search Committee members is robustly defined in the acts. To reduce the chances of appointment of the university leadership under a political influence a provision can be made in the act to fill vacancies in the BOT by the remaining BOT members themselves so that the BOT becomes self-perpetuating.

For existing universities, should the appointment of a non-political Search Committee become infeasible, it can be formed through an election of its members by an electoral college of the relevant universities. In this case the electoral college should comprise of professors with exceptional academic standing as evidenced by their publications in indexed journals.

For freeing the appointment of the university leadership from political influence in non-government universities the appointment of university leadership should be left to their BOT, and the formation of the BOT should be left to the promoters/founders of the university.

The political influence in appointment of the leadership is also deep-rooted in constituent campuses. The approach similar to that for universities should also be adopted for constituent campuses. Provisions for mitigating political influence in the appointment of the leadership may be introduced by amending university Rules.

Giving Decisive Role to External Stakeholders in Governing Bodies

To mitigate the existing marginalization of public interests, which has been observed across universities, the following provisions should be included in university acts:

a. The BOT should have majority of external stakeholders and chaired by an external stakeholder.
b. The proceedings of the BOT should be within the control of the Chairperson. For making this sure the leadership of the university should not be assigned the position of the Member-Secretary of the BOT.

Expanding STEM Education

The government has articulated the intention of increasing the share of technical education to 70%. A coherent policy to increase the share of STEM needs to be developed for increasing the share of STEM in enrolment to at least 50% by 2050. The policy for increasing the share of STEM should, among others, include the following:

a. The share of STEM in public recurrent expenditures should be increased from about 40%[4] in 2016 to at least 70-80% as early as feasible.
b. The public investment on STEM areas should be increased.
c. It is highly unlikely that the share of STEM enrolment could be increased to 50% solely relying on expansion of STEM in constituent campuses. Therefore, hurdles for private sector entry to STEM areas should be removed.
d. Streamlining the approval process for capacity expansion of existing affiliated campuses in STEM areas by making it transparent and regular.
e. Providing financial support for expansion of STEM enrolment to community campuses and not-for-profit private campuses.
f. Increasing the share of students studying and science and mathematics at grades 11 and 12.

According a High Priority to Generation of New Knowledge and Technology

Three major challenges for promoting research are the low share of post-graduate enrolment, the lack of adequate funding for research and incentives for faculty research. Campuses should be encouraged to start and expand PG enrolment by providing incentives, including support for students. The UGC has developed a good capacity for competitive funding of research projects with assistance from the SHEP and HERP. The government should expand research funding by complementing donor funds during the project period and maintaining it after donor funding ceases. Nepal should aim at gradually increasing the share of funding for RDI as a share of GDP to about of the GDP within 10 years, which is equal to that of Vietnam in 2018. To professionally handle a large research funding, it is recommended to establish an autonomous agency for research funding. To provide incentives to the faculty for their engagement in research the weightings for research outputs needs to be increased both for recruitment and promotion to faculty positions.

Accelerating Quality Assurance and Accreditation of HEIs

For ensuring that graduates produced by Nepali HEIs meets at least minimum standards and assuring international recognition of degrees awarded by Nepali HEIs the following interventions are required:

a. The current framework of QAA, which is designed for individual campuses but not for the universities, cannot fully ensure the quality of graduates as the assessment does not adequately cover curricular, examinations, academic calendar and faculty standards aspects of academic programs, which are controlled by universities. Therefore, QAA of universities should start as early as feasible.
b. The mandatory requirement for accreditation of HEIs every five years should be strictly implemented. Non-compliance with this requirement should have consequences for HEIs.
c. An independent agency for accreditation should be established at the earliest possible date.

[4] Based on TU.

Articulating Clear Policies on Non-Government Provision

It would not be possible to attain higher education outcomes related to the GER and share of STEM needed for transforming Nepal into a HIC unless Nepal is fully able to tap the potential of the non-government sector, which is remarkable in Nepal. For tapping this potential, policies related to the non-government provision should, among others, include the following:

a. Constituent, community and private HEIs should be recognized as distinctly separate provisions with their own destiny and leave no avenue for continuing the practice of conversion of community campuses into constituent campuses, which has played detrimental role for development of higher education. This is not to preclude establishment of new constituent campuses, which should be established based on a rigorous feasibility analysis.
b. Community campuses are producing graduates at a fraction of costs to the public treasury compared to that of constituent campuses. Hence there is a solid financial sense in sustaining community campuses. Community campuses, which finance their operational costs entirely from student fees, do not charge fees comparable to private campuses as they are meant to improve access to higher education for students from low income families. Therefore, to assist community campuses in delivery of good quality education the government should increase funding for them based on outcomes and outputs.
c. Two types of private HEIs – for-profit and not-for-profit – are operating in other countries. But private HEIs operating is Nepal are almost exclusively for-profit type. These two types of HEIs serve distinctly different purposes and also financed differently. While for-profit type HEIs financed exclusively from student fees, not-for-profit type HEIs financed both from philanthropic donations and student fees. If the purpose of for-profit HEIs is to make profit the purpose of not-for-profits HEIs is social service. While for-profit HEIs have helped to increase access to higher education at no cost to the public treasury not-for-profit HEIs have helped to nurture excellence in higher education. Most top-class universities in the US like Harvard, MIT etc. are not-for-profit entities. Nepal should articulate a clear policy to tap potential of both type of HEIs.

Increasing the Share of Higher Education in Public Expenditures

The current funding level for higher education of around 0.3% of the GDP would not be sufficient to attain higher education outcomes required for transforming Nepal into a HIC. Nepal should start increasing funding for higher education, which should reach around 1% of the GDP – comparable to that of India and Vietnam of 1.1% and 0.85% respectively – within ten years.

Shift from Input-Based Financing to Output/Outcome-Based Financing of HEIs

At present recurrent funding for universities is based on number of staff positions approved by the government. This system neither provides incentives to the management for efficient and effective operation of universities nor penalize them for mismanagement. As a result, precious resources for higher education is being used sub-optimally at the best. The tolerance for unaccountability originating from the funding system has proved to be a good breeding ground for politicization of

management of universities. A serious exercise to move away from input-based financing to output/outcome-based financing of HEIs is urgently required. There is precedence of such challenging policy changes. For example, in Mongolia funding for teachers in public HEIs have to be raised from student fees [World Bank.2010].

Setting a Clear Policy on Student Fees

The government has been financing public higher education on a cost sharing basis. This policy implies that HEIs have authority to determine fees with a view to meet the funding gap. But universities have not been able to meet the funding gap by raising fees across the university because of the resentment of students' unions under the pretext that public higher education needs to be accessible to all. This disconnect has seriously compromised the ability of universities to deliver quality education. TU constituent campuses have been adopting the following approaches for meeting this challenge: a. charging full fee for programs with high market demand treating them as unsubsidized programs, which are called full fee programs to differentiate them from regular subsidized programs; and b. charging additional fees, albeit modest, for regular programs through campus level initiatives. Both these approaches have proved to be inadequate for meeting the funding gap of regular programs. Since university wide fee increase has not been possible and students have demonstrated their willingness to pay higher fees for programs with high market demand universities should delegate authority for determination of fees to constituent campuses so that there is incentive for campuses to delivery better quality with a view to attract higher fees with a provision for financial assistance to qualified needy students. The feasibility of such an approach has been demonstrated by implementation of full fee programs at a massive scale at the IOE using authority to determine fees delegated by the Executive Council.

Since the public subsidy for community campuses towards recurrent expenditures is very small they should have been able to meet the funding gap by charging appropriate fees. Nevertheless, they also have not been able to raise adequate resources from fees for the same reason as constituent campuses. TU and other universities, as applicable, should delegate the authority for determination of fees to community campuses and the government should provide financial assistance to qualified needy students. The government should unequivocally support such initiatives by clearly articulating policies on student fees.

Whether private campuses, which do not receive public subsidy, can charge fees following market principles remains a contentious political issue in Nepal. The Constitution states that private provision of education should be regulated to make it service oriented. A thought of school interprets it to mean that fees of private campuses should be regulated. Despite the recent provision in TU Affiliated Campus Rules requiring fees for private campuses to be determined by the Executive Council so far fees in private campuses are being determined by campuses themselves except for medical campuses.

Proponents of regulation of fees of private campuses also argue that deregulation of fees of private campuses would give private campuses to charge unjustifiably high fees. Barriers to entry of new campuses and programs existing at present can indeed create such a situation. It is obvious that only the free market can determine fees based on supply and demand. Any attempt to fix fees in a distorted market would open opportunity for rent seeking. And hence such a practice would not be sustainable as evidenced by the situation in the school sector and medical higher education.

Deregulation of fees does not mean private sector should be free to charge and change fees at will. The relationship between parents/students and private campuses does need to be guided by norms aimed at mitigating the scope for extorsion of parents/students by private campuses. The contractual relationship between the campuses and parents/students should clearly spell out the fees, services to be provided, the validity period of fees, the procedure for changing fee etc., which is fair to both parents/students and campuses. Such contract should be monitored and enforced by the government. Serious deliberations are warranted on fees of private campuses so that the country can tap their potential fully, which would go a long way towards contributing to the attainment of higher education outcomes being sought.

Mainstreaming and Expanding Needs-Based Student Financial Assistance

The access to higher education in extremely skewed in favor of rich households. From the perspectives of equity, attaining a high participation rate as well as tapping all bright students making higher education accessible to all qualified needy students is indispensable. For this purpose, the government should significantly increase funding for student financial assistance based on proxy means testing by ensuring sustainability of the SFAFDB after donor assistance to its ends, and administer all scholarships for higher education on need-based basis except some designed to attract very bright students.

Establishing Few New HEIs

Although there is a consensus that the higher education sector would not be able to support country's aspirations a consensus on how to reform it is yet to emerge. The international experience of initiatives underway aimed at reforming the sector indicates that bringing about meaningful changes across the system would be extremely challenging. It also indicates that transforming mediocre universities into world-class institutions is a very difficult task primarily because this cannot be accomplished without changing the institutional culture, which can happen only in exceptional circumstances. In this context, Nepal, in tandem with initiatives for reforming the entire system should also establish a few new universities – in the government as well as non-government sectors - with an aim of developing them into world-class institutions.

Higher Education Act

Discussions in the note indicate that many policy interventions needed for meeting the challenges associated with the attainment of higher education outcomes to support transforming Nepal into a high-income country cannot be implemented within the framework of the existing university acts. Efforts to process a higher education act has not been successful to date mainly because they were not driven by a clear set of policy goals and as a result, they turned into a competition between stakeholders to maximize gains for themselves. To mitigate this challenge, first, the legislation should be formulated by a group of experts free from conflict of interests based on evidence, second, the proposed policies should be disseminated to all stakeholders in a transparent and easy to understand manner so that they are able to provide an informed feedback and, third, all stakeholders should be

given opportunity to provide their inputs in the process of parliamentary deliberations on polices underpinning legislation.

The lead for higher education reforms should in principle be taken by the government and parliamentarians. But the obligation to inform them about the reform content lies with the academia, who are best placed to formulate the evidence-based reform content through rigorous scientific analysis.

Aligning the Higher Education System with the Federal Structure

Schedule 5 of the Constitution gives the Federal Government the mandate for central universities, and standards and regulation of higher education, and Schedule 6 gives the Provincial Government the mandate for provincial universities and higher education [CAS.2015]. Research in the area of governance of higher education in federal states is scarce. Carnoy M. et. al. has concluded that each federalism is context nested and distinct, there are no general laws, and no models of optimal cases for higher education management for federal states. And it mentions that Australia, Russia, Brazil, India and Mexico have yet to find effective ways of consistently turning multi-level educational government into an asset in higher education [Carnoy M. et.al.2018]. Based on these observations it will take serious efforts and time to evolve a structure of effective management of higher education in the federal structure. Given the daunting challenges associated with reforms in higher education rapid transfer of responsibility for higher education to Provincial Governments would make reforms in higher education even more daunting if not impossible. In this context it would be desirable to sequence the transfer of responsibility for higher education to Provincial Governments in the following way:

a. Establishment of non-affiliating universities funded by the Provincial Governments.
b. Transfer of autonomous constituent campuses to Provincial Governments.
c. Transfer of autonomous campuses upgraded to into universities to Provincial Governments.
d. Transfer of selected universities under the Federal Government to Provincial Governments.

Implementing Higher Education Reforms

Each proposed reform comprise one or more policy interventions proposed above. For example, a new governance framework for universities include the following policy interventions: dismantling the affiliation system; promoting autonomy of campuses; putting in place a clear accountability framework for HEIs; freeing appointment of HEI leadership from political influence; and giving decisive role to external stakeholders in governing bodies. Proposed reforms are grouped into four clusters: governance, financing, STEM and RDI, and quality and relevance. In each cluster reforms are sequenced into three phases - short-term (year and two), medium-term (three to five years), and long-term (six to ten years) as illustrated in the table below. Though all types of proposed reform interventions are to be initiated within ten years they are not expected to expand across the whole sector. Another five to ten years may be necessary for expanding reforms throughout the higher education system.

Phase 1 (year 1 and 2)	**Phase 2 (year 3-5)**	**Phase 3 (year 6-10)**

Governance		
All new universities will be established as non-affiliating universities under a new governance framework.	New governance framework established in at least three universities. Introduction of provision for establishment of community and private (for-profit and not-for-profit) universities.	New governance framework in place in all universities.
All new constituent campuses will be established with academic, financial and administrative autonomy under a new governance framework.	All new affiliated campuses will be established with academic, financial and administrative autonomy.	
	New governance framework to be established in at least twenty constituent campuses.	New governance framework to be established in remaining constituent campuses.
		At least ten accredited constituent campuses operating under new governance framework will be declared universities.
	Affiliated campuses have full administrative and financial autonomy. Academic autonomy granted to at least twenty-five accredited affiliated campuses.	Academic autonomy granted to at least fifty accredited affiliated campuses. At least ten accredited affiliated campuses will be declared universities.
		At least twenty constituent campuses operating under new governance framework will be brought under jurisdiction of Provincial Governments.
		At least five public universities operating under new governance framework and ten community/private universities will be brought under jurisdiction of the Provincial Governments.
Financing		

Policy on increasing funding for higher education approved.		Higher education expenditures reach 1**%** of GDP.
	Funding based on output/outcomes introduced in few universities. A framework of HEI funding based on outputs and outcomes instead of teacher positions approved.	Funding based on output/outcomes introduced in all universities.
A policy on higher education tuition fees approved.	The policy allowing HEIs to determine fees to meet the funding gap through tuition fees with provisions for financial assistance to needy students and fair contractual relationship between students and HEIs in place. The policy introduced in selected HEIs.	The policy implemented in all HEIs.
A policy on student financial assistance approved.	The allocation for student financial assistance increased by 100%. An autonomous regular government agency for student financial assistance established.	
STEM and RDI		
Policy aimed at encouraging expansion of STEM in non-government sector adopted by the cabinet. University Rules, procedures and practices amended/ changed.	Community campuses receive capital and recurrent cost support for expansion of technical education. Private not-for-profit campuses receive tuition support for enrolling needy students in technical education.	
Policy for prioritizing research, development and innovation approved.	Incentives for increasing the share of post graduate programs in place. All universities introduce promotion/ recruitment for faculty with high weightings	Research funding as a share of GDP reaches 0.3% of GDP. All promotion/ recruitment of faculty is based on high weightings for research accomplishments.

	on research accomplishments. An independent research funding agency established.	
	Incentives for increasing the share of post graduate programs in place. Universities introduce promotion/ recruitment for faculty with high weightings on research accomplishments. An independent research funding agency established.	Research funding as a share of GDP reaches 0.3% of GDP. All promotion/ recruitment of faculty is based on high weightings for research accomplishments.
A new university designated to become a world-class university established.		
Quality and relevance		
QAA of universities initiated. Rewards and sanctions to HEIs for participating in QAA in place.	An independent quality assurance and accreditation agency established.	All HEIs are subjected to regular QAA process.

The content of the reforms is elaborated in this chapter. It also makes suggestions on implementation of reforms including the revision of the legal framework.

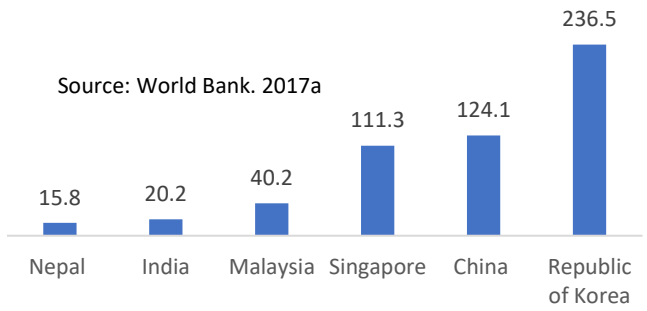
Introduction

1. The people of Nepal had to endure 104 years of extreme oppression under the tyranny of Rana Regime. During that period the dream of prosperity was beyond their imagination. In 1951, when the Rana Regime was overthrown, it germinated in the minds of Nepalese. But prosperity continues to elude to date. Nepal remains a low-income country with per capita GNI of US$790 in 2017 [World Bank.2018].
2. The single most important factor, which contributed to sluggish economic growth, was the protracted political instability. The people fed up with the political instability have created an environment for a stable government through 2017 Parliamentary elections. With the promulgation of the Constitution by the elected representatives of the people and formation of governments at all levels of the Federal Republic it appears, against all odds, that Nepal may have got a unique window of opportunity to focus on the agenda of prosperity.
3. There are formidable challenges for realization of the dream of "Prosperous Nepal and Happy Nepali" articulated by the Government of Nepal (GON). Nepal's economy is growing slower than its peers in the income group and neighbors owing to the low productivity of its agriculture, industry and services, which is being exacerbated by the large-scale labor migration driving up wages. Increasing the productivity is key to gaining competitive edge for its industry and services. The ability of higher education to create new knowledge and technology and high-quality human resources with RDI skills is critical for significantly enhancing the productivity, without which materializing the dream of "Prosperous Nepal and Happy Nepali" would not be possible. But the higher education is in a dire state. The note suggests reforms in the higher education sector, which should enable it to deliver the outcomes required for supporting Nepal's transformation into a high-income country (HIC) by 2050.
4. The Policy Note begins with the review of the political and socio-economic environment of the country and challenges facing development. The second chapter discusses the role of higher education in economic development. The third chapter reviews the status of higher education outcomes of Nepal in comparison to selected low-income, lower middle-income, upper middle-income and high-income countries with particular reference to the enrolment, equitable access, share of STEM, research, development and innovation (RDI), and quality and relevance. Further it suggests higher education outcomes to be attained for supporting Nepal's journey towards a HIC. The fourth chapter portrays the picture of Nepal's higher education system and identifies challenges for enhancing higher education outcomes related to enrolment, equitable access, share of STEM, RDI, and quality and relevance. The fifth chapter articulates policy interventions needed for addressing the challenges in the higher education sector identified in Chapter 4 so that it is able to meaningfully contribute to the Nepal's goal of becoming a HIC by 2050. The sixth chapter recommends phasing and sequencing of reforms drawing upon policy interventions proposed in Chapter 5.

Chapter 1 Country Context

1. Nepal is a landlocked country with a medium-sized population of 29 million in 2017 and a medium-sized territory of 143,000 sq.km. bordering China and India. Nepal is rich in bio, cultural and ethnic diversity but relatively poor in natural resources except for water resources. Nepal's economy is dominated by the tertiary sector with a share of 57.6% in the GDP in 2017/18 followed by primary and secondary sectors with shares of 28.2% and 14.2% respectively [MOF.2018]. Around 63% of the population depend on agriculture for livelihoods [NPC.2016].
2. The turning point in Nepal's history was 1847, when the tyranny of the Rana Family began. The Ranas with a view to perpetuate their grip on power adopted the strategy of isolating the country from the rest of the world except for the British Empire, of which it became an ally. On the domestic front, the Ranas adopted the strategy of denying its people the access to education. These strategies largely shaped the course of development of the country for a century.
3. In 1951, when the Rana regime was overthrown, Nepal emerged as a backward country. Nepal inherited the poorly educated people from the Ranas. In 1953, the primary education participation rate was barely 3.7% of the primary age population in Nepal [Pandey R.R. et al. 1956], whereas, Republic of Korea had already achieved universal elementary education by 1960 [UNESCO. 2015]. Access to primary education in Nepal also lagged substantially behind that of India – while GER of Nepal was 25% in 1970 it was 78% in India in 1971 [World Bank. 2017].
4. The journey for determining a sustainable political system, which began in 1951, may have ended with the formation of a government with a comfortable majority in 2017. This protracted political transition was another setback for development of the country. The defining feature of the period from 1951 to 2017 was the political instability. The power struggle between political parties, who wanted to establish a multi-party democracy, and the monarchy continued till 2007 culminating in the declaration of a republic. From 1990 to 2017, Nepal witnessed 26 governments including a decade long insurgency. This has forced successive governments to be preoccupied more with prolonging their tenure rather than addressing developmental issues, which required longer time horizons. As a result, development suffered.
5. Contrary to the widespread perception that the Rana regime was the primary culprit for Nepal's backwardness, Nepal started to lag behind other countries more after the Rana period than during the Rana period. For example, in 1962, GNI per capita of Nepal, China, India, Republic of Korea, Malaysia and Singapore were US$50, 70, 90, 120, 240 and 490 respectively. The gap between GNI per capita of Nepal and other countries widened considerably since 1962 as seen from Figure 1.1 [World Bank 2017a].

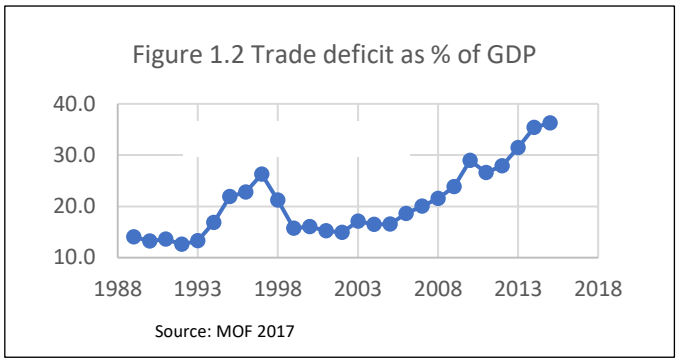
Figure 1.1 Ratio of GNI/capita in 2017 to 1962



6. One of the key reasons behind the slow economic growth of Nepal is the stagnation of the productivity as indicated by

the rising trade deficit [Figure 1.2]. The trade deficit rose from 13.2% of the GDP in 1989/90 to 36.2% in 2014/15 [MOF. 2017].

7. The lack of job opportunities associated with the low economic growth led to a heavy migration out of the country. Since 2007, the average new entrants to the work force was 330,000 on an average, while the average migration out of the country during the same period was 375,000 on an average. This large-scale migration has increased dependence of the economy on remittances. While in 1996, one in every four households received some form of remittances, in 2016, more than one in every two households depended on remittances. The contribution of remittances to the GDP increased from 2% in 1996 to 30% in 2016 [World Bank 2017b]. While high remittances have made significant contribution to the reduction of poverty, which decreased from 73% to 25% between 1999 and 2016, it may also have contributed to the reinforcement of the low growth trap due to the shortage of the work force raising the wages, and loss better skilled work force. High remittances have also reduced the pressure on the government to deliver leading to the poor service delivery. Dismal performance of higher education in terms of contribution to the upgrading of technology is an example of the result of the poor public service delivery. Another example of the poor public service delivery is the comparatively higher incremental capital output ratio (ICOR) for Nepal compared to Bangladesh, Vietnam, India, China, Cambodia and Mongolia [Figure 1.3, World Bank 2017b].



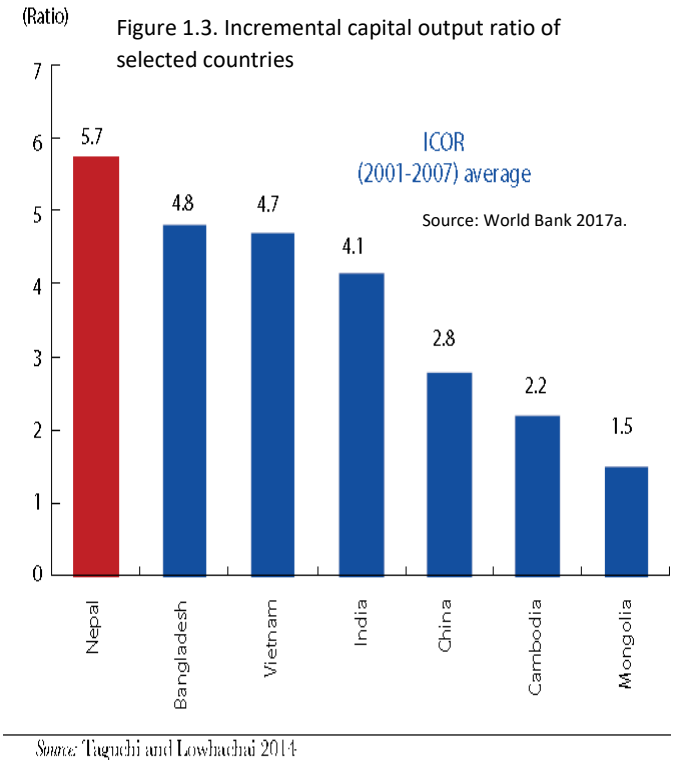


Figure 1.3. Incremental capital output ratio of selected countries

Source: Taguchi and Lowhachai 2014

8. The Fourteenth Plan has set the goal of attaining the status of a MIC, which is defined as a country of with per capita GNI of US$994 to 12,054 according to The World Bank Classification [World Bank 2018a], by 2030 without a specific target for GNI per capita [NPC 2016]. All Asian countries except for Nepal and war-torn Afghanistan are already MIC (Figure 1.4). Developing countries in Africa like Rwanda and Ethiopia, which are growing faster than Nepal, (Figure 1.5), are expected to overtake Nepal soon in the status quo scenario. Asian countries, which are richer than Nepal, are also growing faster than Nepal. Therefore, the wealth gap between these countries and Nepal is going to grow further.

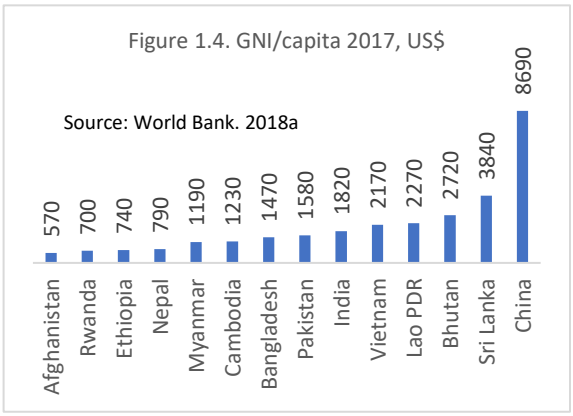


Figure 1.4. GNI/capita 2017, US$

9. The status quo scenario of economic development will lead to a bleak future, which the people of Nepal has rejected by creating an environment for a stable government through the 2017 Parliamentary elections. Therefore, it is now high time to shape a concrete vision about the future of Nepal. Considering to high aspirations of the people the government articulated a dream of "Prosperous Nepal and Happy Nepali". The GON Policy and Program for FY2019 aims at doubling the GNI per capita of Nepal within five years and attaining a double-digit growth thereafter [GON.2018]. If these targets could be achieved Nepal can attain the status of a high-income country (HIC) by 2050 by maintaining an annual growth rate of 7.2% from 2028 onwards. The scenario for economic growth following the above trajectory is presented in Annex 1.

10. A rudimentary assessment of the realism of the dream of transforming Nepal into a HIC by 2050 can be made by observing the time spent by various countries for their transformation from the status of a low-income to that of a high-income country (Table 1.1). Republic of Korea, Japan, Singapore, Spain, Greece and Portugal took 21 to 34 years to attain the status of a HIC from the status of a LIC with GNI/capita of less than or equal to that of Nepal of US$790 in 2017. During that period their economy grew from 15.7 to 20.1 times. Nepal will become a high-income country

by 2050 if its economy grows by 15.3 times within 33 years, which may be possible based on historical precedents.

Table 1.1. Time spent by low-income countries to attain high-income status

	Low-income (<995US$)		High-income (>12,055US$)			
Country	Year	GNI/Capita	Year	GNI/Capita	Years	GNI/increase, multiple
Korea Rep	1975	650	1996	13,040	21	20.1
Japan	1963	690	1986	13,820	23	20.0
Singapore	1968	750	1991	12,980	23	17.3
Spain	1965	730	1990	12,220	25	16.7
Greece	1964	790	1995	12,410	31	15.7
Portugal	1969	790	2003	13,230	34	16.7
Nepal	2017	790	2050	12,056	33	15.3

Source: World Bank, 2018a.

11. Although the goal seems very to be ambitious Nepal may not have much of an option except for accepting this challenge if it wants to close prosperity gap with developed nations and not to fall behind its peers. Rwanda with a GNI/capita less than that of Nepal but growing faster has set a target becoming a HIC by 2050 [Tashobya. A. 2016]. Vietnam has set a goal for attaining the status of a MIC by 2035, and subsequently becoming a high-income country [Govender D. 2017]. Discussions have already started about strategies for avoiding the middle-income trap by focusing on restructuring of economy and changing the model of focus on quality instead of quantity [Khoan Vu, Zerrillo P.2016]. China is expected to be a high-income country by 2035 on the path to transform China into fully developed and advanced nation by 2049 – the second centennial goal. [Zhang Jun. 2017].
12. The following factors may provide a unique window of opportunity for Nepal to attain the above goal: a. the prospects of a stable government; b. Nepal's strategic location between two giant economies, which can enable Nepal to access unlimited market; and c. the advent of the fourth industrial revolution may open new paradigms of economic growth. But there are formidable challenges to capitalize on this window of opportunity. Among others, Nepal should be able to break the low growth high migration trap by raising the productivity, the prerequisites for which are enhancement of the skill of the work force and upgrading of the technology both through creation of new technology and adoption of the existing technology. The policy note makes suggestions for reforms in the higher education sector aimed at enhancing the skill of the work force as well as upgrading the technology in order to support Nepal's ambition of becoming a HIC by 2050. It is to be noted here that higher education alone would not be able to help Nepal become a HIC, but excellent higher education is a prerequisite for achieving this goal.

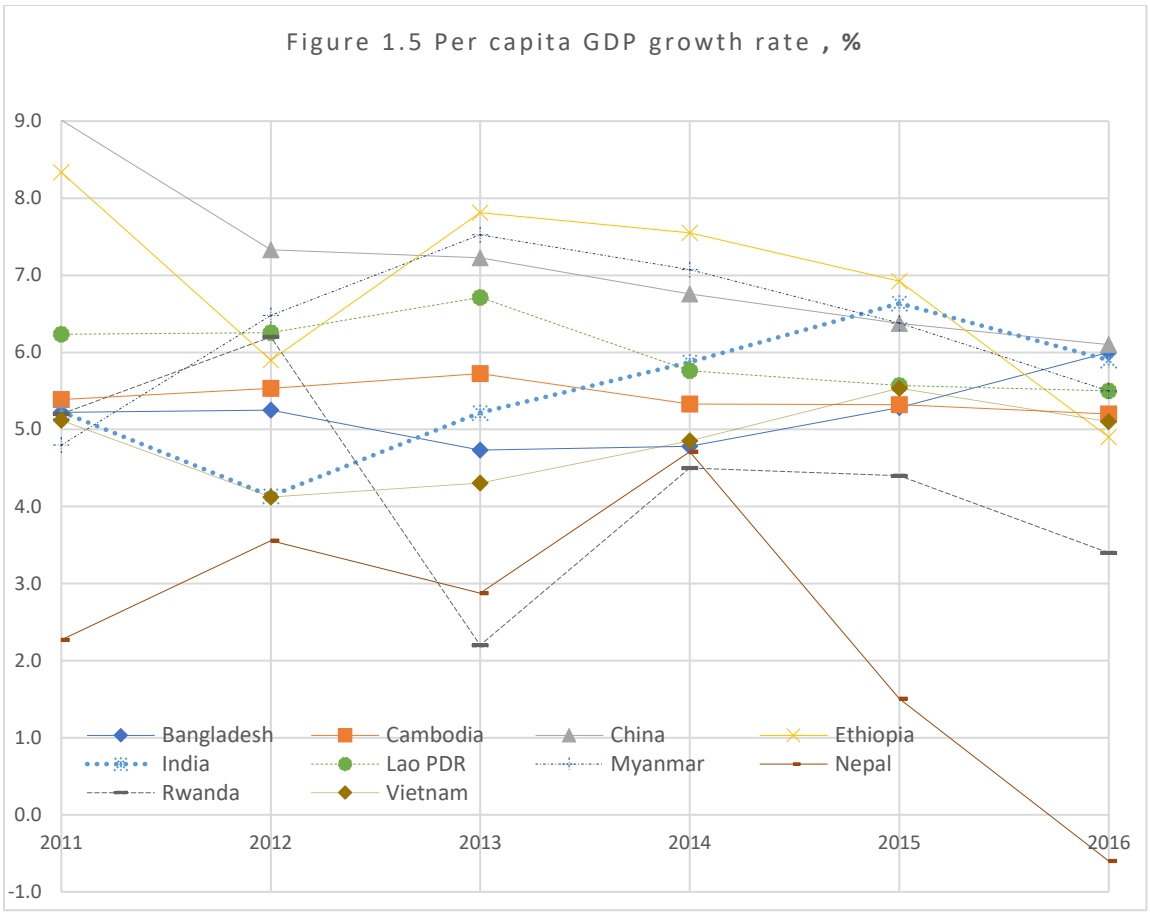


Figure 1.5 Per capita GDP growth rate , %
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
-1.0
2011
2012
2013
2014
2015
2016
Bangladesh
Cambodia
China
Ethiopia
India
Lao PDR
Myanmar
Nepal
Rwanda
Vietnam

Chapter 2 Role of Higher Education in Economic Development

13. This chapter discusses about the role of higher education in economic development with a view to fully leverage its potential for supporting Nepal's aspirations for prosperity. It specifically explores the impact of the availability of human resources with higher education and the research, development and innovation (RDI) capacity on economic development. In relation to the availability of human resources both the participation rate in higher education and the importance of science, technology, engineering and mathematics (STEM) education are analyzed. And in relation to the RDI capacity the following areas are analyzed: the importance of excellent research capacity; the importance of innovation; the role of universities in patenting; implications of reduction of the time lag between invention and innovation; and the relevance of world-class universities.

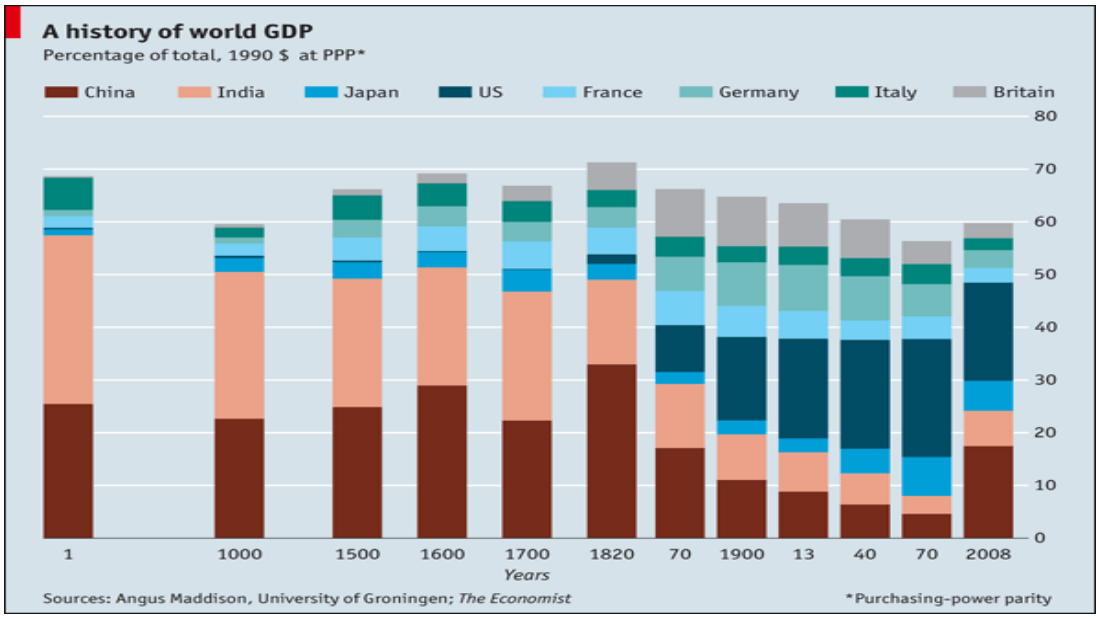
Knowledge – Driver of Economic Growth

14. The importance of higher education and research for socio-economic development is well recognized for developing and as well as developed countries. The Organization for Economic Development and Cooperation (OECD) defines the role of tertiary education in social and economic development in the following way: "Tertiary education contributes to social and economic development through four major missions:
    a. The formation of human capital (primarily through teaching).
    b. The building of knowledge bases (primarily through research and knowledge development).
    c. The dissemination and use of knowledge (primarily through interaction with knowledge users).
    d. The maintenance of knowledge (primarily through intergenerational-storage and transmission of knowledge). [OECD 2008]"
15. Out of the above four missions developing countries are mostly engaged in fulfilling the first mission. To fulfill the second mission HEIs would have to be engaged in RDI activities. The World Bank elaborates the role of tertiary education highlighting its contribution to supporting knowledge-driven economic development and creation of the enabling environment through building of the social capital stating that, "Tertiary education institutions have a critical role in supporting knowledge-driven economic growth strategies and the construction of democratic, socially cohesive societies, tertiary education assists in the improvement of the institutional regime through the training of competent and responsible professional needed for sound macroeconomic and public-sector management. Its academic and research activities provide crucial support for the national innovation system. The norms, values, attitudes, and ethics that tertiary education institutions impart to students are the foundation of the social capital necessary for constructing healthy civil societies and cohesive cultures – the very bedrock of good governance and democratic political system [World Bank 2002]." But many developing countries are struggling to address the mission of building knowledge bases. While all developed countries are actively engaged in fulfilling the third mission through university industry linkages only some developing countries are doing so.

Pillay underscoring the relevance of tertiary education for developing countries states, "The widespread recognition that tertiary education is a major driver of competitiveness in an increasingly knowledge-driven global economy has made high-quality tertiary education more important than ever both in industrialized and developing countries." (Pillay, 2011)

16. Altbach articulates the importance of research in the following way, "Governments are becoming increasingly aware of the important contribution that high performance world-class universities make to global competitiveness and economic growth. There is growing recognition, both in industrial and developing countries, of the need to establish one or more world-class universities that can effectively compete with the best of the best around the world." (Salmi, J, 2009)
17. Khan based on a literature review of the role of research and development on economic growth has concluded that, "The review of theoretical and empirical studies relevant to the role of R&D in economic growth of countries around the world agree on the significant role of different form R&D in productivity or economic growth. Therefore, it can be concluded that the developing countries should concentrate on R&D to achieve the sustained economic growth (Khan, 2015)". The rapid rise of Republic of Korea, Finland, Singapore, Estonia and China exemplifies how countries that have focused on generation as well as adaption of knowledge have been able to achieve a dramatic economic growth. India is on a similar track.
18. Figure 2.1 presents a glaring example of the relationship between the knowledge and prosperity of nations that can be observed during the last two millenniums [Economist. 2018]. While, from 1 AD to 1970 AD, the share of the US in the world GDP increased from about 1 percent to about 22 percent, the shares of India and China declined from 31 percent and 26 percent to about 3 percent and 5 percent respectively. If, in 1 AD, the wealth of knowledge the US possessed was negligible compared to that of India and China the situation had just reversed by 1970.

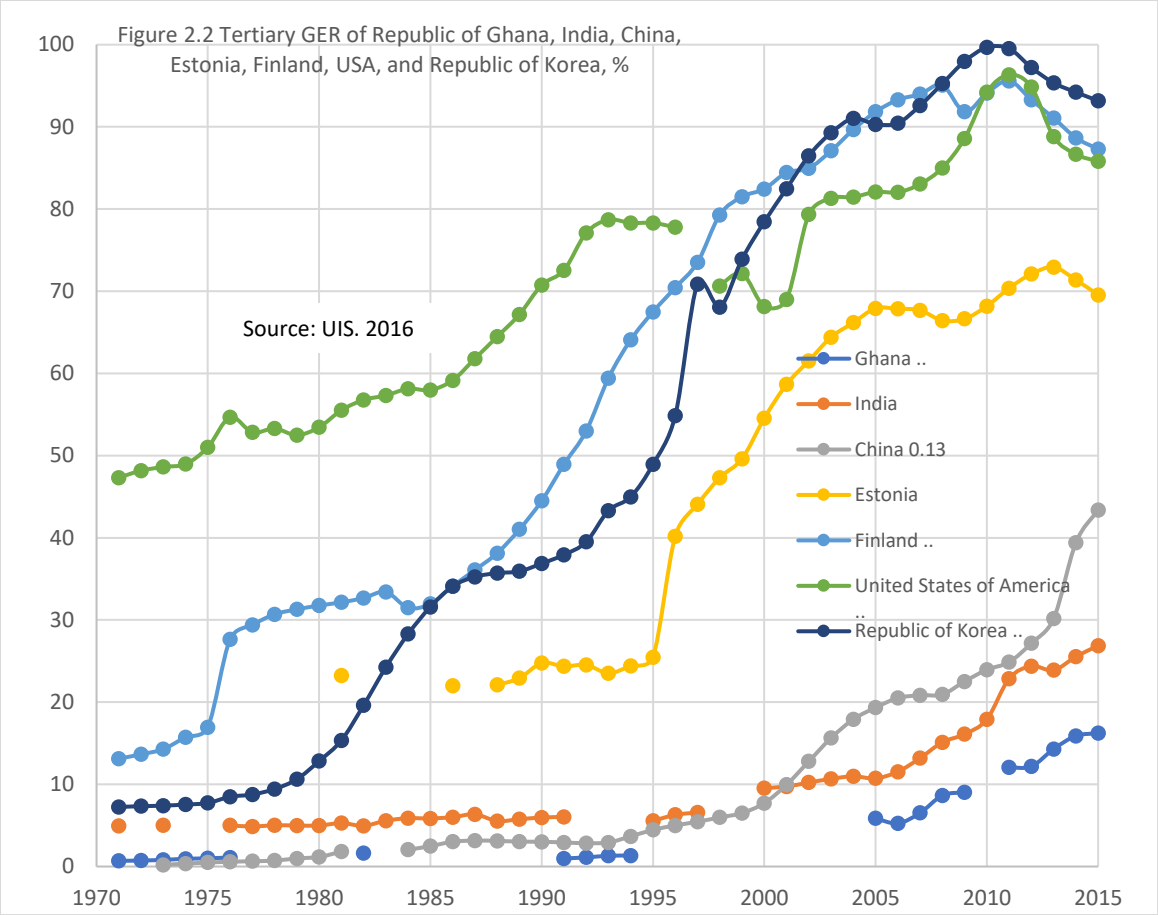
Figure 2.1. Change in the share of various countries in the world GDP



19. Although the relevance of high quality research-oriented higher education for developing countries is well established some key stakeholders are not still fully aware of this. This may be because deliberations on this issue has been largely limited to academic circles. An attempt is being made here to extend a discourse on this issue to a wider public by presenting compelling arguments understandable to a broad of group of stakeholders including politicians, policy makers, professors, students and the civil society.
20. Among an array of questions which stakeholders need to find convincing answers to, to make them committed to tapping the potential of higher education for economic growth are the following: a. what is the higher education gross enrolment ratio (GER) a developing country should aim at attaining?; b. how competitive should the best university of a developing country should be?; c. how great is the risk that expansion of higher education would result unemployment?; d. what is the right mix of disciplines for developing countries?; e. what is the level of public expenditures on higher education that would be necessary to commit to?; and f. what are the chances that high quality research oriented universities will to fail to trigger economic growth? There are hardly right answers to these questions because the answers have to be context specific. Even for a given country it would not be possible to give precise answers because these answers would depend upon a number of assumptions. Nevertheless, it is important to come up with at least some guiding principles so that stakeholders can be attracted to consider this issue seriously. The policy note makes an attempt to address these questions.

Enrolment Rate and Economic Growth

21. The number of tertiary education graduates required for economic growth of a country depends upon the technological sophistication of industries in the country. The share of high value products in exports of developing countries has been increasing steadily. In 1995, for the first time the value of high-technology exports from developing countries exceeded that of their low-technology products [World Bank. 2002]. High-technology products require higher share of tertiary graduates than low-technology products. A shift from low-technology products to high-technology products is a prerequisite for sustained economic growth. Therefore, the production of tertiary graduates needs to be continuously increased.
22. Figure 2.2 shows a relationship between the GER and transition of various countries to high-technology products. In 1971, the GNI per capita of Ghana and Republic of Korea were US$270 and 310 respectively. And the tertiary GER of Ghana and Republic of Korea were 0.7 and 7.2% respectively. Although these countries were comparable in terms of GNI per capita Korea was able to significantly expand higher education whereas Ghana was not. By 2015, the tertiary GER of Korea reached 93.2% compared to 16.2% of Ghana. This helped Korea to move rapidly compared to Ghana from low-technology products to high-technology products. As a consequence, Korean products became more competitive and benefitted from the premium price. In 2016, GNI per capita of Korea reached US$27,600 compared to US$1,380 that of Ghana. Though the success of Korea compared to Ghana cannot be attributed to the progress made in higher education alone but this would not have been possible without the expansion of higher education.



23. In 1971, tertiary GER of Korea and Finland were 7.3% and 13.1% respectively, which were significantly behind that of the US of 47.3%. By 1999, both Korea and Finland overtook the US in terms of the tertiary GER. At present, Korea's GER is the highest in the world. Both Korea and Finland with investments in higher education were able to develop knowledge-economy. The GNI capita of Finland increased from US$2,470 in 1970 to US$44,730 in 2016. This example shows that for poor countries to catch up with the developed nations it is not enough to aim at competing with the peers but they need to be able to compete with rich countries. After all, in the globalized economy competition is open to all countries – rich and poor alike. Estonia is another example of a country which benefitted from expansion of higher education. From 1995 to 2015, tertiary GER increased from 25.4% to 69.5%. A small country with population of 1.3 million, which was one of the republics of the Soviet Union, has emerged as a leader in ICT. Skype, which was subsequently bought by Google for US$9 billion, was developed in Estonia. Its GNI per capita rose dramatically from US$4,150 in year 2000 to US$17,750 in 2016.
24. To analyze the relationship between tertiary GER and GNI per capita a scatter plot of the tertiary GER and GNI per capita in PPP$ of 35 countries with GER above 47.4% and GNI per capita above $19,020 has been prepared (Figure 2.3). Countries facing political problems and with a high share

of income from natural resources were excluded. The trendline in the figure shows a positive correlation between the tertiary GER and GNI per capita. Some outlier countries –UK, Switzerland (CH), Turkey (TR), and Chile (CL) - are shown in the figure.

25. Switzerland and Turkey represent two extreme cases, the first has a very high GNI per capita (PPP$63,660) for a relatively low GER (57.7%), and Turkey has relatively low GNI per capita (PPP$23,990) for a very high GER (94.7%). Compared to Turkey Switzerland has three distinct advantages. First, the quality of universities in Switzerland is much higher than in Turkey enabling the former to be innovate more. Switzerland has 8 universities in top 500, of which 7 are in top 200, 5 in top 100, and 1 in top 20, whereas Turkey has only 1 in top 500 (ARWU 2017, refer to Annex 2). Second, Turkey overtook Switzerland in terms of GER only recently, in 2010. It takes time to reap benefits from increased GER. Third, Switzerland has been a high-income country for long time and it has developed niche areas, where it will not be easy for Turkey to compete.
26. Another similar case is the comparison between Chile and the UK. Compared to the UK, Chile has significantly higher GER – 56.5% and 88.6% respectively. But the GNI per capita of the UK of 42,100 PPP$ is significantly higher than that of Chile of23,270 PPP$. The comparative advantages of UK over Chile are similar to that of Switzerland over Turkey. The superiority of the UK compared to Chile in terms of the quality of universities is especially noteworthy. The UK has 50 universities in top 800, of which 38 are in top 500, 34 in top 400, 28 in top 300, 20 in top 200, 9 in top 100, and 3 in top 20, whereas Chile has only 4 in top 800, 2 in top 500 and 1 in top 400 (ARWU 2017).
27. The advantage of high tertiary GER lies in opening the possibility of upgrading production technology enabling country to be more competitive. The above examples, also so that the quality of education matters as much as the quantity of human resources. While a high GER is a necessary

condition for prosperity it is not a sufficient condition. It is to be noted that it takes years to see the impact of the increased GER.

28. Figures 2.4, 2.5 and 2.6 illustrates the relationship between the tertiary GER and GNI per capita for Republic of Korea, Turkey and Chile. In Korea, GER increased from 1990 to 2010, which declined thereafter. But the GNI per capita has been increasing steadily from 1990. This is because the GER of 93.2% in 2015 remains very high. In case of Turkey and Chile, both the GER and GNI per capita has been increasing since 1990.

Figure 2.4 Korea Rep: Tertiary GER, % and GNI/capita, PPP$

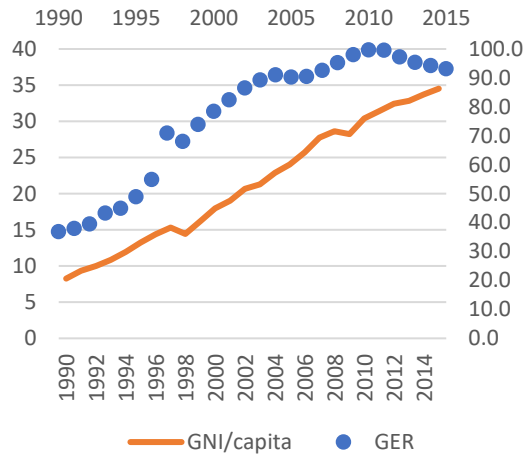


Figure 2.5 Turkey: Tertiary GER, % and GNI/capita, PPP$

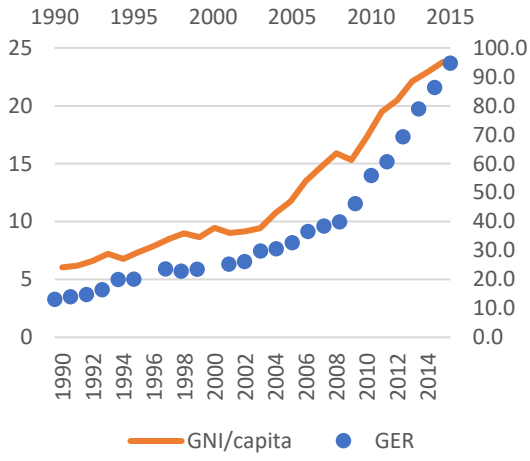
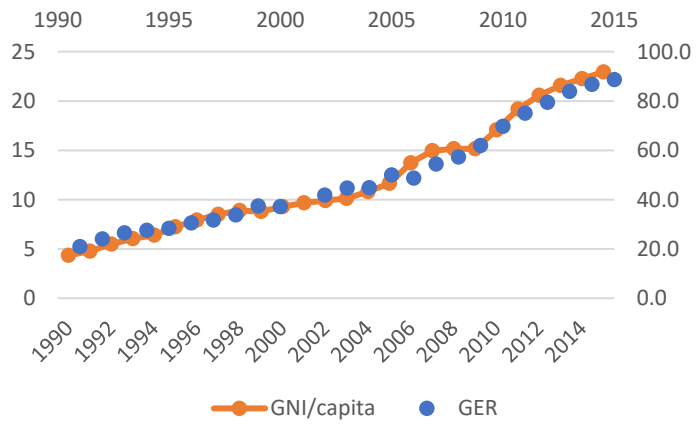


Figure 2.6 Chile: Tertiary GER, % and GNI/capita, PPP$



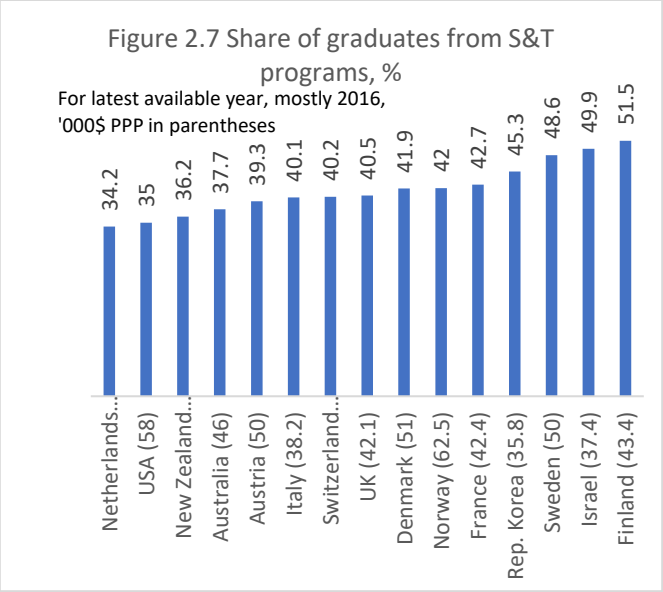
29. The above evidence clearly indicates that a high participation in higher education is a prerequisite for sustained economic growth.

Role of Science, Technology, Engineering and Mathematics Education

30. In the previous section the importance of attaining a high GER and sustaining it for prosperity was underscored. Experience of developed countries show that it is not only important to have a high GER but it is equally important to have a right composition of higher education graduates. There is a broad consensus in that a relatively high share of higher education graduates in STEM areas

is critically important for raising competitiveness of the economy by enhancing the productivity. Developed countries have been strengthening STEM in higher education either through implementation of STEM specific strategic plans or non-STEM specific strategic plans incorporating the STEM agenda [ACOLA. 2013].

31. The US government concern about STEM can be traced back to 1944 (ACOLA, 2013). The US Federal STEM Education Five-Year Strategic Plan 2013 articulates the importance of STEM for development of the US in the following way: "Advances in science, technology, engineering and mathematics have long been central to our Nation's ability to manufacture better and smarter products, improve health care, develop cleaner and more efficient domestic energy resources, preserve the environment, safeguard national security, and grow the economy" [NSTC. 2013]. The following statement in the Strategic Plan hints at the on-going competition between nations to gain superiority in STEM education, "In China 50% of first degrees are awarded in STEM fields compared to 19% in the US". The strategic plan aims at expanding education in STEM areas right from kindergarten to higher education to catch up with China and other countries.
32. The UK's long-term policy agenda for STEM is articulated in the Science and Innovation Investment Framework 2004-2014, which states: "The nations that can thrive in a highly competitive global economy will be those that can compete on high technology and intellectual strength – attracting the highest-skilled people and companies which have the potential to innovate and turn innovation into commercial opportunity" (DfES, 2004).
33. The Government of Republic of Korea implemented detailed plans for technology development starting from 1960. The Korean government has attributed the recent advancement of the Korean economy and its role in the global community to the development of science and technology (MEST, 2012a).
34. The Japanese Science and Technology Basic Law (Kagaku Gijutsu Kihon Ho, or S&T Law of 1995) provided a legislative commitment to progressing science and technology and established mid- to long-term commitments across several government ministries. The legislation established the Council for Science and Technology Policy, headed by the Japanese Prime Minister. The Council is the principal mechanism to determine mid-term science and technology strategies. While each ministry oversees the implementation of individual STEM programs, the Council has authority over the general direction of the promotion of science and technology on the basis of five-year basic plans, thereby ensuring mid- to long-term planning and commitments (ACOLA, 2013).



35. There is no universally agreed list of STEM programs. For the purpose of the analysis of the share of STEM programs, the programs falling under the following clusters as defined by UNESCO Institute of Statistics (UIS) were assumed as STEM programs: engineering, manufacturing and construction; agriculture, forestry, fisheries and veterinary; information and communication technologies; health and welfare; and natural science, mathematics and statistics. The share of STEM graduates in the total number of higher education graduates of developed economies, for which data is available, with GNI/capita of PPP $35.8 to 63.7 thousand varies in the range of 34.2% to 51.5% (Figure 2.7), and the mean share is 42.6%. The shares of STEM programs for the above countries have remained stable during past 18 years. The mean share and their ranges for each STEM cluster and STEM as a whole are presented in Table 2.1. The table shows that the shares of STEM clusters in the total number of graduates varies in a wider range compared to the overall share of STEM.

Table 2.1 Mean shares and share ranges of graduates of various STEM clusters in the total number of graduates

Cluster	Engineering, manufacturing and construction	Agriculture, forestry, fisheries and veterinary	Information and communication technologies	Health and welfare	Natural science, mathematics and statistics	STEM
Mean	15.1	1.3	3.6	16.4	6.2	42.6
Range	6.7-40.5	0.4-2.4	2.2-7.1	3.8-26.9	2.5-13.4	34.2-51.5

36. Even with the high shares of STEM graduates developed countries are facing scarcity of STEM human resources. They are trying to meet this shortfall by attracting international students to STEM programs. Table 2.2 shows that in all countries in the table the enrolment of international students as a share of total international enrolment in engineering, manufacturing, construction, sciences, mathematics, statistics and computing is higher than that for national students. The difference is substantial for Denmark, Finland, Germany and UK. And the share of international students in STEM programs in US and Sweden are very high (ACOLA, 2013).

Table 2.2 Share of higher education enrolment in engineering, manufacturing, construction, sciences, mathematics, statistics and computing in selected OECD countries

Country	National students, %	International students, %
Australia	20	22.7

Denmark	21.1	29.6
Finland	34.3	42.9
Germany	27.6	37.6
New Zealand	22.1	26.1
UK	22.3	28.5
Canada	-	31.2
Japan	-	16.2
Sweden	-	51.7
US	-	35.9

Source: ACOLA. 2013.

37. The following gives indication about the shortage of STEM human resources the US is facing: a. according to McKinsey, 64 percent of companies have vacancies for STEM positions due to a lack of qualified applicants; b. STEM workers typically earn 26% more than those in non-STEM positions; c. STEM jobs are projected to grow by 17% and to produce 2.8 million job openings. In contrast, job growth in other professions is projected to be less than 10%; and d. by 2020, the U.S. will demand 123 million highly-skilled workers, but there will only be 50 million qualified people to fill these roles [ATT.COM.2018]. Given the short supply of STEM human resources, which is projected to persist, developing countries are expected to lose some of their STEM human resources to developed countries. Considering the need for a high share of STEM human resources to develop a prosperous economy and to compensate for the expected brain drain countries seeking prosperity should take a strong initiative to enhance the share of STEM graduates in higher education.

Research Capacity and Economic Growth

38. The ability to produce high quality products at lower costs by enhancing productivity through technological upgrading, and innovative products based on new technology are prerequisites for prosperity. Research helps to upgrade technology as well as develop new technology. The paramount importance of research for prosperity is well established for academicians but it may not be obvious for a wide range of stakeholders. An effort is being made here to provide the evidence of the importance of research for prosperity in manner understandable to a wide range of stakeholders.
39. The creation of new knowledge through research is one of the key functions of universities. The research capacity of universities gives a good indication of the research capacity of countries. The correlation between the research capacity of countries and their prosperity is analyzed to provide empirical evidence of importance of research for achieving prosperity. Ranking of universities is used here as a measure of their research capacity.
40. Responding to the need for objectively assessing the quality of outputs of universities - education and knowledge creation – university ranking systems have emerged. Usher A. describes the origin of the rankings in the following way, "University rankings or league tables, a novelty as recently as 15 years ago, are today a standard feature in most countries with large higher education systems. They were originally created over 20 years ago by U.S.W. News and World Report in order to meet a perceived market need for more transparent, comparative data about educational institutions" [Usher A. 2007]. Rankings are widely used by students for selecting best

universities and governments for funding. Academic Ranking of World Universities, Times Higher Education Supplement, QS World University Rankings and Webometrics Ranking of World Universities are among four notable international ranking systems. There are no universally accepted criteria for ranking universities. The above rankings use different criteria and they serve different target groups. The criteria used by these rankings, interpreted by the author, are presented in Table 2.3. Considering the paramount importance of research outputs for socio-economic development Academic Ranking of World Universities (ARWU), which is solely based on research outputs, has been chosen for analysis of the research capacity of universities.

Table 2.3 Comparison of ranking methodologies- weightings by criteria

Ranking Criteria	Research	Teaching	Internationalization	Reputation
Academic Ranking of World Universities	100	0	0	0
QS World Ranking	20	20	10	50
Times Higher Education Supplement	62.5	30	7.5	0
Ranking Web of Universities	45	0	0	55

Source: Based on ARWU 2018, THEWUR 2018, QSWUR 2018, Cybometrics 2018.

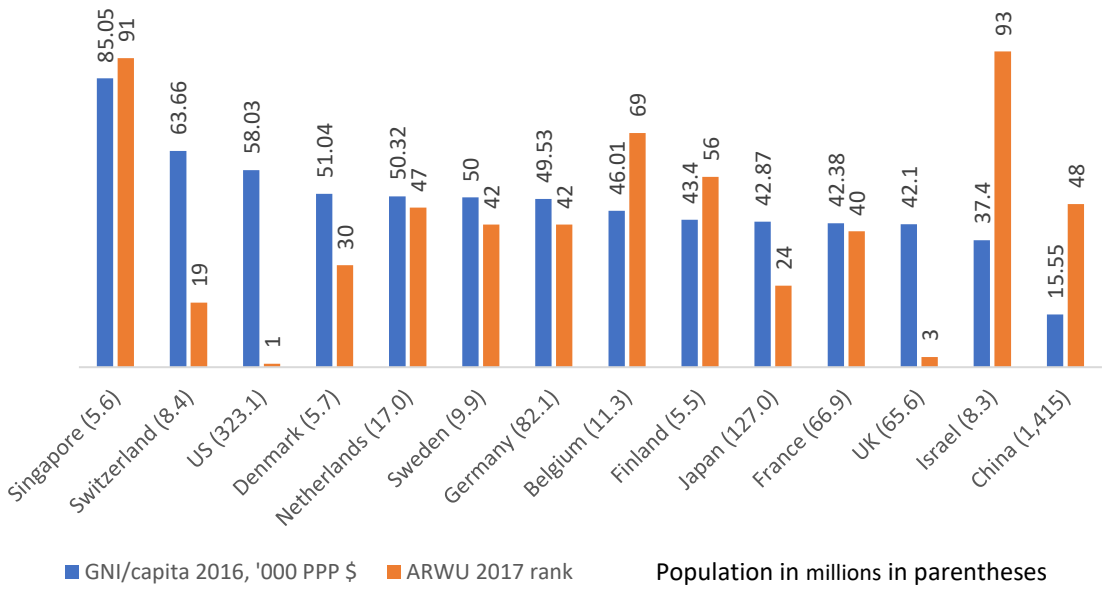
41. ARWU ranks universities in the following ranges: top 1-20, 1-100, 1-200, 1-300, 1-400, 1-500 and 1-800. Table 2.4 hints at the correlation between the quality of universities and GNI per capita. With few exceptions countries with universities within top 200 ranking have GNI per capita of US$35,790 or more. China with GNI per capita PPP US$ of 15,550 and Russia with 22,540, which have two and one universities respectively in top 100 range, are exceptions. This shows that to develop high quality universities countries do not have to become rich first, and as a matter of fact developing high quality universities is one of the means for becoming rich.
42. Both China and Russia have been trying to develop universities competitive with those of developed economies. "In 1993, the government adopted the Guidelines of China's Educational Reform and Development, which called for, among other things, building up 100 key universities with high-quality courses of specialized studies. In 1998, then-President Jiang Zemin announced the goal of building world-class universities, with a clear focus on the advancement of science and technology" [Salmi 2009]. In Russia, Project 5-100 was launched with a target of getting Russian Universities within top 100 by 2020. India is another example of a country adopting excellence of universities as a strategy for economic growth. The first initiative in this direction was taken in 1950s through establishment of Indian Institute of Technologies (IITs). Out of seven Indian universities within top 800 three are IITs. The Indian Government is launching an initiative to establish fourteen Innovation Universities aiming at World-Class Standards under the Eleventh Plan [MHRD. 2017].

Table 2.4 GNI per capita ranges of countries with at least one university in each ranking range

Ranking range ARWU	1-20	1-100	1-200	1-300	1-400	1-500	1-800
GNI/capita range, PPP$	>42,100	>37,400	>35,790	>12,860	>12,860	>11,110	>11,110
Exceptions	None	China 15,550, Russia 22,540	Brazil 14,810, China 15,550, Russia 22,540	None	India 6,490	India 6,490	India 6,490

43. GNI per capita and ARWU rank of the highest ranked university of countries with at least a university in top 100 ranking are presented in Figure 2.8. Countries with rich natural resources except for the US were excluded from the above analysis. All countries in the group except for China have GNI per capita of PPPUS$37.4 thousand or higher. And the ranking of the best university lies within top 93. This is another evidence of the linkage between the research capacity and prosperity of countries. The figure shows that countries poor in natural resources and with small population can also prosper if they are able to build excellent research capacity. China's top university has been able to secure a spot in top 100 with a relatively low GNI/capita, which has contributed to its rapid growth.

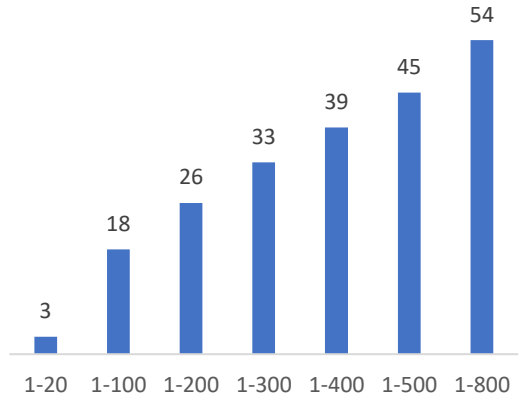
Figure 2.8 GNI/capita and ARWU highest ranked university



Research Excellence is Concentrated in a Few Countries

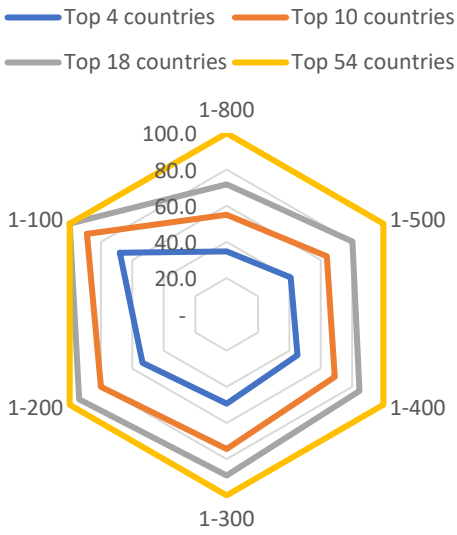
44. The number of countries, which have at least one university within top 1-20, 1-100, 1-200, 1-300, 1-400, 1-500 and 1-800, is shown in Figure 2.9. The figure shows that top quality universities are concentrated in a limited number of countries. Top 20 universities are located in three countries, top 100 in 18 countries and top 800 in 54 countries.

Figure 2.9 Number of countries with universities within top ranking ranges

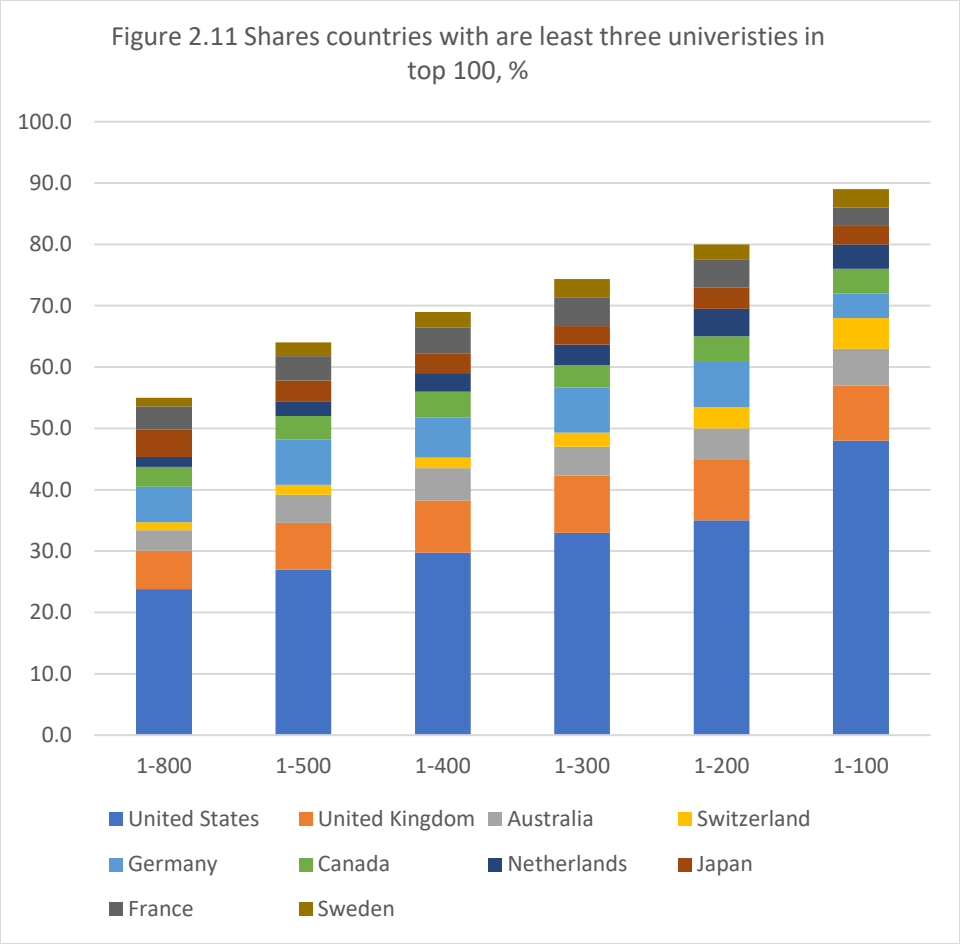


45. Figure 2.10 shows the extent of concentration of research excellence in a few countries, which is one of the main reasons for extreme wealth disparity among nations. The area within the outer hexagon represents 800 top ranking universities in the world, which belong to 54 countries. It can be observed that the areas representing universities in 18, 10 and 4 countries decrease substantially less than the corresponding number of universities. The innermost hexagon shows that the shares of four countries in the total number of universities in in top 100, 200, 300, 400, 500 and 800 rankings, which are 68.0%, 53.5%, 49.3%, 45.3%, 40.8% and 34.7% respectively.

Figure 2.10 Distribution of top ranked colleges, %



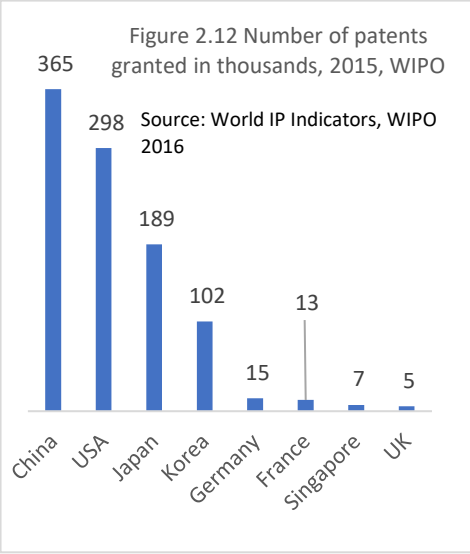
46. Figure 2.11 shows shares of ten countries, which have at least three universities in top 100, in different ranking ranges. The following observations can be drawn from the figure: a. the US is well ahead of other countries in terms of research standing. The US started investing on higher education much ahead of other countries. For example, in 1971, the tertiary GER of the US was 47.3% compared to that of France, Japan and UK of 18.5%, 17.6% and 14.6% respectively; b. small countries with small population and with few natural resources like Switzerland (population - 8.5 million and land area - 41,285 sq.km.) and Netherlands (population - 17 million and land area – 41,543 sq.km.) also have been able to prosper by developing high quality universities, among others; c. six largest economies with exception of China have at least three universities in top 100; and d. countries rich is natural resources like the US, Canada and Australia also are relying on ability to generate and use knowledge for growth of their economy.



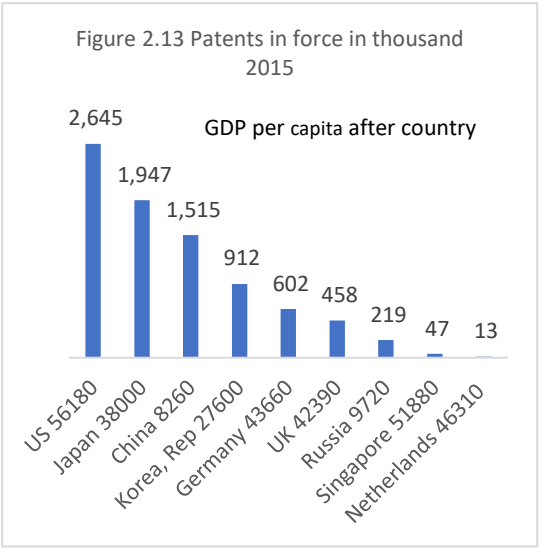
47. The competition for the superiority in knowledge in intensifying even more because the world has entered the age of knowledge economy. It is not only that developing countries are trying to catch up with the developed countries but the developed countries are also trying to retain their superiority. In 2004, Germany launched a national competition to identify 10 universities with the potential to become world-class universities, selected 41 proposals for centers of excellence, and 39 proposals for strengthening graduate schools. In 2006, the government committed US$2.3 billion for supporting this initiative. In 2006, Denmark launched globalization fund for financing research universities on a competitive basis. The allocation was US$1.9 billion from 2007-2012 [Salmi. 2009].
48. Given the intense competition for superiority in knowledge and technology creation capacity those developing countries, which do not embark into a journey to build a world-class research and development capacity will not only be unable to close the prosperity gap with developed countries but they may also slip behind the peers.

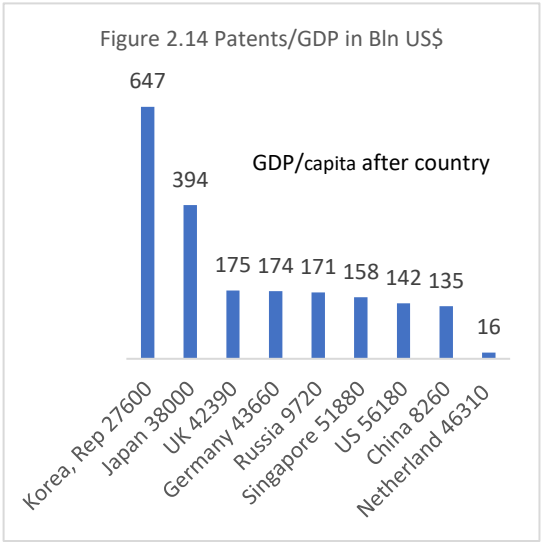
The Importance of Innovation

49. For rapid economic growth it is not enough to make discoveries or inventions through research but it is as important to use them through innovation. Patenting reflects innovation capacity of a



country. The number of patents granted in various countries, in 2015, is presented in Figure 2.12. China, the USA, Japan and Republic of Korea standout in terms of the patenting capacity. This, partly, explains the rapid rise of China and Republic of Korea. Patents normally have a life time of 20 years. Therefore, the current technological capacity of a country is determined better by patents in force rather than by patents granted recently. Figure 2.13 presents patents in force in 2015. It is interesting to note that out of seven countries with the largest number of patents in force six are the world's largest economies – the USA, Japan, China, Germany, France and the UK. Republic of Korea, which has the fourth largest number of patents in force, is an innovation power house. Technological sophistication of an economy can be better judged based on the ratio of patents to GDP. Figure 2.14 presents the number of patents in force per billion US$ of GDP. In terms of the technological sophistication of the economy Republic of Korea tops developed economies followed by Japan, and Singapore is comparable to with developed economies.





50. Considering the importance of innovation for economic growth countries are creating favorable environment for innovation as reflected in the following statement in OECD, 2008 "the state has also moved in a number of countries – starting with the USA – to make the development and patenting of technologies, as well as the licensing of their use, attractive for university researchers and universities, by granting researchers the intellectual property rights over scientific finding arrived at with the use of public funds ". Without creating favorable environment for innovation research outputs may not contribute to prosperity therefore developing countries would benefit from building research capacity in tandem with creating favorable environment of innovation.

Role of Universities in Patenting

51. A bulk of research takes place in universities and public research institutions, which receive substantial public funding, even in countries where big companies exist. The role of universities in patenting, however, varies from country to country. This role, among others, depends upon the capacity of industries to innovate. OECD, 2008 summarizes the US experience as follows, "the university origins of enormously successful companies like Cisco, Google and Yahoo - all three of which grew out of Stanford University research and two of which took Stanford licenses - are well known. Less often noted is the fact that new business formation around university science and technology is a very small fraction – probably no more than 2-3% - of the total rate of new business start-ups in the USA. The same is true of patenting. Even in the USA, where patenting by universities is most common, it is only a minor contributor to the overall stock of patented knowledge. About 3,700 patents were granted to US universities in 2001, out of the total of about 150,000 US patents issued in that year [Mattoon R. 2006]".
52. But more recent experience of China and Republic of Korea shows that when university-industry linkage is carefully designed and facilitated by the government universities can contribute more to patenting. Figure 2.15 shows that patenting by Korean universities and public research institutions was higher than that of the USA by an order of magnitude during 2010-2013. And the

Figure 2.15 Patent families of top 5 universities and public research organizations 2010-13

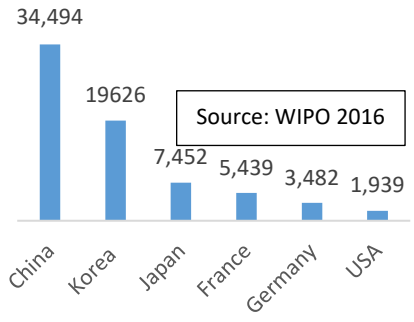
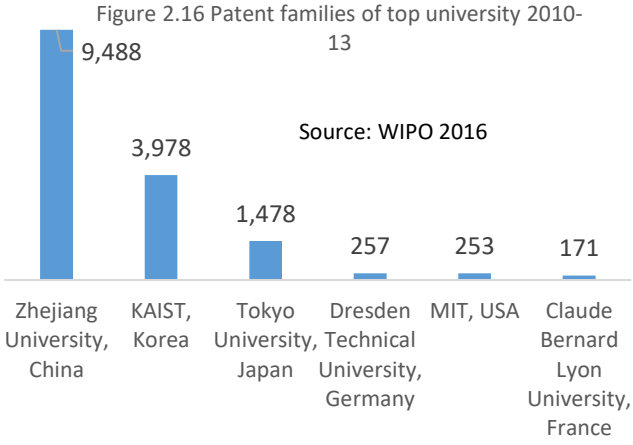


Figure 2.16 Patent families of top university 2010-13



performance of Chinese universities and public research institutions was even higher during the same period. The comparison of the number of patent families, of top universities of China, Republic of Korea, Japan, France, Germany and USA, during the period of 2010-2013, shows that China, Republic of Korea and Japan significantly outperformed France, Germany and the USA (Figure 2.16).

53. OECD 2008 emphasizing the role of universities in supporting economic growth in developing countries states, "this means changing the current paradigm to include (in addition to teaching and research) a third mission: service to the community and close cooperation with the public and private sectors to contribute to innovation and development. It is imperative that universities

work towards fulfilling their mission of community service – a mission that has been promoted in industrialized countries over the past two to three decades."

Translating Research Outputs into Economic Growth

54. Here an attempt is being made to show the mechanism through which research outputs leads to economic growth. The greater the value addition in products and services of a country the faster is the economic growth. One way to increase the value added of products and services is to raise the quality of products and services and thus attract a premium price for them. The question to be answered in this connection is whether research is required for enhancing the quality of products and services given the perception that research is about new discoveries or inventions. Quality of products and services may be improved by solving specific problems related with them through systematic scientific investigation by using existing scientific knowledge and technology. Such research is called applied research to differentiate from basic research which is aimed at creating new knowledge.
55. In the globalized economy companies have to face intense competition for selling products and services. Only those companies which are able to continuously upgrade their products and services are able to survive. Their growth depends upon their ability to remain ahead of the competitors by offering better products. A household goods company like Proctor and Gamble and food company like Nestle have been able to stay in the market and make a good profit because of their ability to continuously upgrade their products through RDI. R&D expenditures and R&D expenditures as a share of sales for Proctor and Gamble is presented in Figure 2.17. The share of R&D expenditures has been rising over the years. Proctor and Gamble collaborates with a number of universities in the area of R&D. One of the notable collaborations is with University of Cincinnati [UIDP 2013]. In 2013, Nestle's R&D expenditures were equal to 1.63% of the sales. Nestlé collaborates with the majority of universities and university hospitals in Switzerland and has close ties with the University of Lausanne, ETH Zurich and the Ecole Polytechnique Fédérale de Lausanne, among others [Nestle.2013].

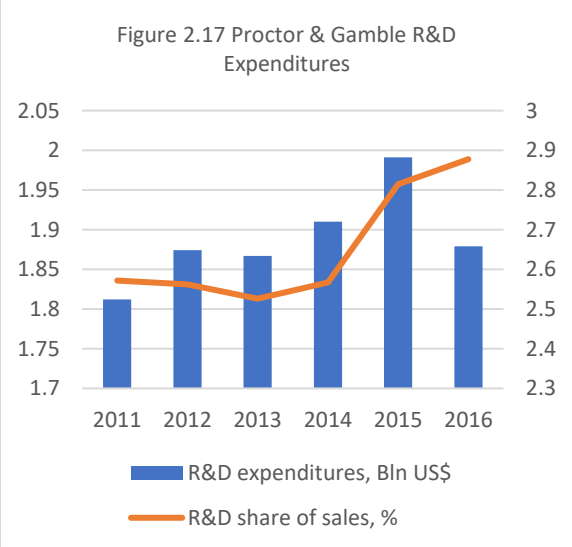
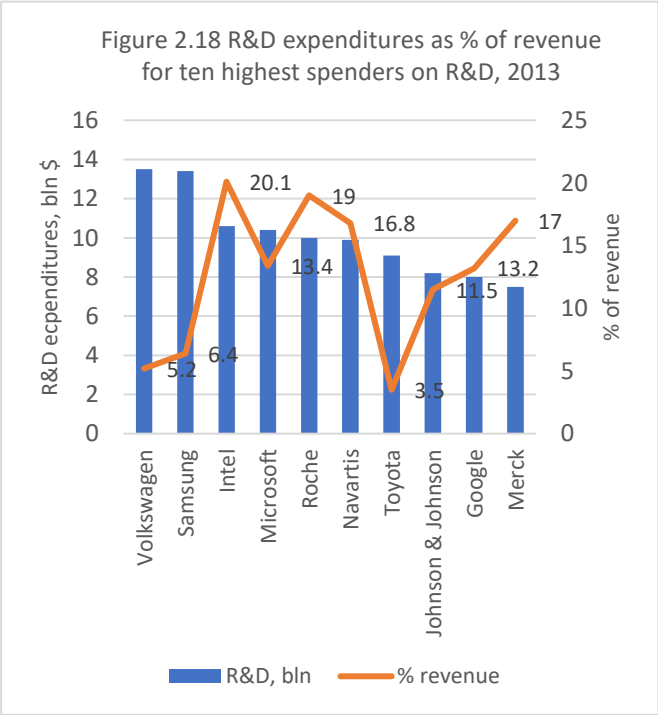


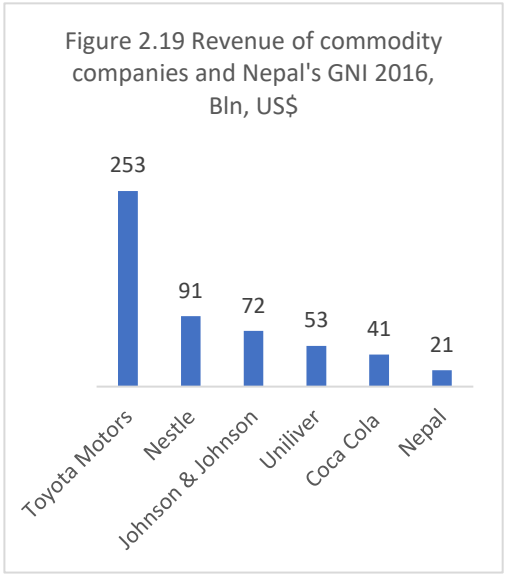
Figure 2.17 Proctor & Gamble R&D Expenditures

56. RDI is spreading to all types of products and services however trivial they are not. For example, security services firms like Group for Security (G4S) is engaged in R&D. Security services are one of the areas of expertise of Nepal, which has a long tradition of providing security services. But G4S has penetrated Nepal and captured high value clients. G4S is a UK based multinational company, which employs 45,000 people in 120 countries. In 2013, its spending on R&D in UK alone was £2.6 million, and £14 million worldwide. It has developed 6 patents in the UK [NTU. 2013]. In terms of value added G4S holds 22th position

in the UK with a total value of £5.3 billion [DBIS 2010]. Uber, offering ride hailing taxi services, among others, is another example. Its R&D spending in the first half of 2015 was US$94.7 million [Statista 2017]. Figure 2.18 presents a glaringly example of how companies are investing heavily on R&D to maintain their competitive edge. In 2013, Toyota and Volkswagen - car companies well known for quality products – spent 3.5% and 5.2% respectively of their revenues on R&D. These examples illustrate that companies in developing countries would not be able to make a headway without getting engaged in RDI. Therefore, universities not only would have to do research but they also should produce graduates with RDI capacity.

57. Figure 2.19 compares GNI of Nepal with revenues of commodity companies well known for quality products to illustrates what they have achieved by investing on RDI. The revenue of a beverage producer – Coca Cola – was twice the GNI of Nepal in 2016. The revenue of a food company - Nestle – is more than four times the GNI of Nepal. There is no reason why Nepal should not aspire to compete with companies like Coca Cola and Nestle by building RDI capacity in the country.





58. Another way to increase value added of products and services is to produce novel products like smart phones and social media. The value added from novel products can be much higher than that from high quality products as illustrated by Figure 2.19 and 2.20. The annual profit of Apple company in 2016 was more than five times of the annual budget of Nepal. Annual profits of relatively recently established tech companies – Google, Samsung, Microsoft, Alibaba, Facebook and Oracle – are also higher than the annual budget of Nepal (Figure 2.20).
59. The market value of Apple company established in 1977, which started production of iPhone in 2007, is over US$777 billion in 2017 – the highest in the world among companies. Similarly, the market value of Facebook company established in 2004 is over US$464 billion in 2017. But the market value of the richest oil company- Exxon-Mobil, which takes its origin from Standard Oil established in 1870, is only US$344 billion only (Figure 2.21). Figure 2.21 compares market values

of tech companies with commodity companies renowned for quality products. This comparison shows that tech companies are way ahead in terms of creating value addition.

60. The above examples show that developing countries aspiring to bridge prosperity gap with developed countries should explore the possibility of wealth creation through development of novel products as well. Emergence of the knowledge economy has opened an opportunity for developing countries to catch up with developed countries as resource endowment or capital is no longer a prerequisite for economic development.

Figure 2.20 Profit of tech companies and Nepal's public expenditures 2016, Bln US$

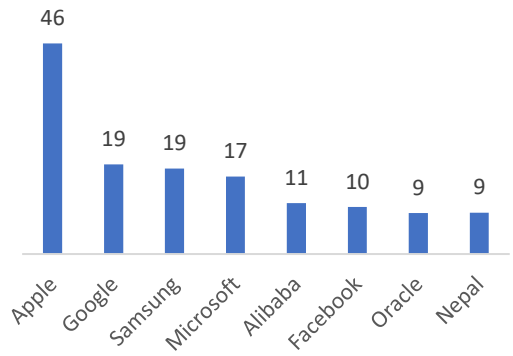
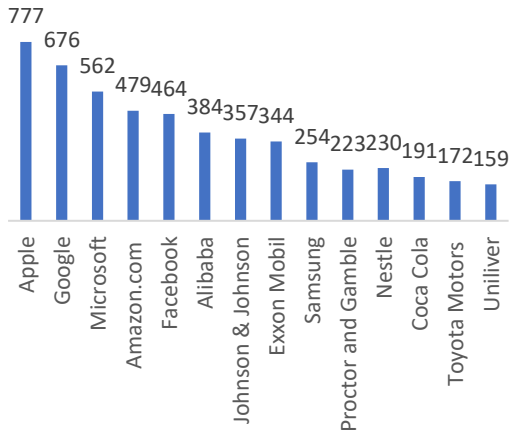


Figure 2.21 Market value Tech and Commodity Companies 2017, Bln US$



Time Lag between Invention and Innovation is Decreasing Dramatically

61. Lately it is not only that the pace of creation of new knowledge has increased dramatically but also the time lag between an invention and innovation, that is the time required for the use of the invention, has also reduced dramatically. For example, the laws of electromagnetic induction discovered in 1821 by Michael Faraday laid the foundation for the design of electrical generators. But the first commercial distribution of electricity started only in 1896, when the first transmission line was commissioned [Doppelbauer M. 2018]. Whereas, the invention, development and demonstration of compact fluorescent light was completed within five years – 1975-1980 [Hanna R. et al. 2015].
62. Market deployment and commercialization time for products is also decreasing as seen from the example of market penetration of various products [Figure 2.22]. Compared to electricity the spread of cell phones and internet has been much faster in the US. Figure 2.23 shows how dramatically the time for market penetration was reduced from landline to mobile phones and from mobile phones to smart phones.

Figure 2.22. Market deployment and commercialization time

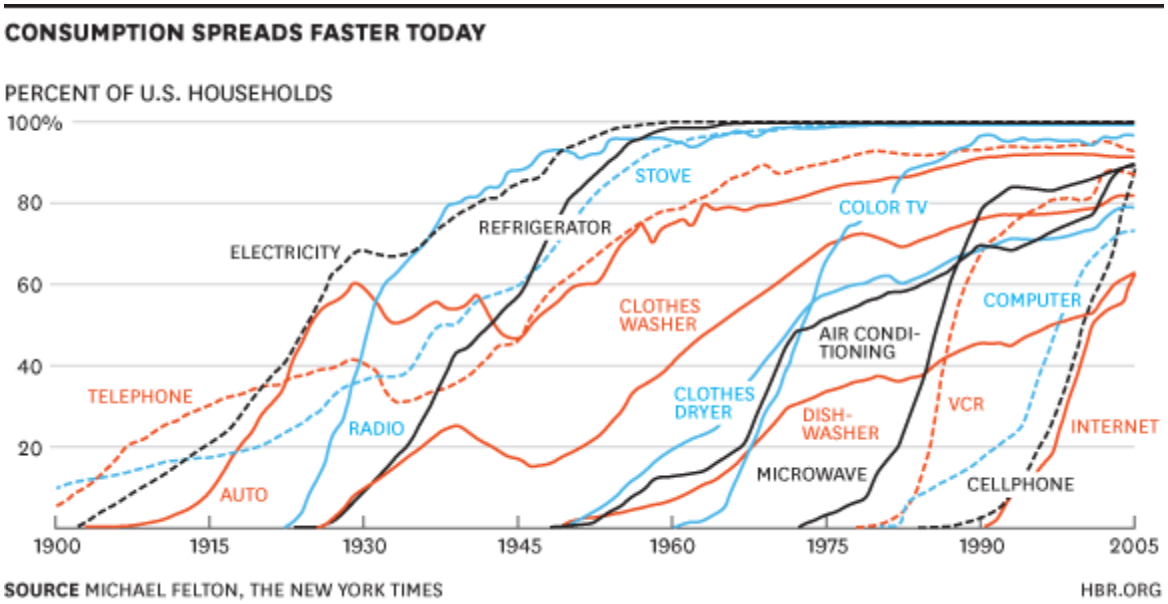
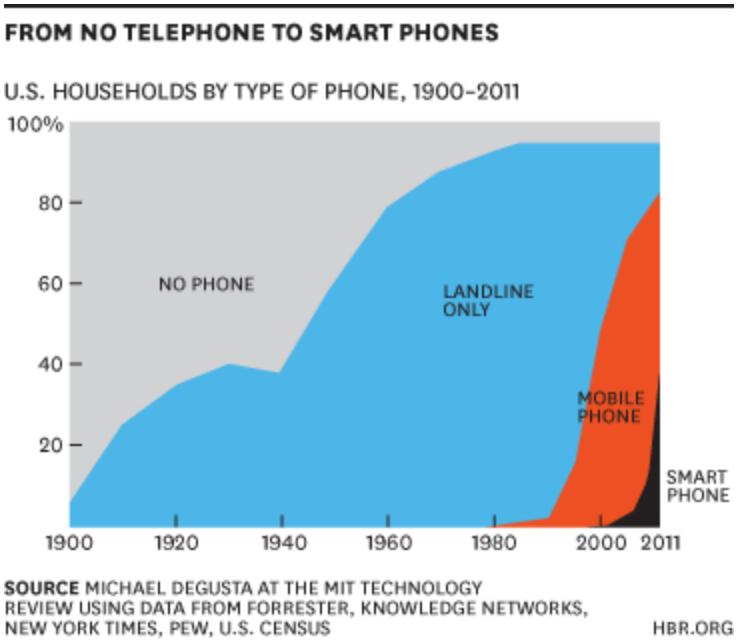


Figure 2.23 Spread of telephones



63. The above changes have several implications for higher education in developing countries. First, to make goods and services produced competitive in the globalized economy the technology used for producing these goods and services needs to be made more sophisticated and upgraded more frequently. This would require a higher share of the work force with higher education, and consequently, the production of higher education graduates would need to be increased. Second,

the technological sophistication of production in developed countries has substantially increased demand for work force with university degrees, which they have not been able to meet. This shortfall is being met through migration of higher education graduates from developing countries as well as enticing students from developing countries to study higher education in developed countries. The production of higher education graduates needs to be increased also to compensate for this loss of the skilled work force. Third, to equip higher education graduates with knowledge and skills compatible with technological upgrading of enterprises higher education institutions would need to renew curriculum more frequently and upgrade faculty commensurately, among others, through engagement in RDI activities. Fourth, technologies are becoming obsolete in relatively shorter period of time, and as a result when patent enforcement period ends the patented technology may not have much value. This implies that developing countries may have to keep paying royalty for technology to keep an up to date technology, and consequently, the profit margin for goods and services produced will be relatively small. Therefore, for catching up with richer countries the only option will be to get engaged in RDI. This requires developing countries to develop research universities. Fifth, the world has entered into the age of knowledge economy, in which knowledge creation and innovation enables countries to prosper more than natural endowments or cheap labor. In this economy, it is not possible to stay in business unless enterprises are able to constantly upgrade their products and services through RDI. In this context, all countries have to compete for superiority in RDI capacity.

The Case for World-Class Universities

64. The competition between developed countries for attaining superiority in knowledge and technology is getting ever more intense. In this connection they are giving a high priority to strengthening the research capacity of universities through development and strengthening of world-class universities. But most developing countries have not taken steps to significantly strengthen research capacity of their universities assuming that this is not something developing countries can succeed in. As a result, the gap in research capacity of developed and developing countries is increasing. This precludes the possibility of materializing aspirations of developing countries to close the prosperity gap with developed countries. Among the strategies for economic growth developing countries have been pursuing are: a. to adapt existing knowledge and technology; b. to focus R&D on upgrading the quality of products and services in addition to adapting existing knowledge and technology; and c. to focus R&D on upgrading the quality of products and services, and development of novel products in addition to adapting existing knowledge and technology. Many developing countries are choosing the first option. This option can contribute to economic development but it will not help in narrowing the gap between developed and developing countries. The second option is within the grasp of developing countries provided they are committed to develop good quality universities and produce graduates capable of engaging in R&D activities and support enterprises in RDI activities. Every developing country aspiring to bridge the wealth gap with developed country should at least chose this option. The third option may be seen too ambitious at the first glance but it is not. The emerging knowledge economy has opened up an opportunity for developing countries to catch up with developed countries because natural endowments for huge capital accumulation is no longer a prerequisite for development. For this option to materialize development of world-class

universities is a must. Experience indicates that with due commitment developing countries can develop such institutions within two-three decades. Singapore, Republic of Korea and Taiwan have chosen this option and succeeded. China and India also are on the same path. Finland and Estonia are among more developed countries choosing the same path.

Conclusions

65. The history of economic development of the world indicates at the linkage between economic development and the ability to create knowledge and technology. Yet many developing countries have not been giving due priority to strengthening of their ability to create knowledge and technology. One of the reasons for this appears to be the lack of information containing compelling arguments about the importance of creation of knowledge and technology understandable to a broad of group of stakeholders including politicians, policy makers, academia, students and the civil society.
66. The technological sophistication of production has been increasing throughout the history. It has accelerated noticeably during the last few decades increasing the demand for workforce with higher education in both developed and developing countries. Developing countries aspiring to close the prosperity gap with developed countries can do so only by speeding up sophistication of the technology of production, which requires rapid increase in the participation rate in higher education. Given that higher education GER of developed countries is generally over 50% and for some it is over 80% developing countries will not be able to compete in the globalized economy unless they are able to substantially increase the higher education GER.
67. The experience of developed economies indicates at the critical importance of a high share of STEM enrolment in the total higher education enrolment. The share of STEM graduates in these countries ranges from one-third to half. Even with such high shares developed economies are experiencing shortage of workforce with STEM education, which is being partly met through brain drain from developing countries. In this context developing countries should develop appropriate strategies for increasing the share of STEM enrolment.
68. The determinant for research capacity of a country is the research capacity of its universities. There is a correlation between research capacity of countries' universities and their GNI per capita. For example, all countries with at least one university in the top 20 ranking range have GNI per capita of more than PPP$42,000, and all countries with at least one university in top 501 to 800 range have GNI per capita of more than PPP$11,000. Excellent research capacity of universities has enabled even small countries with small population and without natural resource endowments to attain prosperity. Singapore, Switzerland, Netherlands and Finland are among such countries. All developed economies without rich natural resource endowment have at least one university in the top 100 ranking range. And the share of four countries with the best research capacity in top 100 universities is 68%. This shows concentration of research capacity in a few countries. Given the intense competition for superiority in knowledge and technology creation capacity those developing countries, which do not embark into a journey to build a world-class research and development capacity will not only be unable to close the prosperity gap with developed countries but they may also slip behind the peers.
69. Research outputs of universities will contribute to economic growth only if these outputs are translated into innovation. Creating a favorable environment for innovation by providing

incentives to researchers is critically important for economic growth. East Asian experience indicate that universities can play a significant role in innovation by building strategic partnership between universities and industry. Developing countries can benefit learning from this experience.

70. Wealth creation can be accelerated by production of better quality products or novel products, which can get premium price due to the reduced competition. Research is indispensable for both production of high quality products as well as novel products. Making a decent profit and surviving in the market is impossible for even producers of day to day commodities. For example, in 2013, Nestle expenditures on R&D was 1.6% of the sales and that of Proctor and Gamble, in 2016, was 2.8%. Similarly, in 2013, R&D expenditures of high tech companies like Intel and Google were 20.1% and 13.4% of the revenue respectively. The pace of wealth creation through development of innovative products is much higher than that through production of quality products. Therefore, developing countries aspiring to catch up with developed countries should carefully consider opportunities for developing novel products as well.
71. The time lag between the invention and innovation has been decreasing dramatically. As a result, by the time the validity period of patents end, they would not carry much of a value. Therefore, countries which are not able to innovate and patent the innovation would not be able to accumulate wealth meaningfully because, first, they have to pay hefty royalty for using an up to date technology with a view to command premium price for their products, and second, they will not be able to make a good profit if they chose to use technology not covered by patents. Therefore, countries aspiring for prosperity should build their own research capacity rather than relying solely on the transfer of the technology.
72. In the quest for supremacy in research capacity developed and some developing countries are building and strengthening world-class research-oriented universities. The gap in research capacity of developed and developing countries, which are not developing world-class universities, is bound to widen. Such developing countries stand no chance of not closing the prosperity gap with developed countries but they also will start to lag behind developing countries developing world-class universities. Therefore, developing countries aspiring for prosperity should consider developing at least one world-class university.

Chapter 3 Higher Education Outcomes for Prosperity

73. The critical role of higher education in economic growth was discussed in Chapter 2. It also provides an idea about higher education outcomes, which developing countries aspiring to attain prosperity should aim at. This chapter attempts to determine higher education outcomes Nepal should aim at achieving based on analyses of the outcomes of selected lower income, lower-middle income, upper-middle income and high-income countries. These outcomes depend on the extent of the prosperity Nepal wishes to attain. This note, in the context of the raised expectations of the people following the promulgation of the new Constitution and formation of a stable government, attempts to tentatively define targets for higher education outcomes, which should support the country to become a high-income country by 2050. The scope of higher education outcomes analyzed includes GER, share of STEM, RDI capacity, and quality and relevance. With a view to provide contextual information a brief description of the education system and school education outcomes is also provided.

School Education Outcomes

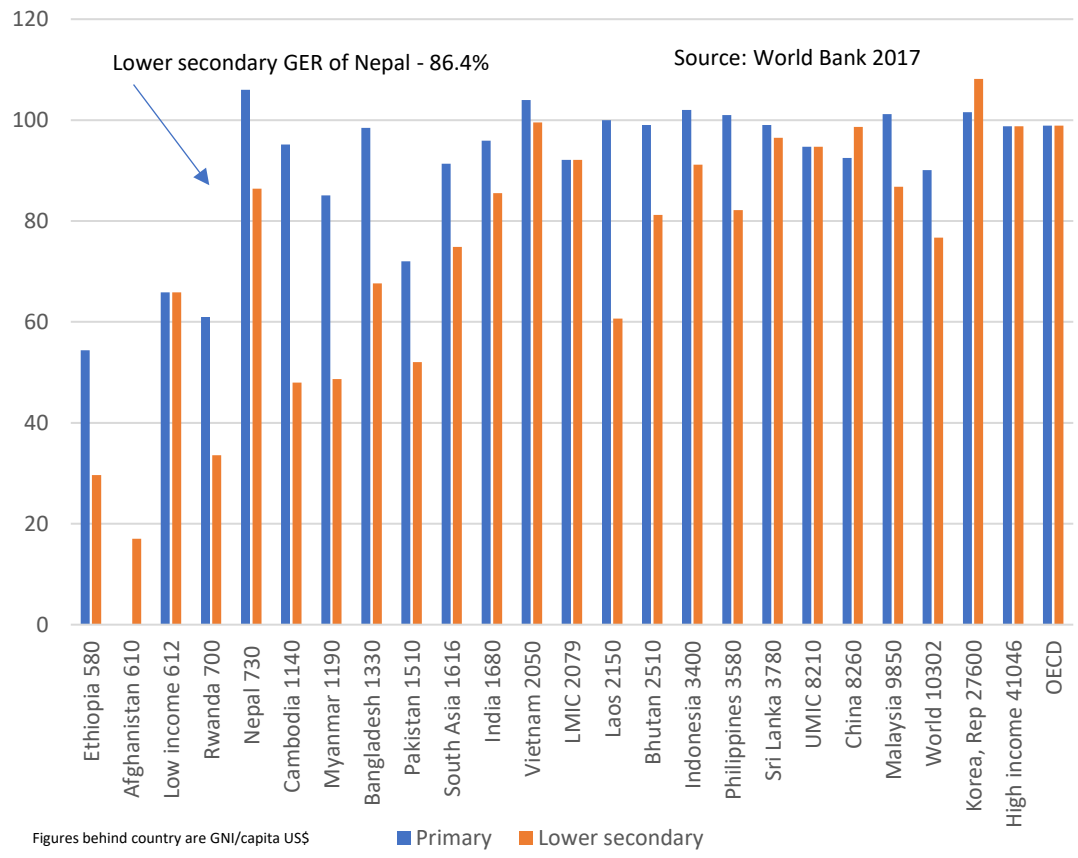
74. School education comprises basic education from early childhood education and development to grade 8, and secondary education from grade 9 through 12. The concept of basic education was introduced recently by subsuming early childhood education and development, primary and lower secondary education. For the purpose of international comparisons data on basic education disaggregated by primary (grade 1-5) and lower secondary education (grade 6-8) have been used in this note. Secondary education has two streams – general and technical[5]. Secondary education has two exits points – one after grade 10 and another after grade 12. Technical education and vocational training of up to three years starts after grade 10. Higher or tertiary education[6] comprising bachelor's, master's, MPhil and PhD levels starts after grade 12.
75. Figure 3.1 compares primary and lower secondary completion rates of Nepal with some low-income countries (LIC), lower middle-income countries (LMIC) of South Asia and East Asia, some upper middle-income countries (UMIC) of East Asia and high-income Republic of Korea, which succeeded in achieving a dramatic economic growth. Nepal has made a significant achievement in access to primary education, which had a primary participation rate of barely 3.7% in 1953 [Pandey R.R. at al. 1956]. Nepal's primary completion rate of 106% in 2016[7] is higher than average participation rates of high-income and Organization for Economic Cooperation and Development (OECD) countries. In spite of the high primary completion rate a large number of out-of-school children persists, which was estimated at 450,000 in 2016. Because of the continuing rapid advancement of technology work force without primary/basic education is not likely to be able to

[5] Technical stream leads to technician qualifications. The share of this stream in the total secondary enrolment is less than 1% (Flash Report 2016/17).
[6] Higher and tertiary education is being used as synonymous terms. There is no provision for non-degree post-secondary education in Nepal.
[7] Figures are for 2016 or earliest available year.

meaningfully contribute to the economy. Therefore, at the primary/basic level Nepal's priority should be universal completion.

76. Nepal with the lower the secondary participation rate of barely 3.3% in 1953 has also made a good progress in improvement of access to lower secondary education. Nepal's lower secondary completion rate of 86.4% in 2016 is higher than the South Asian average of 74.9%, but lower than LMIC of average of 92.1% and UMIC average of 94.7%. Among the LMIC in Figure 3.1 Cambodia has the lowest lower secondary completion rate of 48% and Vietnam the highest of 99.6%. Out of eleven LMIC countries in the figure four countries have lower secondary completion rate close to or higher than that of Nepal.
77. The above comparison of the lower secondary participation rates was made assuming grades 6-8 for Nepal as lower secondary. However, lower secondary grades are different from country to country, and in some countries lower secondary includes grades 9-10. The completion rate for grade 9-10 is not available. The Gross Enrolment Ratio (GER) for grade 9-10 is 79% [DOE 2016]. Increasingly countries are aiming at universal lower secondary completion. In this context Nepal needs to aim at achieving universal completion of grade 10.
78. The upper secondary GER (grade 11-12) for Nepal of 49.7% is relatively high for a low-income country (LIC) but it is less than that of LMIC of 56.8% and of UMIC of 86.8% (Figure 3.2). Among

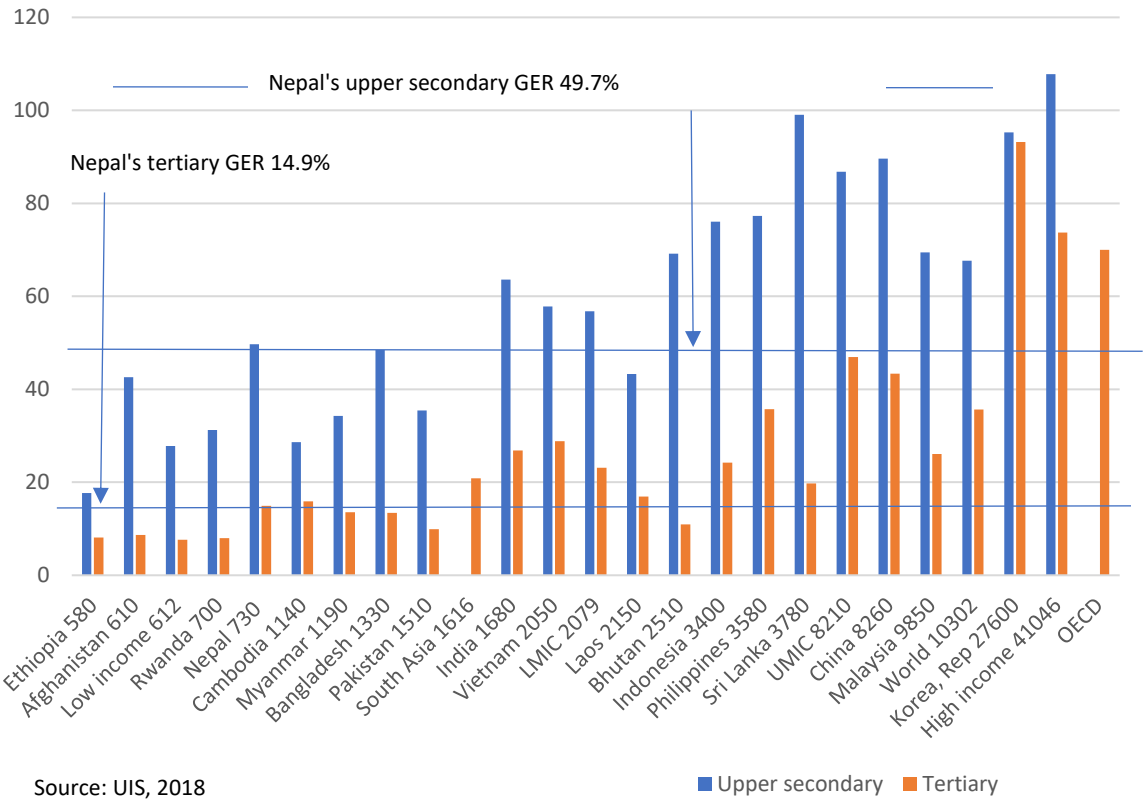
Figure 3.1 Primary and lower secondary completion rates, %



the LMIC in Figure 3.2 Cambodia has the lowest upper secondary GER of 28.6% and Sri Lanka the highest of 99.1%. Out of eleven LMIC countries in the figure seven countries have upper secondary

GER close to or higher than that of Nepal. Given that it is the age of knowledge economy and that Nepal needs to significantly enhance its competitiveness Nepal needs to aim at significantly increasing the upper secondary participation rate.

Figure 3.2 GER upper secondary and tertiary 2016, %



Source: UIS, 2018

Higher Education Outcomes

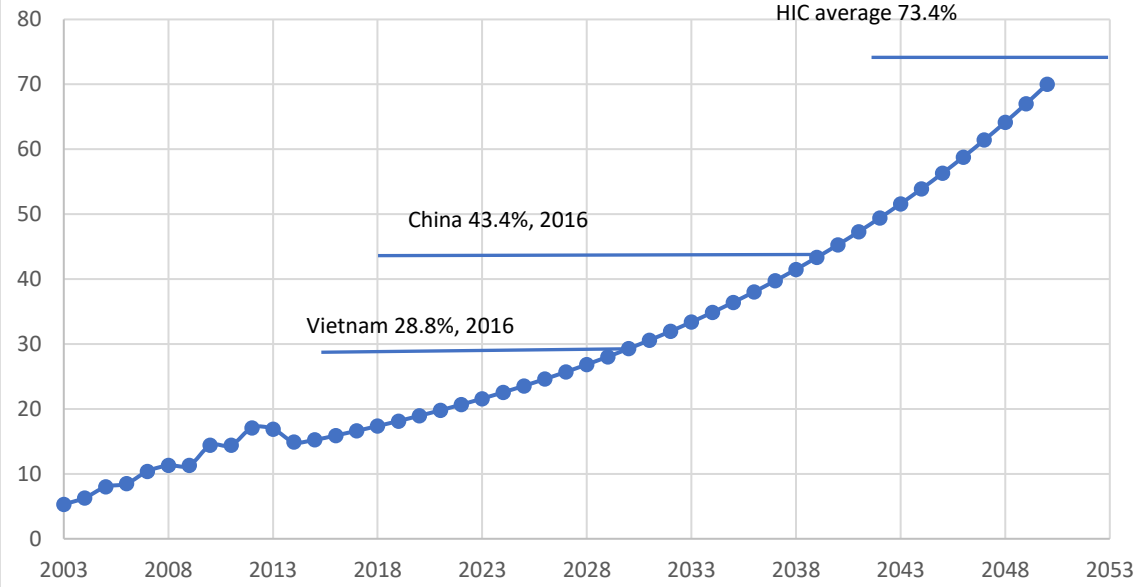
Enrolment Rate

79. The tertiary GER for Nepal of 14.9% is higher than the LIC average is 7.6%. But it is less than that of LMIC average of 23.1%, UMIC average of 46.9% and of HIC average of 73.7% for 2016 [UIS 2018]. Among the LMIC in Figure 3.2 Pakistan has the lowest tertiary GER of 9.9% and Vietnam the highest of 28.8%. Out of twelve LMIC in the figure eight countries have tertiary GER higher than that of Nepal.
80. In the last few decades the pace of increase in the GER has accelerated across rapidly growing economies to support the rapid technological upgrading of production. For example, in Estonia the GER increased from 25.4% in 1995 to 72.9% in 2013, in China from 7.7 % in 2000 to 43.4% in 2015, in Finland from 31.5% in 1984 to 95.1% in 2008, in Turkey from 38.5% in 2007 to 94.7% in

2015 and in Chile from 48.6% in 2006 to 88.6% in 2015. Republic of Korea has been able to compete with more richer countries through the rapid increase in the workforce with higher education. The tertiary GER of 93.2% of Republic of Korea is higher than the HIC average of 73.8%.

81. One approach to setting the target of GER growth will be to compare Nepal's GER with that of low income countries. Nepal may not need to prioritize GER growth under this approach. However, if this approach is followed, Nepal will not be able to compete with LMIC and hence the goal of attaining the status of HIC will not be materialized. The historical growth and the projected growth of GER that will help Nepal gain competitive advantage is presented in Figure 3.3. Nepal should aim at attaining Vietnam's 2015 GER of 28.8% by 2030, China's 2016 GER of 43.4% by 2040 and GER of 70% by 2050, which is close to the 2016 average GER of HIC of 73.8%. In the above context the stagnation of GER in recent years is a matter of concern (Figure 3.3). The projection assumes a growth rate of GER of 4.52% per annum starting from 2016, which seems plausible given that the average enrolment growth rate between 1989 to 2016 was 5.1%. The suggested trajectory of growth of GER is not to a prescription but a guidance, which should be updated periodically based on the economic growth and employment rates.

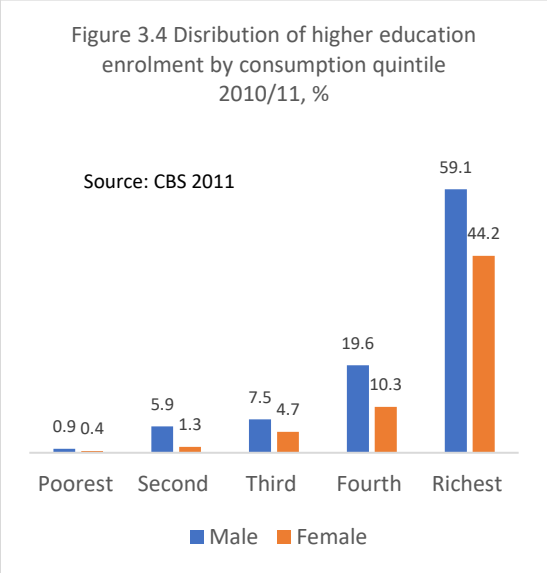
Figure 3.3 Higher Education GER - Historical and Projection, %

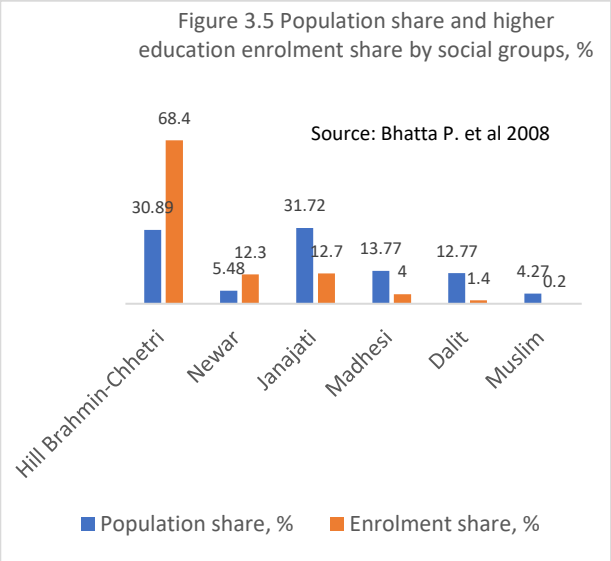


82. To support the agenda of prosperity and prepare students for higher education the participation rate in and quality and relevance of school education would also need to be enhanced. Nepal has made commendable progress in terms of access to primary education (grade 1-5). The challenge at this level lies in achieving universal completion of quality basic education at the earliest date to begin with and attain the universal completion of grade 10 by 2030. This target is consistent with the target of ensuring that all students enrolled in grade 1 in 2019 complete secondary education articulated in the Policy and Program of the Government (GON. 2018).

Equitable access

83. There is a severe disparity in access to higher education by region, income and social/ethnic group. Data on disparity by recently constituted Pradesh is not available. There is significant disparity by consumption quintile (Figure 3.4). The share of the richest (fifth) quintile is higher than four poorer (lower) quintiles taken together. Similarly, the share of the fourth quintile is higher than that of the first three taken together. Although Figure 3.4 shows gender disparity too, the gender gap has now been bridged. The Gender Parity Index (GPI) in 2014/15 was 1.09 [UGC 2016].
84. Figure 3.5 shows disparity in access to higher education by social groups. While hill Brahmin-Chhetris and Newars are significantly over represented compared to their population share Janajatis, Madeshis, Dalits and Muslims are underrepresented. From the perspective of attaining the targets set for the participation rate as well as tapping the talent from the entire population serious efforts will be needed to reduce this disparity significantly.





Share of Science, Technology, Engineering and Mathematics Graduates

85. Developed and developing countries are in a race to achieve superiority in science and technology education. From 1950 to 2000, the East Asian economies fashioned a uniquely successful industrial development model in which the focus was clearly on "science and technology as the primary productive forces" (Mathews and Hu 2007). Now the centrality of strength in science and technology as a driver of growth is well established.
86. The share of science and technology graduates for selected LIC, LMIC, UMIC and HIC are compared in Figure 3.6. While for Nepal programs related to science and technology, engineering, medicine, agriculture, animal sciences and forestry are included in the science and technology group as defined in Nepal, for other countries programs related to STEM that is natural sciences,

mathematics, statistics, information and communication technology, engineering, manufacturing, construction, agriculture, forestry, fisheries, veterinary, health and welfare as defined by UIS are included. In this context, STEM and S&T group are used in this note interchangeably.

87. The GON has not set a target for the share of S&T enrolment for higher education. In 2015/16, the share of S&T areas in the total enrolment was 20.3% (UGC. 2016), which is low compared to LIC like Rwanda (35.9%), LMIC like Myanmar (49%), India (34.7%), Vietnam (35.3%) and Indonesia (36.2%), and UMIC like Thailand (33.9%) and Malaysia (42.7%). And this share is in the range of 35 to 50% for most HIC. Based on the above Nepal should aim at achieving the share of S&T areas in the higher education enrolment of about 50% by 2050. A scenario of growth of the share of STEM in higher education enrolment is presented in Figure 3.7. According to this scenario the share of STEM will reach about 35% by 2030 - close to the 2016 STEM share of Vietnam of 35.3%, about 43% by 2038, which is close to the STEM share of Malaysia of 42.7%, and about 50% by 2050, which is close to 2016 STEM share of 50.4% of Finland. This scenario is consistent with the manifesto of the ruling party to increase the share of technical disciplines to 70% [Left Alliance. 2017].
88. One of the main constraints for increasing S&T area enrolment in higher education is the low share of students taking science at grades 11-12. The School Sector Development Program (SSDP) supported by development partners has set a target for the share of science enrolment at grades 11-12 of 15% only [World Bank 2017c], which has already been achieved - the share of science enrolment in 2013 at grade 11 was 14.7%, and at grade 12 - 23.6% [HSEB. 2015]. To enable Nepal to increase the share of S&T areas in the higher education enrolment to 50% by 2050 it should aim at attaining the share of science enrolment at the higher secondary level of around 50% by 2040.

Figure 3.6 Share of S&T graduates 2016

Source: UGC.2016 for Nepal and UIS for rest.

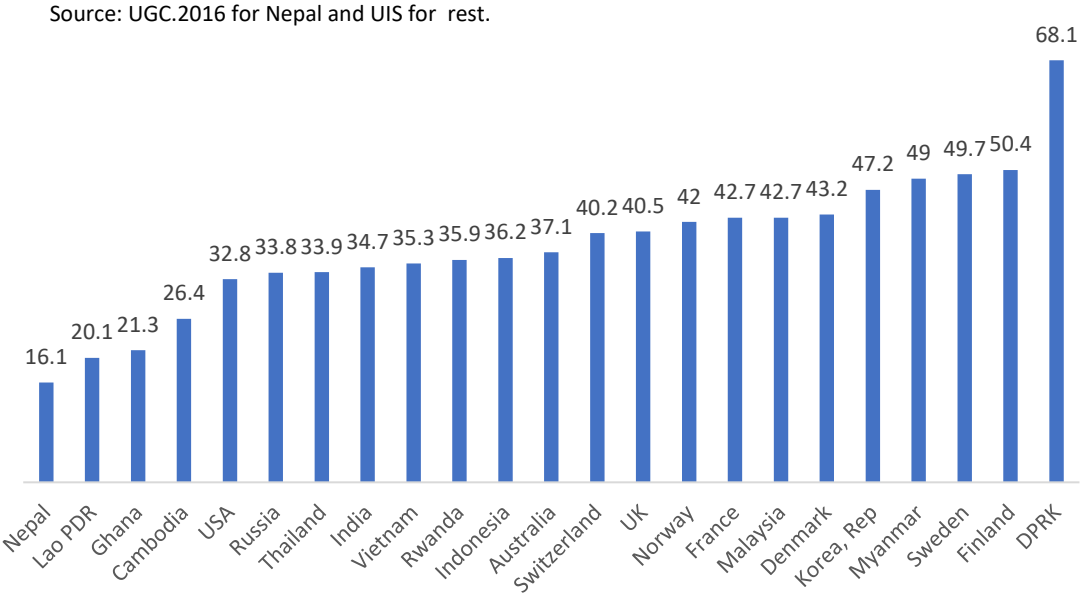
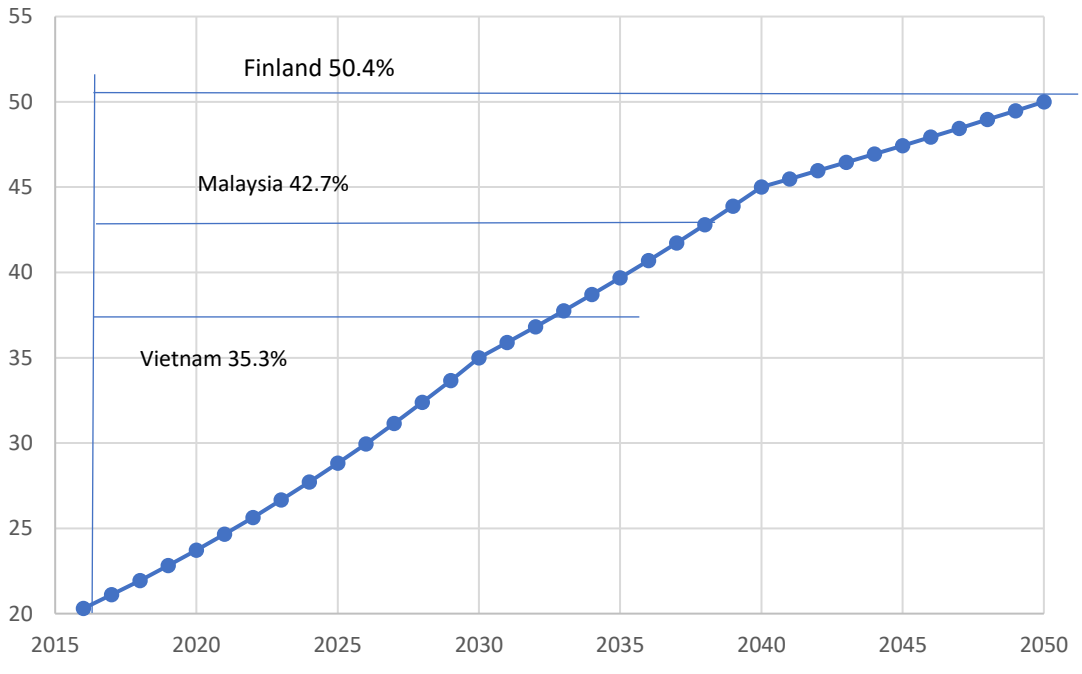
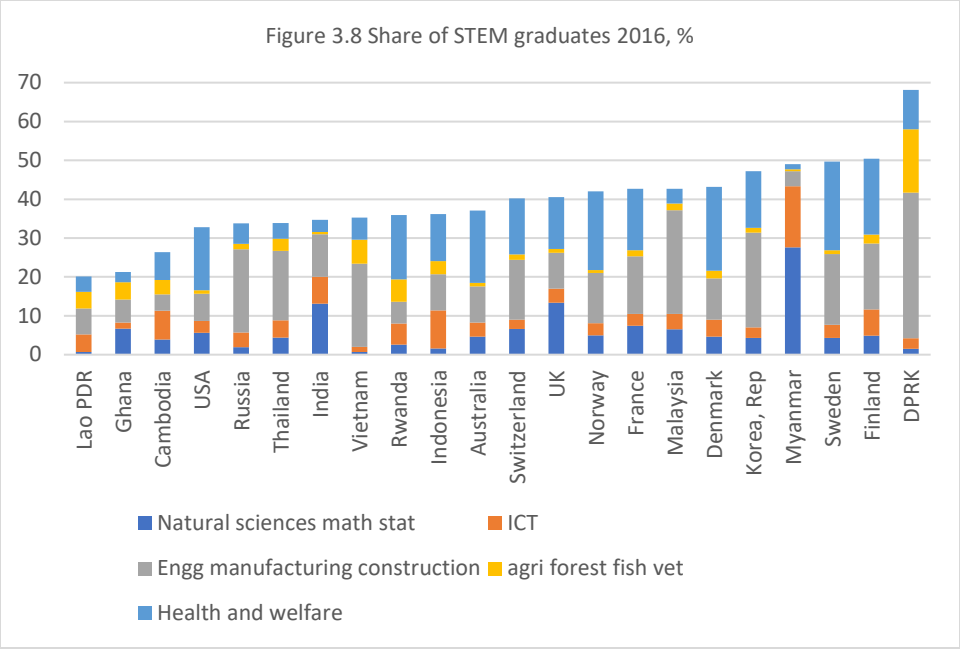


Figure 3.7 Scenario of STEM Growth, %





89. Figure 3.8 presents the distribution of graduates between the five components of STEM. In most countries, the components with highest shares within STEM are: natural sciences, mathematics and statistics; and engineering, manufacturing and construction. Nepal's shares for these two components are compared with that of other countries in Figures 3.9 and 3.10. Nepal's share of engineering graduates of 3.2% is the lowest. Even low-income Rwanda with a per capita GNI lower than that of Nepal has the share of 5.6%. Among LMIC Myanmar has the lowest share of 3.9% and DPRK highest of 37.5% followed by Vietnam of 21.4%. Among UMIC Malaysia has the highest share of 26.7% and Thailand the lowest of 17.9%. Among HIC Republic of Korea has the highest share of 24.4%. Figure 3.9 shows that the share of engineering enrolment in Nepal has virtually stagnated. It increased from 3.3% in 2007 to 3.9% only in 2014. Nepal should aim at increasing the share of engineering enrolment to about 20% by 2035, which is close to Vietnam's share of 21.4% for 2016.

Figure 3.9 Share of engineering, manufacturing and construction graduates 2016, %

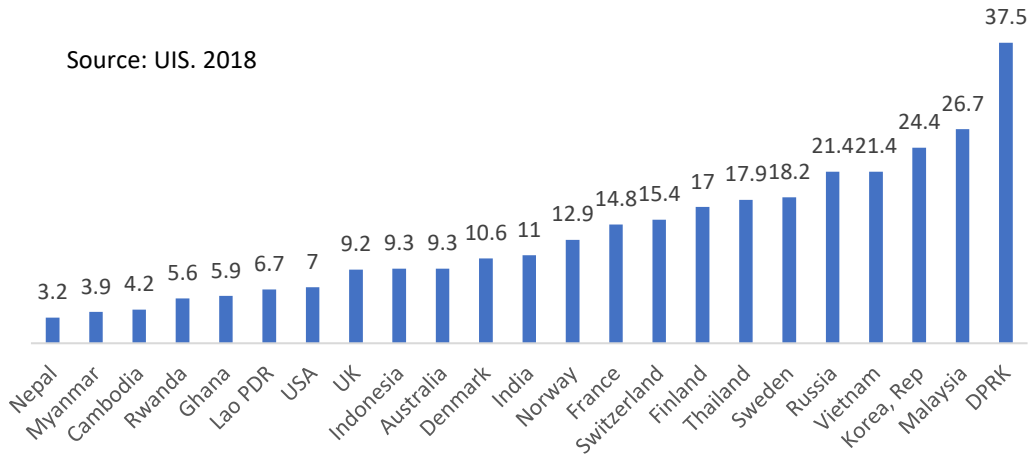
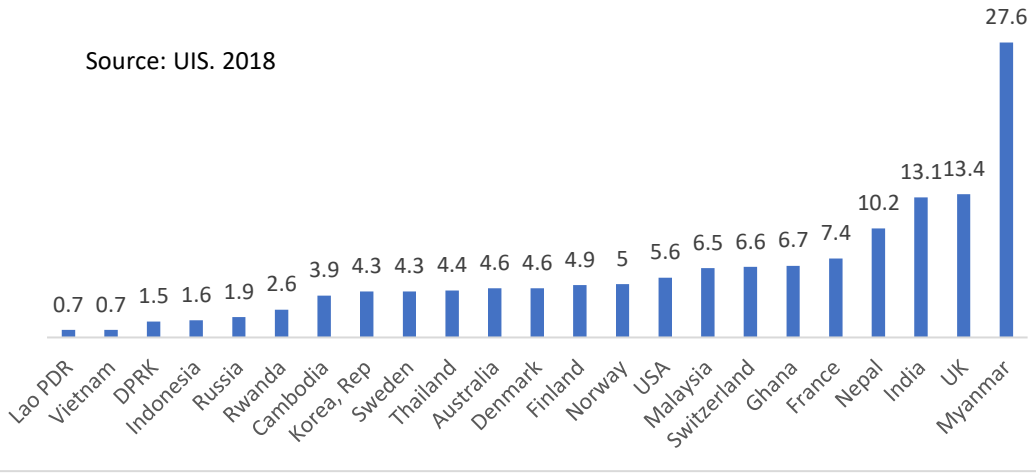
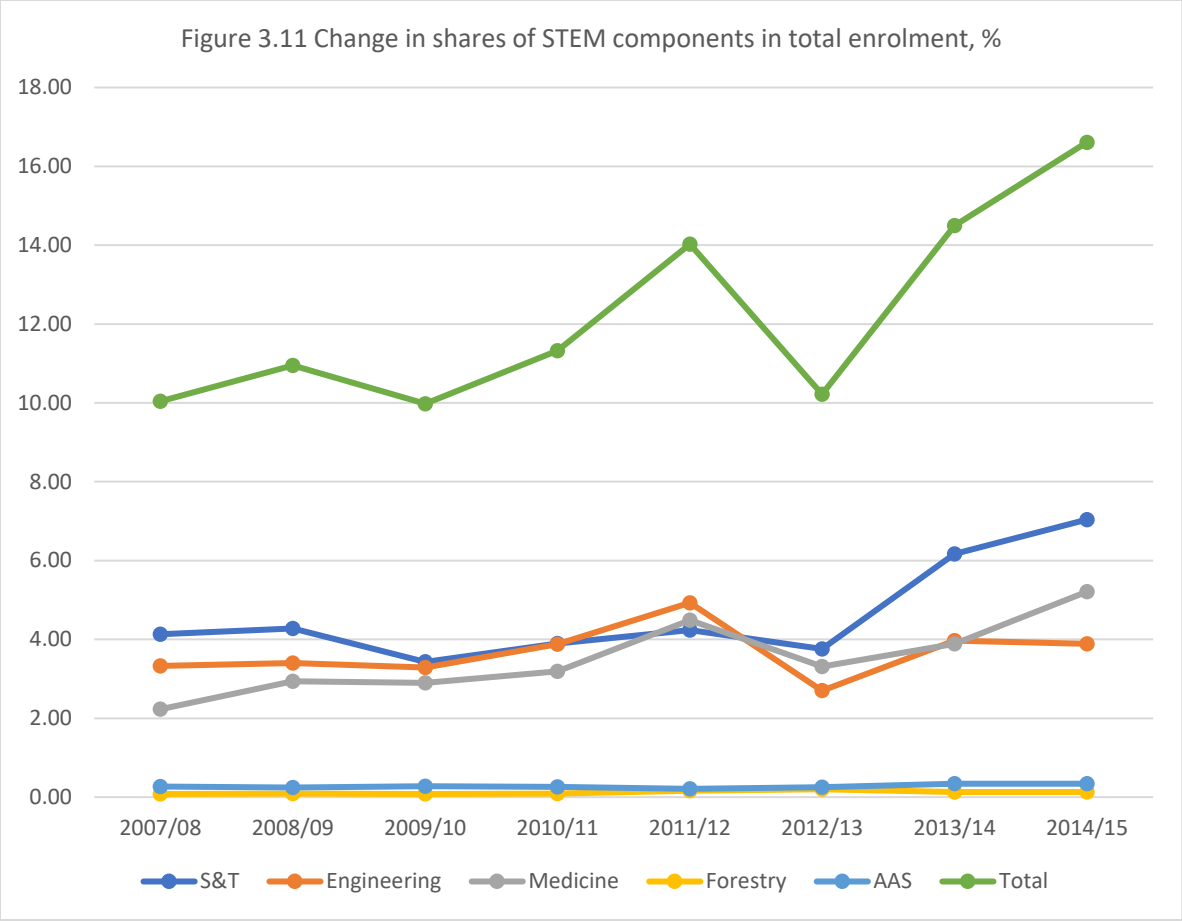


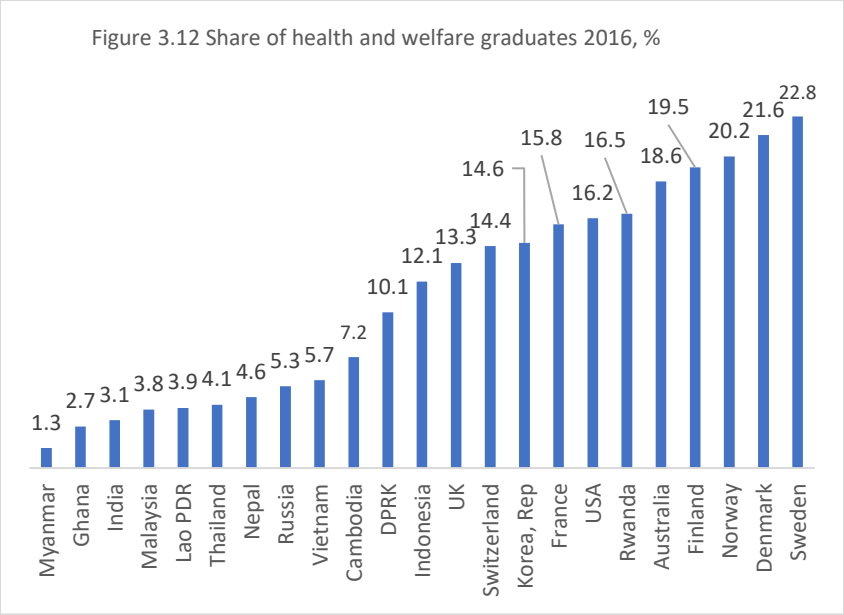
Figure 3.10 Share of natural sciences, mathematics and statistics graduates 2016, %



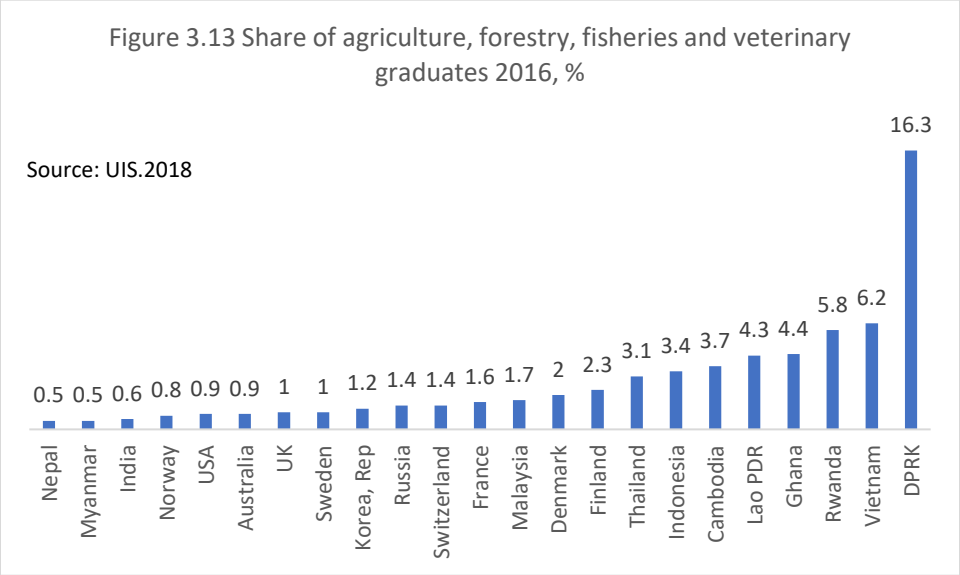
90. Nepal's share of natural science graduates of 10.2% is one of the highest among countries compared. Only two LMIC – Myanmar (27.6%) and India (13.1%) – have higher share of graduates compared to Nepal's. The share of science enrolment has increased remarkably from 4.1% in 2007 to 7% in 2014 (Figure 3.11). In spite of this Nepal continues to face shortage of science and mathematics teachers. Considering the large migration of science graduates and the importance of science it would make sense to aim at increasing this share to around 15% by 2035.



91. Nepal's share of health and welfare graduates of 4.6% is lower than that of LIC Rwanda of 16.5%. Out of eight LMIC four have the share higher than that of Nepal and four less than with the lowest share of 1.3% for Myanmar and highest share of 12.1% for Indonesia. HIC have shares of health and welfare graduates in the range of 13 to 22% (Figure 3.12). Considering the above Nepal should aim at increasing it to about 13% by 2035. Nepal's share of enrolment in health and welfare has increased from 2.2% in 2007 to 5.2% in 2014 (Figure 3.11). This trend may not continue given the stringent regulation of the medical education sector being implemented.



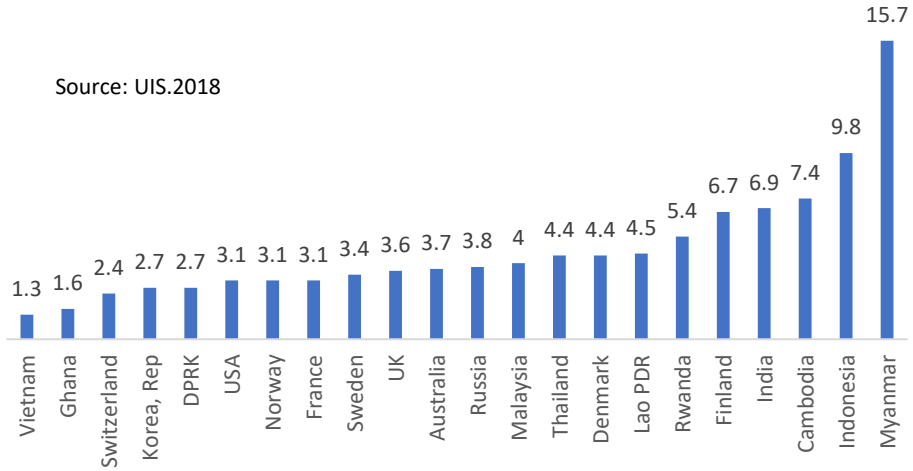
92. Nepal's share of graduates in agriculture, forestry, fisheries and veterinary is lowest among the countries compared. LIC Rwanda's share of 5.8% is higher than that of Nepal by an order of magnitude. Among LMIC DPRK has the highest share of 16.3% followed by 6.2% for Vietnam. Among the UMIC Thailand has the highest share of 3.1%. Among HIC Finland has the highest share of 2.3% (Figure 3.13). The share of enrolment in this category has virtually stagnated. It increased from 0.35% in 2007 to 0.47% in 2014 (Figure 3.11). If Nepal does not take initiative to raise agricultural productivity, among others, by increasing the production of agriculture, forestry, graduates, fisheries and veterinary graduates it risks to threaten the livelihood population dependent on agriculture because the agriculture sector will shrink due to its inability to compete with produces of other countries. Nepal's share of agriculture related graduates should not be less than that of Finland with challenging climatic condition for agriculture, and in fact it should be comparable with countries like Vietnam. Therefore, Nepal should aim at increasing the share of agriculture to about 5% of the higher education enrolment by 2035.



93. Nepal's share of graduates for Information and Communication Technology (ICT) is not available. Given that Myanmar's share is 15.7%, which is almost close to the Nepal's total share of S&T

graduates Nepal's share of ICT graduates should be low (Figure 3.14). Low income Rwanda's share is 5.4%. Other countries with higher share of ICT graduates are Finland (6.7%), India 6.9%, Cambodia (7.4%) and Indonesia (9.8%). Given tremendous promise the ICT sector holds Nepal should aim at increasing the share of ICT enrolment to about 8-10% by 2035.

Figure 3.14 Share of ICT graduates 2016, %



Research, Development and Innovation

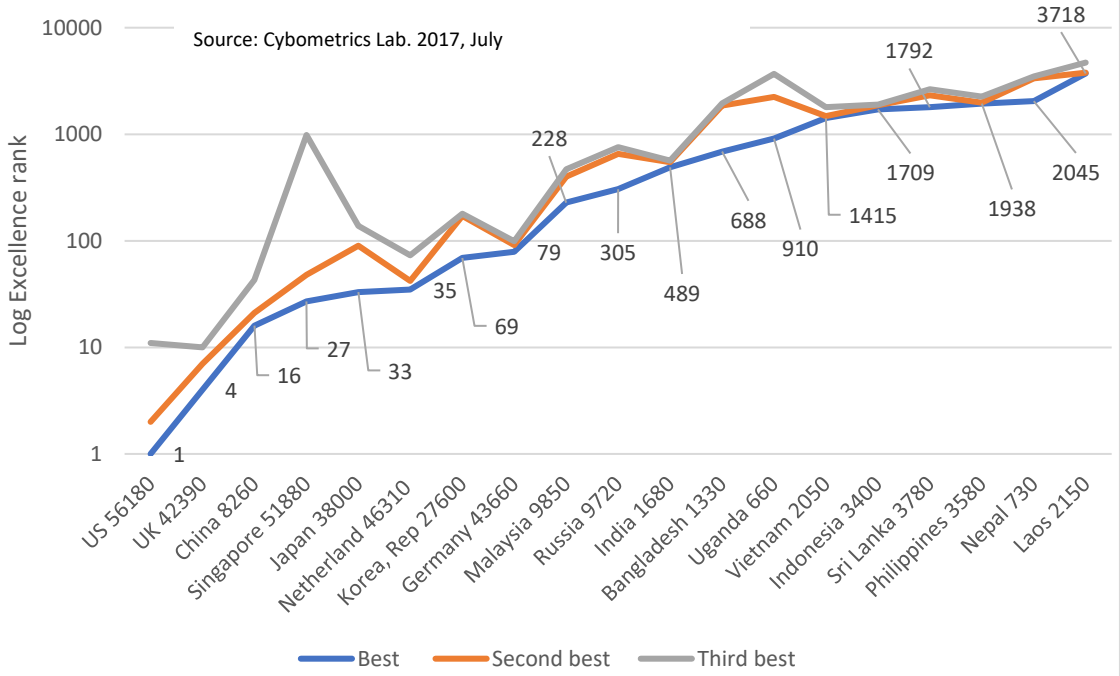
94. Social and economic progress is achieved principally through the advancement and application of knowledge (World Bank, 2002). All developed and developing countries aspiring for rapid social and economic development are investing heavily on research, development and innovation (RDI). Republic of Korea was able to attain spectacular economic development in a relatively short span of time mainly through significant achievement in RDI. Singapore, China and India have been following the same path.
95. One of the ways to compare the RDI capacity of countries is to compare excellence ranking of their universities. Cybometrics Lab information has been used for comparing excellence ranking of universities across countries of different income groups as this is the only ranking system that captures universities of all countries. Figure 3.15 presents ranking of three best universities of selected LIC, LMIC, UMIC and HIC[8] based on Webometrics Ranking of World Universities (Cybometrics Lab. 2018). The lowest curve shows the ranking of the best university, the highest curve that of the third best university and the middle curve that of the second-best university.
96. The best university of Nepal ranks 2,045 whereas that of Uganda a LIC with lower GNI per capita than that of Nepal ranks 910. Among seven LMIC compared only Laos's research ranking of 3,718 is lower than that of Nepal. India, a LMIC, stands out in terms of research excellence. The ranking of its best university of 478 is by far the best among LMIC. It is this capacity that is providing competitive edge for India, among others. Among UMIC China with the best university ranked 16 is by far the best among UMIC, which ranks higher than best universities of UMIC Singapore,

[8] Per capita GNI given after the name of the country in x-axis.

Japan, Netherlands, Republic of Korea and Japan. This has provided competitive edge for China. The experience of China and India shows that poorer countries can compete with richer countries in academic excellence provided they prioritize RDI.

97. Figure 3.15 shows that the ranking three best universities of countries excelling in research in contrast to universities of countries with weak research capacity are not far apart except for Singapore. The third best university in Singapore, which ranks 984, is a recently established university. This underscores the need for building excellent research capacity in a number of universities.

Figure 3.15 Three top ranked universities in research excellence



98. The ranking based on ARWU, which ranks top 800 universities exclusively based on research outputs, has been used to compare countries of high income, upper-middle income and lower-middle income groups in terms of the presence of their universities in top 800 positions. UMIC are represented in all university ranking ranges, and one LMIC is represented in the ranking range of 1-400 (Table 3.1). This indicates that UMIC and LMIC are trying to compete with countries from higher income groups. If Nepal is to move up the ladder of income groups initially it should be able to compete with LMIC followed by UMIC and HIC.

Table 3.1 Representation of countries from various income groups in university ranking ranges

Ranking range	1-100	1-200	1-300	1-400	1-500	1-800
HIC	16	23	27	31	33	40
UMIC	2	3	6	7	12	14
LMIC				1		
No. of countries	18	26	33	39	45	54

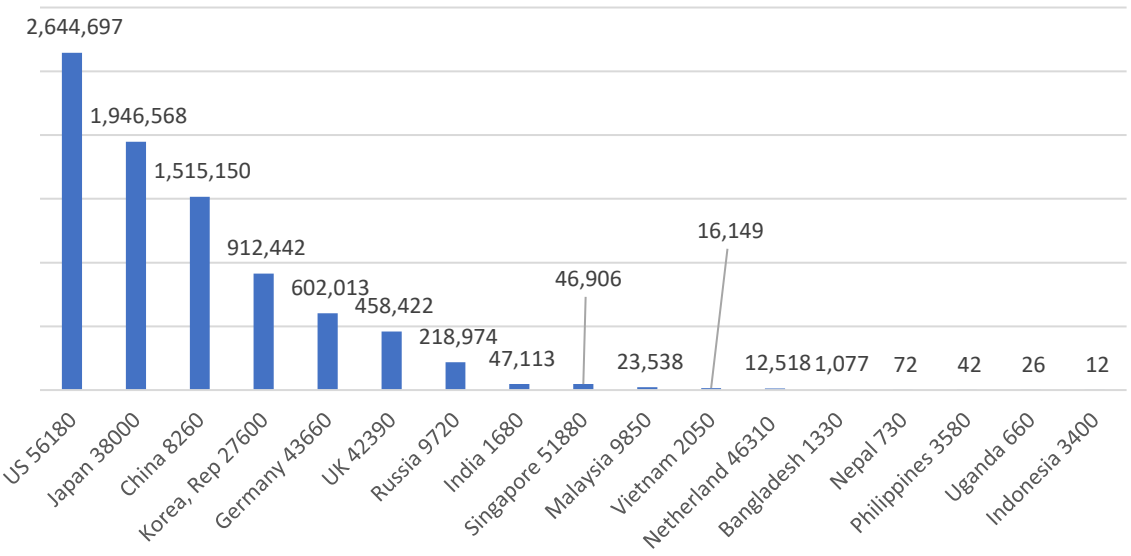
99. Based on the above Nepal should aim at improving the excellence ranking of its best universities in the following time frame shown in Table 3.2. The task ahead is undoubtedly dauting considering the stagnation of universities in Nepal in terms of academic excellence. But there is no option except accepting this challenge if Nepal is to aspire to become a HIC by 2050. International experience shows that with strong commitment it is possible to build world-class universities within 25-30 years.

Table 3.2 Time frame of enhancing research excellence of best Nepali HEIs

Year	2025	2030	2035	2040	2045	2050
Milestone	Bangladesh, Uganda	1-800	1-500	1-400	1-300	1-100/200
Ranking system	Cybometrics	ARWU				

100. For accelerated economic growth it is not enough to produce research outputs but they need to be turned into innovation. Engineering research backed by research in natural sciences accounts for most of the innovation. In Nepal, in 2016, 44.9% citable research publications were made in natural sciences followed by 44.9% in medical sciences, 6.8% in engineering and 10.7% in other fields (Scimago 2017). The excellence ranking of TUIOE, a premiere engineering institution for Nepal is 6008, which is the lowest research rank in Webometrics ranking [Cybometrics.2018]. Research publications in engineering and the excellence ranking of the IOE indicates at the low level of RDI in engineering. This is reflected in patents in force in Nepal (Figure 3.16). In 2015, patents in force in Nepal was only 72. Given patents have generally life time of twenty years this is indeed a very low number. It is to be noted that no patents have been granted so for any of the HEIs of Nepal. Patents reflect innovation focus of the economy. Low-income India and Vietnam standout in patenting activity. This is one of the reasons behind their rapid growth. Among UMIC China and among HIC Republic of Korea stand out in terms of innovation focus. It is the innovation focus that is helping China to grow and Republic of Korea to sustain the high-income status. Nepal needs to make serious efforts to build conducive environment for innovation.

Figure 3.16 Patents in force in 2015



Quality and Relevance

101. The quality assurance and accreditation (QAA) system is a universally accepted tool for quality assurance of HEI. QAA was initiated by the University Grants Commission (UGC) in 2007. But to date only 26 HEIs out of over 1,400 have been accredited. In addition, there is no provision for QAA of universities, which control, curriculum, academic norms and examinations. Therefore, the QAA system in place does not allow to assess the overall status of quality of higher education
102. n in Nepal. Only another tool available for comparison the quality of Nepali HEIs among themselves and with those of other countries is Webometrics Ranking of World Universities, which ranks over 28,000 HEIs. Figure 3.17 presents overall ranking of the highest ranked HEI of selected countries and Figure 3.18 presents ranking of all Nepali HEIs covered by Webometrics.
103. The overall ranking of Nepal's best HEI – TU - of 3591 is far behind the ranking of the best HEI of low-income Uganda of 1486. Nepal's ranking is substantially behind all LMIC in the Figure except for Laos. Among LMIC India has the best ranking of 561, and among UMIC China has the best ranking of 45, which is better than that of many HIC.

Figure 3.17 Overall rank of best university

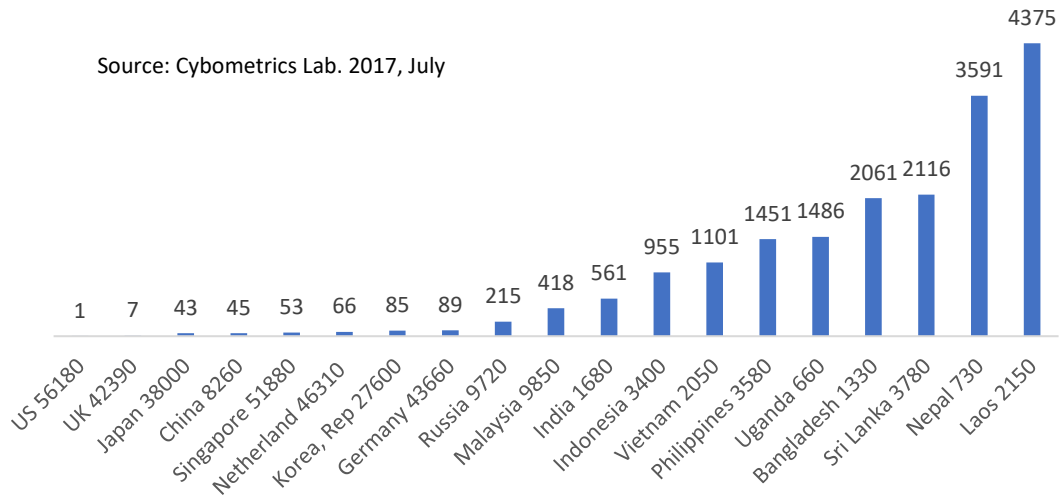
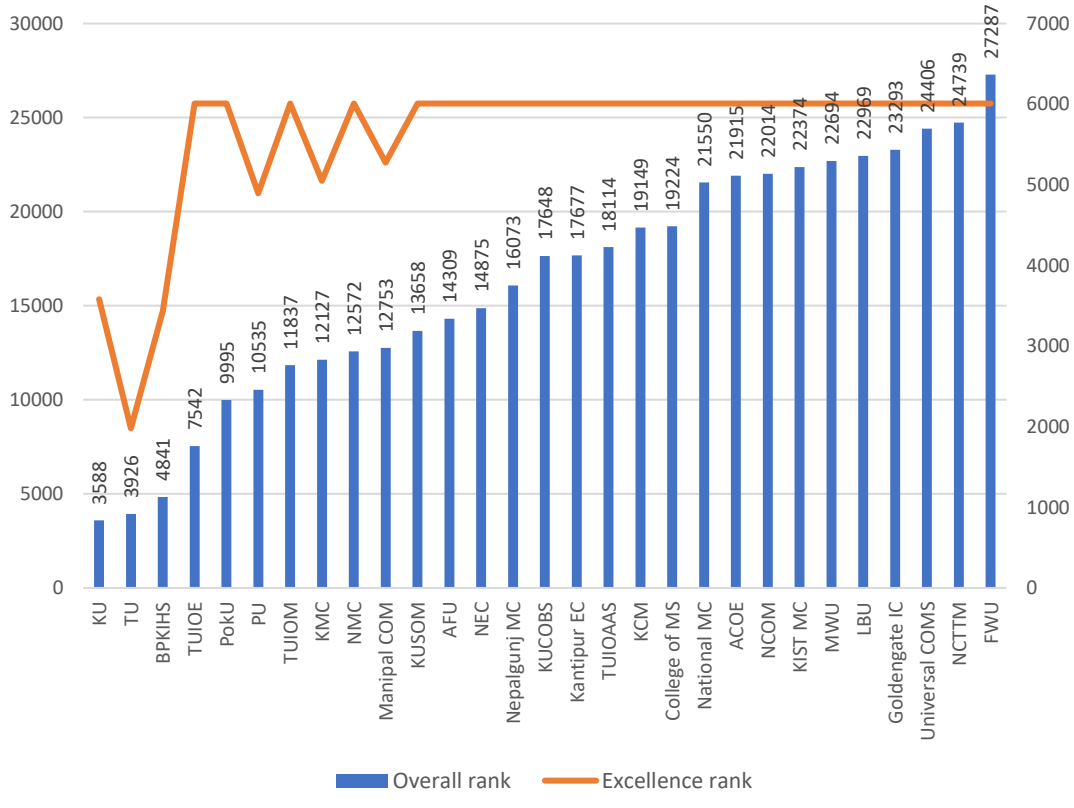
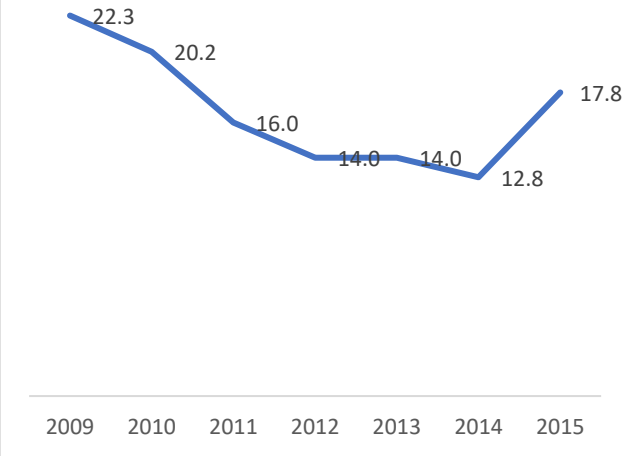


Figure 3.18 Overall and excellence ranking of Nepali HEIs
Source: Web Ranking July 2018.2.1.3



104. Webometrics ranking of twenty-seven Nepali HEIs gives an indication of the quality of higher education system as a whole. In terms of overall ranking only two universities Tribhuvan University (TU) and Kathmandu University (KU) are ranked within top 4,000. In terms of excellence ranking only five HEIs – KU, TU, BPKIHS, PokU and PU - have rankings better than 6008, which is the lowest rank for excellence. This implies that no meaningful research is being conducted in twenty two out of twenty-nine HEIs ranked. This is an indication of poor quality of higher education in the country. This is contrary to the widely held perception that some HEIs, particularly TUIOE and TUIOM, are of high quality. There is no doubt that these HEIs are the best in Nepal in terms of adherence to academic norms and standards like adherence to academic calendar and administration of high quality entrance examinations. But their quality need to be significantly enhanced to enable them to support rapid growth of the country.

Figure 3.19 Higher education pass rates, %



105. There is a significant diversity in the way programs are delivered in HEIs. It would not be appropriate to make blanket statements with regard to quality of higher education programs across the board. The description of delivery of programs below represents the dominating trend. Pass rates vary considerably across universities, HEIs and programs but overall pass rates are very low (Figure 3.19).

106. Barring some exceptions there is no proper academic calendar, and even whatever exists is poorly implemented. Similarly, academic requirements, including eligibility to seat for examinations, are poorly defined and even whatever defined is not strictly implemented. In extreme cases students are allowed to register for examinations without attending classes. There are instances of prescribed instruction not being completed.

107. Based on the above, prioritizing quality improvement of HEIs is critical for supporting rapid economic development of the country. The critical outcomes related to quality improvement are coverage of all HEIs, including universities, by periodic QAA, adherence to the academic calendar and other academic norms and standards, increase in pass rates and the improvement in the ranking of HEIs. The milestones for improving overall ranking of few best HEIs should be similar to that for excellence ranking presented in Table 3.2.

Conclusions

Higher education outcomes to be attained by Nepal in order to support its goal of becoming a high-income country by 2050 are summarized below.

108. The tertiary GER for Nepal of 14.9% is relatively high for a low-income country (LIC). But it is less than the LMIC average of 23.1%, of UMIC average of 46.9% and of HIC average of 73.7% [UIS 2016]. Considering the increase in GER across the world associated with increasing sophistication of the technology of production and to achieve the aim of becoming a HIC by 2050 Nepal should

aim at attaining Vietnam's 2015 GER of 28.8% by 2030, China's 2016 GER of 43.4% by 2040 and GER of 70% by 2050, which is close to the 2016 average GER of HIC of 73.8%.

109. There is a stark inequity in access to higher education across different welfare groups of students. The participation rate of females in higher education from the richest and poorest quintiles in higher education are 44.2% and 0.4% respectively. From the perspective of attaining the targets set for the participation rate as well as tapping the talent from the entire population significant efforts will be needed to bridge this disparity.
110. The share of STEM in the total higher education enrolment of 20.3% is low compared to LIC like Rwanda (35.9%), LMIC like Vietnam (35.3%), and UMIC like Thailand (33.9%). And this share is in the range of 35 to 50% for most HIC. Nepal should aim at increasing the share of STEM to about 35% by 2030 - close to the 2016 STEM share of Vietnam of 35.3%, about 43% by 2038, which is close to the STEM share of Malaysia of 42.7%, and about 50% by 2050, which is close to 2016 STEM share of 50.4% of Finland.
111. The share of graduates in engineering, manufacturing, construction areas of 3.2% is very low compared to that of LIC like Rwanda (5.6%), LMIC like Vietnam (21.4%), UMIC like Thailand (17.9%), and HIC like Republic of Korea (24.4%). Nepal should aim at increasing the share of engineering enrolment to about 20% by 2035, which is close to Vietnam's share of 21.4% in 2016.
112. The share of graduates of 0.5% in agriculture, forestry, fisheries and veterinary areas is very low compared to that of LIC like Rwanda (5.8%), LMIC like Vietnam (6.2%), UMIC like Thailand (3.1%), and HIC like Finland (2.3%). If Nepal does not take initiative to raise agricultural productivity, among others, by increasing the production of agriculture, forestry, fisheries and veterinary graduates it risks to threaten the livelihood population dependent on agriculture because the agriculture sector will shrink because of its inability to compete with produces of other countries. Therefore, Nepal should aim at increasing the share of agriculture to about 5% of the higher education enrolment by 2035, which is close to that of Vietnam in 2016.
113. The share of graduates in health and welfare of 4.6% is also low compared to that of LIC like Rwanda (16.5%), LMIC like Indonesia (12.1%). HIC have shares of health and welfare graduates in the range of 13 to 22%. Considering the above Nepal should aim at increasing it to about 12% by 2035, which is about the same as that of Indonesia for 2016.
114. The share of graduates in natural sciences, statistics and mathematics of 10.5% high by international comparison but less than that of India of 13.1%. But the country continues to face shortage of teachers in science and mathematics. Considering the large migration of science graduates and the importance of science it would make sense to aim at increasing this share to around 13% by 2035, which is close to the 2016 share of India.
115. Data on the share of ICT graduates for Nepal are not available. Shares of ICT graduates in countries like Finland, India and Indonesia with high contribution of ICT to the economy are 6.7, 6.9% and 9.8% respectively. Given tremendous promise the ICT sector holds Nepal should aim at increasing the share of ICT enrolment to about 10% by 2035, which is close to the share of Indonesia in 2016.
116. The research capacity of Nepali HEIs is low as evidenced by excellence ranking of its best university of 2,045, which is lower than that of LIC Uganda of 910, LMIC Bangladesh of 688 and LMIC India of 489. HIC have been able to sustain their dominance because of their competitive edge in research. Barring few exceptions all HIC countries have at least one university in top 800 in ARWU ranking. Countries like Republic of Korea, India and China have been able to grow their economy at a fast pace benefitting from their research capacity, which is superior to their peers in the

respective income groups. Among 54 countries with at least one university in top 800, 14 are UMIC and one is LMIC. For attaining the status of HIC by 2050 Nepal should aim at enhancing the excellence ranking of its best universities by 2025 at par with that of Uganda and Bangladesh, which rank 910 and 688 respectively in Cybometrics ranking. And further it should aim at securing spots for its best universities within top 800, 500, 400, 300, 200/100 in ARWU ranking by 2030, 2035, 2040, 2045 and 2050.

117. The quality of higher education is low as indicated by the low overall ranking of Nepali HEIs and lack of meaningful progress in accreditation. Poor enforcement of academic calendar and academic norms, and low pass rates, barring some exceptions also indicate at the poor quality of higher education. Nepal should accord high priority to quality improvement to improve overall ranking of its best universities in a fashion similar to that for excellence ranking and extend QAA to all campuses, including universities, at the earliest.
118. It would not be possible to attain the above outcomes of higher education without improvements in school education outcomes. For this purpose, universal completion of quality basic education should be a high priority. Given that generally compulsory education extends to grade 9 or more Nepal should aim at universal completion of grade 10 by 2030.
119. One of the main constraints for increasing STEM enrolment in higher education is the low shares of students taking science at grades 11-12, which are 14.7% in grade 11 and 23.6% in grade 12. To enable Nepal to increase the share of STEM in the higher education enrolment to 50% by 2050 it should aim at attaining the share of science enrolment at the higher secondary level of around 50% by 2040.

Chapter 4 Challenges in Higher Education

120. This chapter begins with the background of the higher education sector, and then it describes various aspects of the system – composition, financing, and governance and management – with a view to identify challenges for delivering desired outcomes articulated in chapter 3, namely, high GER, equitable access, high share of graduates in STEM, programs of high quality and relevance and excellent RDI outputs.

Higher Education System

Background

121. Universities in Nepal are autonomous institutions established through individual acts. They report to the Ministry of Education, Science and Technology (MOEST). Funds to universities are channeled through the University Grants Commission (UGC), which assists the MOEST in regulation of the higher education sector.
122. Modern higher education in Nepal started with the establishment of Tri-Chandra College in 1918, which offered Patna University (India) programs. Prior to the establishment of Tribhuvan University (TU) in 1959, there were 6 government colleges, and 15 public (non-government) colleges – not-for-profit institutions established under the community initiative. All these colleges became affiliated to TU from 1959. While government colleges reported to the Ministry of Education (MOE) public colleges were autonomous. In 1971, under the National Education System Plan, all colleges - 12 government and 45 private - were nationalized and made constituent campuses of TU [Pandey B.D. 1978]. In 1981, when TU became unable to cope with the increasing demand for higher education, it started to give affiliation – permission for offering academic programs of the university - to private campuses. Private campuses were subsequently classified into not-for-profit community and for-profit private campuses. Multi-university concept started, in 1984, after the establishment of Nepal Sanskrit University by separating the Sanskrit Faculty from TU.
123. Universities offer academic programs through constituent, community and private campuses. Constituent campuses receive sizable public financing though the extent of public subsidy varies in a wide range. Compared to constituent campuses community campuses receive negligible public financing. Private campuses are not eligible for public financing.

Higher Education Institutions and Enrolment

124. In 2015, higher education programs were offered by nine universities with powers to affiliate campuses – TU, Mahendra Sanskrit University (MSU), Kathmandu University (KU), Purbanchal University (PU), Pokhara University (PokU), Lumbini Bouddha University (LBU), Agriculture and Forestry University (AFU), Mid-Western University (MWU) and Far-Western University (FWU) - and four degree granting institutions without powers to affiliate campuses – BP Koirala Institute of Health Sciences (BPKIHS), Nepal Academy of Medical Sciences (NAMS), Patan Academy of

Health Sciences (PAHS), Karnali Academy of Health Sciences (KAHS). While universities report to the MOEST medical science institutions report to the Ministry of Health and Population.

Figure 4.1 Enrolment share of universities 2015/16, %

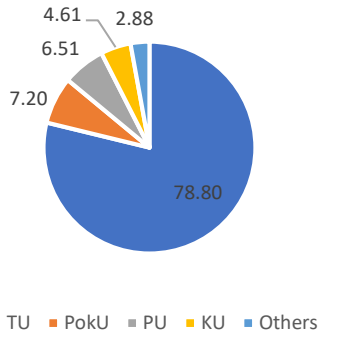


Figure 4.2 Enrolment share by type of provision 2015/16, %

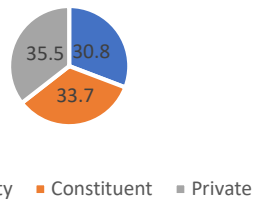
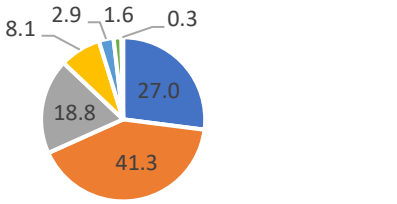


Figure 4.3 Distribution of campuses by enrolment range,%



125. The share of universities (including academies) in the total enrolment of 361,077 is presented in Figure 4.1 [UGC.2017][9]. Despite the establishment of new universities, the lion's share of the higher education enrolment remains with TU. The share of various types of campuses in the total enrolment is illustrated in Figure 4.2. Two third of higher education students are being catered to by the non-public provision – community and private campuses.

126. There are altogether 1,407 campuses. Distribution of campuses by enrolment range presented in Figure 4.3 reveals that most of the campuses are of small size. The share of campuses with enrolment of over 500 is only 12.9% (165) and over 1,000 is only 4.8% (67). The share of different type of campuses by the enrolment range is illustrated in Figure 4.4. All campuses with enrolment of 5,000 and above are constituent campuses. Constituent campuses also dominate in the enrolment range of 2,001 to 5,000. In the enrolment range of 1,001 to 2,000, campuses are evenly distributed between three types of campuses. Among campuses with enrolment of 500 and below the lion's share of campuses are of community and private types.

[9] Unless otherwise specified higher education statistics is based on UGC. 2017.

127. TU and NSU has a large number of constituent campuses spread across the country – 60 and 15 respectively. Over 98% of community campuses (524) are affiliated to TU. Bulk of private campuses are affiliated to TU, PU, PokU – 74%, 15% and 7% of the total number of campuses respectively.

128. The share of affiliated campuses in the total enrolment of universities varies in a wide range as seen from Figure 4.5. While the share of affiliated campus enrolment in NSU is only 15% it is over 90% in PU and PokU. For remaining universities affiliated campus enrolment is around 60%.

129. Shares of post-graduate (PG), including MPhil and PhD, in the enrolment of universities are presented in Figure 4.6. The overall share of PG of 11.7% is low. For example, the share of PG enrolment at IITK was 45.6% in 2017/18 [IITK.2018a]. While NSU, MWU, AFU and BPKIHS have relatively high share of PG enrolment – from 25.3 to 37.5%, this share is in the range of 9.2 to 13.3% for other universities. The overall share of PhD enrolment is very low at 0.3%. NSU has the highest share of PhD enrolment – 37.5%, followed by AFU and KU with shares of 2.8% and 0.8% respectively. TU, the oldest and largest university, has very low shares of PG and PhD – 11.5 and 0.2% respectively. Shares of PG and PhD programs in various types of campuses is shown in Figure 4.7. The share of PG enrolment in constituent, community and private campuses are 24.1%, 5.6% and 5.2% respectively.

Figure 4.4 Share of provisions by campus enrolment range, %

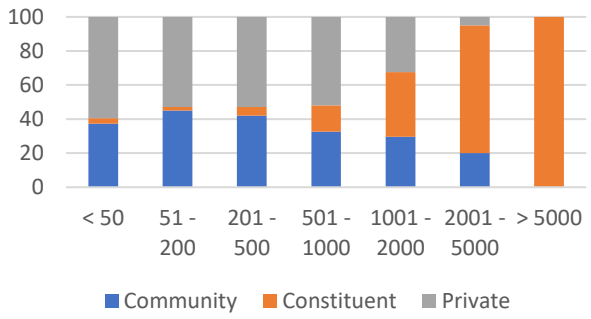


Figure 4.5 Share of affiliated campuses in enrolment of universities, %

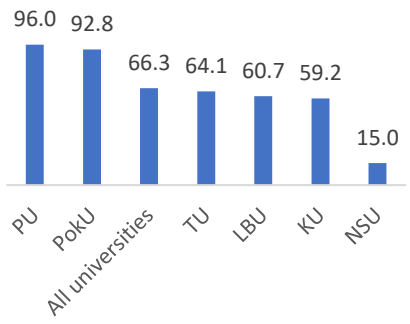


Figure 4.6 Share of post graduate and PhD in total enrolment by university, %

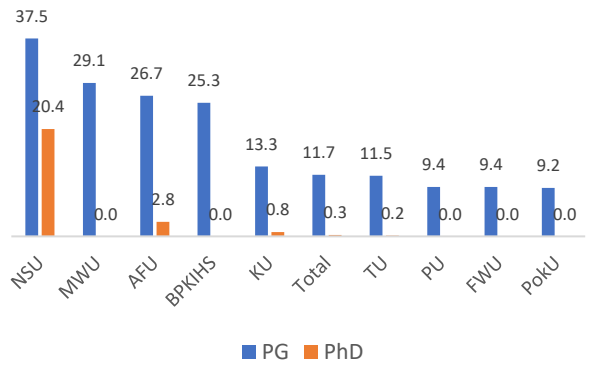
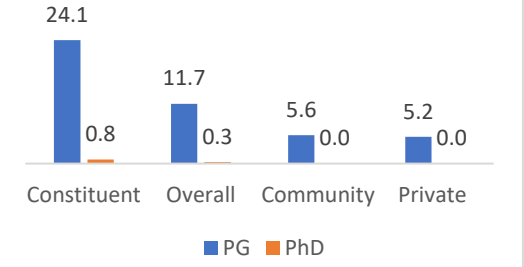


Figure 4.7 Share of PG and PhD in enrolment by campus type, %



Share of STEM

130. Shares of S&T enrolment for multidisciplinary universities are presented in Figure 4.8. The share of S&T enrolment is highest at KU – 73.3%, and lowest at TU – 12.9%. It is interesting to note that the S&T enrolment of TU is lower than that of newest universities – MWU and FWU. While the share of S&T in constituent campuses of 30.7% is close to the share in private campuses of 27.1%, the share in community campuses is very low at 1.4% (Figure 4.9).

Figure 4.8. Share of S&T enrolment by university 2015/16, %

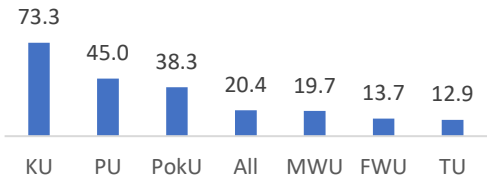
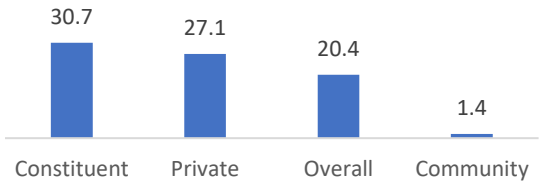
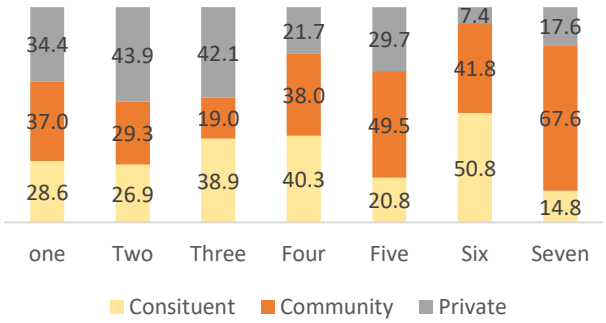


Figure 4.9 Share of S&T by campus type, %



131. Shares of different types of campuses in provinces is presented in Figure 4.10. Private campuses have highest shares in provinces two and three – 43.9% and 42.1% respectively – where community campuses have lowest shares among provinces – 29.3% and 19% respectively. This hints at the complementary role of private and community campuses. This observation is also confirmed by the distribution of enrolment in provinces six and seven. While the shares of community campuses of provinces six and seven of 41.8% and 67.6% respectively are the highest among the provinces, the shares of private campuses of 7.4% and 17.6% in provinces six and seven respectively are the lowest among the provinces. While private campuses are flourishing in affluent provinces like province 3 and provinces with good connectivity like province 2, community campuses are flourishing in relatively poor areas, and areas with poor connectivity like provinces seven and six. It is interesting to note that community campuses can sustain even in areas with ample supply of constituent and private campuses like province three, including urban areas, because they are responsive to the demand of those students who cannot afford private campuses, but are not satisfied with constituent campuses.

Figure 4.10 Shares of different types of campuses in provinces, %



Financing

132. The Constitution of Nepal establishes rights to free higher education for disabled, financially handicapped and dalit citizens [CAS 2015]. Under the policies related to the basic needs it articulates the intention of making higher education free gradually. Higher Education Policy, the

summary of which is provided in Annex 3, envisages financial assistance to students for equitable access to higher education [GON 2015]. The Fourteenth Plan does not articulate financing policy for higher education. The financing policy based on the prevailing practice is that of cost sharing in higher education. However, there are no targets for cost sharing or uniformity across universities or constituent campuses.

133. University acts do not clearly articulate the extent of government financial support for universities. Provisions in university acts, from which government financial commitments to universities can be interpreted are presented in Annex 4. The KU Act categorizes KU as a university in the non-government sector and makes no mention about government financial support to it as well as sources of funds. PU, PokU, LBU, MWU and FWU acts expect these universities to be supported also by non-government resources – private and people's, whereas TU, NSU and AFU acts do not mention about support from non-government sources. For all government sector universities GON, tuition and other fees, donations and loans are mentioned as sources of funds.

134. Constituent campuses as integral parts of publicly funded universities are eligible for public financing. TU Act is the only legal instrument, which defines eligibility of private campuses for public funding [GON. 2010]. It states that the structure of an affiliated campus [private sector] and financial assistance it receives will be as prescribed. But to date TU has not extended financial assistance to affiliated campuses. However, the UGC has been providing financial support to community campuses albeit in small amounts. The scale of support towards capital expenditures for community campuses increased substantially since the start of Second Higher Education Project (SHEP) in 2007, under which community campuses were made eligible for project support. This support is being continued under the Higher Education Reforms Project (HERP).

135. Table 4.1 presents government recurrent grants per student for constituent and community campuses. Per student grants are strongly skewed in favor of constituent campuses though the Higher Education Policy recognizes community campuses as a type of provision in its own right. Similarly, per capita grants for a non-government sector KU is significantly lower than that of government sector universities. The above practice shows that government sector campuses - constituent campuses of government sector universities - are receiving preferential treatment over non-government sector campuses – community campuses and constituent campuses of KU - notwithstanding the non-profit nature of the later. This policy is confirmed by the practice of increasing the per student grant level to community campuses once they are converted into constituent campuses.

Table 4.1 Regular annual government grants per student 2015/16, Rs.

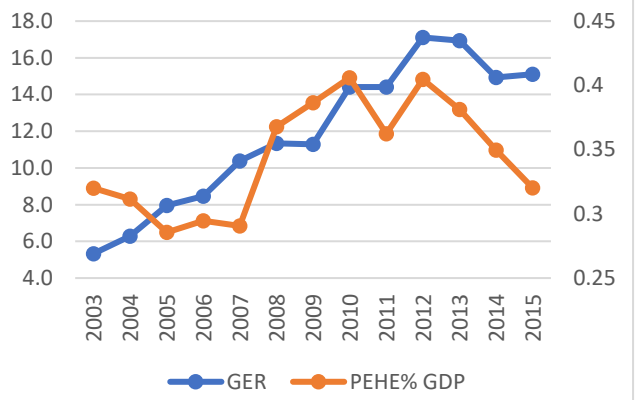
University	Campus type	Grant/student, Rs.
All (average)	Community	2,785
KU	Constituent	8,822
MWU		29,547
PokU		42,531
FWU		43,781
TU		47,509
All (average)		49,437
PU		68,421
AFU		189,514
NSU		284,000
LBU		389,610

Source: UGC.2015.

136. The following observations can be drawn from Table 4.1: a. TU, NSU and AFU, for which non-government support is not anticipated by their acts, are receiving comparatively higher level of funding. TU's funding level though comparable with other universities should be considered preferential when the economy of scale is considered; b. other government sector universities excluding LBU, which has a very small enrolment, received per capita grants in the range of Rs. 29,547 to 68,421. Generally, per capita grants are higher for universities with smaller enrolment; and c. per capita grants to universities are not based on outcome/out-based criteria. For example, per capita grants for NSU significantly higher than that for AFU though their enrolments are comparable. In addition, per capita expenditures for AFU - a technical university – should be higher than that of NSU, which is a liberal arts university.

137. The level of public subsidy for higher education, which is low, has been decreasing in recent years (Figure 4.11). While, during 2003-2015, public expenditures on higher education as a share of GDP fluctuated between 0.29% to 0.41%, the tertiary GER increased from 5.3% to 17.1%. The decrease in the subsidy rate did not result in commensurate decrease in GER because of the increased share of non-government provision and increased cost sharing in the public provision.

Figure 4.11 Nepal GER tertiary education and public expenditures on higher education as share of GDP, %



138. In 2018/19, the subsidy rate for TU, a public university, was as low as 69.1%. The lowest subsidy rate among the TU constituent campuses was 30.6% for Shankar Dev Campus offering management programs. The subsidy rate for IOE, which offers programs with high operational costs, was only 47.6% in 2015/16 [TU.2018].

139. The decreasing public subsidy rate for higher education together with the inefficient utilization of resources resulted in severe financing problem for TU. Decentralization of TU campuses and institutes in 1998 helped to meet this challenge by paving the way for campus/institute level initiatives to raise resources. The policy of charging market fees for programs in demand started after the implementation of the ground-breaking reform of Full Fees at the TU Institute of Engineering (IOE) in 1997. Charging full costs for programs in high demand is no longer taboo in constituent campuses. Practically all new programs with high market demand are being run on full cost recovery basis. Most constituent campuses do offer such programs on their own initiative.

140. But the level of fees for traditional programs, determined centrally by the TU management, remains low. Though campuses have been able to levy some additional fees for traditional programs on their own these fees are far short of the costs. Since the lion's share of TU constituent campus students are enrolled in traditional programs constituent campuses are facing serious financing challenges. Since past few years TU constituent campuses have not been able to cover even salaries of all staff from government funding. Campuses are financing part of the salary costs and other costs associated with the operation of campuses through internal resources.

141. The extent of underfunding of TU constituent campuses can be judged through comparison of per student expenditures for IOE and KUSOE. While per student per year expenditures for the IOE is around Rs. 95,000, KUSOE charges an annual fee of Rs. 172,000. Given that KU has the policy of recovering recurrent costs from student fees the annual fee should be close to the expenditures incurred. In this context the IOE is severely underfunded even in the country context. Comparison of per student annual expenditures for IOE and IIT Kanpur (IITK) reveals that the expenditure levels at the IOE is significantly lower than that of IITK (Table 4.2). Per student expenditures of IITK is 11.2 times higher than that of the IOE. This difference is partially associated with the difference in salary scales. The comparison of non-salary expenditures of the IOE and IITK also reveals under funding of IOE. While non-salary expenditures per student excluding scholarships and housing subsidies for students is 5.5 times higher in IITK compared to that in the IOE, per student expenditures on maintenance and teaching materials are 51 times and 44 times higher respectively. If the low level of expenditures on non-salary costs compromises the quality of education the low level of scholarship handicaps the capacity of IOE to attract bright students.

Table 4.2 Per student per year expenditures of IOE and IITK 2016/17

Item	IOE, NRs.	IITK IRs.	Ratio IITK/IOE
Total expenditures	88,907	998,579	11.2
Non-salary expenditures excluding scholarship and student housing subsidies	56,947	311,207	5.5
Maintenance	102.1	5,222.1	51.1
Scholarship	675.8	87,434.4	129.3
Teaching materials	626.3	27,630.0	44.1
Enrolment	6,067	6,478	

Source: IITK. 2018 and TU. 2017a

142. Shares of various expenditure categories in the total recurrent expenditures for TU as a whole, IOE and selected TU constituent campuses are presented in Table 4.3. The shares of non-salary costs for all HEIs except Patan Campus and Public Youth Campus are much lower than that of IITK of 43%. The shares of non-salary costs are extremely low for Prithvi Narayan Campus and Tri-Chandra Campus. Campuses do not seem to have been able to prioritize the available scarce resources on expenditures critical for learning such as teaching materials. The share of teaching materials for HEIs is less than that of IITK of 2.8%. Shankar Dev, Public Youth Campus and Patan Campus had no allocations for teaching materials. The shares of maintenance are also substantially less than that of IITK of 5.2% except for Patan Campus. The high share of repair and maintenance budget for this particular year for Patan Campus appears to be an exception than a rule.

Table 4.3 Shares of various expenditures categories of public HEIs 2015/16, %

Institution / Expenditure category	TU	IOE	Amrit Science Campus	Nepal Commerce Campus	Shankar Dev Campus	Prithvi Narayan Campus	Public Youth Campus	Patan Campus	Tri-Chandra Campus
Non-salary costs excluding scholarship	35.12	28.61	37.59	31.67	27.15	17.43	41.19	43.85	20.65
Scholarship	0.89	0.76	0.12	0.36	0.11	1.03	0.03	0.35	0.00
Teaching materials	1.4	0.70	3.27	0.05	-	0.28	-	-	0.10
Maintenance and repair	0.87	1.15	1.39	0.81	0.47	0.33	0.06	5.20	1.01
Research	0.16	0.61	-	0.51	0.55	-	-	-	0.08

Source: TU 2015

143. Table 4.4 gives an idea about the level of per student per year expenditures in accredited community and private campuses. Per year per student expenditures of community campuses are less than the average for TU constituent campuses. Given that the pass rates of TU constituent campuses and community campuses are in the same range higher expenditures of TU constituent campuses may not have translated into better performance of these campuses. Per student cost of Biomedical Engineering College is higher than that of IOE and comparable to that of KU.

Table 4.4 Per student per year recurrent expenditures of community and private campuses 2015/16, Rs.

Campus	Community		Private
	Lumbini Banijya	Janapriya Multiple	Biomedical Engineering College
Expenditures	10,473	27,038	174,776

144. Table 4.5 presents shares of various expenditure categories for community and private campuses. The shares of expenditures on non-salary costs are higher in community and private campuses compared to constituent campuses. These campuses are also spending higher share of recurrent budget on teaching materials, maintenance and repair, and scholarship.

Table 4.5 Shares of various expenditures categories of community and private campuses 2015/16, %

Expenditure category	Lumbini Banijya (community)	Janapriya Multiple (community)	Biomedical Engineering College (private)
Non-salary costs excluding scholarship	21.1	31	48.1
Scholarship	3.6	2.3	10.2
Teaching materials	0.02	2.1	2.3
Maintenance and repair	1.25	0.32	1.2
Research	4.55	0.95	2.4

Source: TU 2015

145. Given the low level of public subsidy for higher education HEIs are being compelled to raise tuition fees for delivery of quality education. However, the lack of political and social consensus on the issue of tuition fees has made it difficult for constituent and community campuses to raise enough resources from tuition fees. Private campuses, by and large, have been able to fix market-based

fees. But lately, this freedom is being constrained by attempts to regulate fees. The government has fixed maximum fees for medical education.

Governance and Management

146. OECD 2007 eloquently describes the importance of governance environment in the following way, "To be able to operate and compete in a market economy, HEIs need to enjoy sufficient autonomy to be able to take initiatives. Autonomy of HEIs from the government, and autonomy of departments and individual academic staff within the HEIs, are critical for fostering a culture of initiative-taking form the institutional level down to the individual academic staff level. Autonomy improves the ability of institutions to adapt their programs and courses in response to labor market needs, which in turn increases their contribution to national competitiveness. More autonomy means that HEIs can better respond to student needs, and thereby improve the teaching and learning experience of student, which should translate into increased student achievement. Universities are best able to take responsibility for their future when they function in an autonomous manner. They are best placed to identify their own problems and come up with their own solutions."
147. The above statement underscores the importance of autonomy of universities from the government and autonomy within universities. In the Nepali context autonomy of campuses, which are responsible for delivery teaching learning and research mandate of universities, from universities is as important as autonomy of universities from the government. Therefore, governance and management of higher education is reviewed here in terms of autonomy of universities from the government as well as in terms of autonomy of campuses from universities.

System Governance

University Rules

148. One of the key indicators of institutional autonomy of universities is their ability *to adopt rules* on their own. In Nepal, universities have power to adopt Rules through the University Council (Annex 5). But since the Council is chaired by the Chancellor – the Prime Minister – universities are unable to adopt Rules independent of the government. This on the one hand constrains the freedom of universities to adopt innovative strategies to achieve the goals set by the government, and on the other it makes hard to make universities accountable to the government because of its engagement in formulation of university rules.
149. While some countries allow public universities to formulate rules on their own others do not. According to OECD 2007, "the experience of countries that have decentralized this function indicate that HEIs can handle this responsibility in accountable manner." All US public universities enjoy the autonomy in formulation of bylaws (rules) consistent with their acts through board of trustees (BOT). While some US universities do not have government officials in BOTs others have. But government officials do not chair the BOTs. For example, all 10 trustees of University of Arkansas nominated by the governor are not government employees or elected politicians [UOA. 2017]. In University of Maine, trustees comprise 15 non-government individuals and one ex-officio government employee, and the BOT is chaired by a non-government person [UOM. 2017].
150. National University of Singapore is also able to adopt bylaws independent of the government because the BOT has only one government representative, who does not chair the BOT [NUS.

2017]. In case of IITs, the first bylaws are approved by the government upon recommendation of the Board of Governors (BOG) chaired by a non-government individual, and the BOG has the authority to amend the bylaws on their own subsequently [IIT. 1963]. Therefore, IITs also have power to frame its bylaws on their own.

151. Given that in some countries the government does get involved in formulation of university rules there may be temptation on the part of GON to retain the Government involvement in formulation of university rules. There is no evidence that government involvement always leads to inferior results in university operation. The desirability of government involvement depends upon whether it helps or harms universities. The primary outcome of the government involvement in formulation of rules in Nepal has been to keep university rules as close as possible to civil service rules, values and norms. International experience indicates that the confinement created by civil service like rules, values and norms makes it hard for universities to innovate management practices without which universities would have difficulty in delivering higher education efficiently and effectively.
152. The need for universities to have more flexibility than for the civil service originates from the fact that whereas civil service fully relies on the government funding, operates following the Government Regulations and would not have to take responsibility for the failure in the delivery of services as long as they stick to regulations, universities, as a rule, have to venture into innovative practices to complement government funding and excel in generation of new knowledge and technology, and take the responsibility for the failure to deliver the agreed outcomes. Because of this fundamental difference in the premises for operation of the civil service and universities and considering the constraints for innovative management practices that the government involvement in formulation of university rules may impose it is critical for universities to get autonomy in formulation of rules if universities are to make meaningful contribution in supporting Nepal's aspirations for prosperity.

Appointment of University Leadership

153. The ability *to appoint the leadership* is another determinant of institutional autonomy. Nepali universities do not appoint its leadership. Vice-Chancellors, Rectors and Registrars are appointed by the Prime Minister, the Chancellor. The Prime Minister also appoints Chairperson and members of University Service Commissions (GON. 2010). This provision has opened the window for extending political influence to universities. Since the establishment of TU university leadership has been appointed on political basis. Politicization of university leadership increased significantly since 1990, and now it has percolated down to the level of junior management as well as teachers and administrative staff. There is also a deep-rooted practice of sharing management as well as other positions between major political parties – ruling and opposition. Politicization has marginalized academic norms, values and interests in universities resulting in academic decline of universities.
154. The following provision of the Constitution of University of California shows the importance of shielding universities from political influence, "As established and discussed further in the provisions of Article IX, Section 9 of the Constitution of the State of California, the University of California shall constitute a public trust to be administered by the corporation known as "The Regents of the University of California," with full powers of organization and government, subject

only to such legislative control as may be necessary to insure the security of its funds and compliance with the terms of the endowments of the university and such competitive bidding procedures as may be made applicable to the university by statute for the letting of construction contracts, sales of real property, and purchasing of materials, goods, and services. Pursuant to Article IX, Section 9, the University shall be entirely independent of all political or sectarian influence and kept free therefrom in the administration of its affairs" [UOC. 2017].

155. In the US, university Presidents are appointed by BOTs, and government approval is not required for appointments. In Lithuania, Finland, France, Czech Republic, Hungary, Latvia, Slovakia and Slovenia university leaders are elected by a varying combination of faculty, staff, students and researchers or academic council/senate. Of these countries government approval is not required for all except for Hungary and Latvia. In the UK, Austria, Denmark, Ireland, Netherland and Sweden university leaders are appointed by governing boards. In these countries university leaders are appointed by the board without approval of the government except for Sweden [OECD.2007]. In NUS and IITs the President/Director is appointed by the President of the country upon recommendation of the university/institute council [NUS.2015; IIT.1963].
156. Based on the above there is no evidence that the engagement of the government in the appointment of university leaders is inherently problematic though the non-involvement does reduce the risks. The decision on the involvement should be made based on the country context. There is ample evidence in Nepal that the government involvement in appointment of university leaders has harmed universities. This is the single most important decision to be made for reforming the higher education sector so that it is able to support Nepal's ambition for prosperity.
157. There are many private universities, mostly not-for-profit, of world-class. Harvard University, Massachusetts Institute of Technology and Stanford University, Pohang University of Science and Technology (Republic of Korea) are some of them. Private universities appoint Presidents on their own. Nepal does not have private universities. But KU is defined in the act as a university in the non-government sector, which was established through a private initiative. Nevertheless, KU is not able to appoint its leaders independently. It is appointed by the Chancellor – the Prime Minister. This represents most significant threat for sustainability of KU. KU will only benefit if it is allowed to appoint the leadership on its own.

University Boards

158. *University boards* – boards of governors (BOG) or boards of trustees (BOT) or councils or senates – play an important role in management of universities. UOA 2017a states, "The Board of Trustees has legal control and responsibility for the functions of the University of Arkansas". This implies that the university leadership is accountable to the BOT appointed by the government. University acts of Nepal fall short of specifying who the university leadership is accountable to. Likewise, it is not clear who the University Council is accountable to (GON. 2010). University governance framework in Nepal has a blurred accountability framework (Figure 4.12) because of the government's direct engagement in university management through appointment of university leadership and chairing of the University Council, which formulates rules, by the Prime Minister (Annex 5). In universities with a clear accountability framework university management is accountable to the BOT, BOT is accountable to the government and the university management gets freedom to manage within the legal framework provided by the government and the BOT.

159. University Councils have not been able to play a meaningful role in supervision of universities because: a. the university leadership is appointed by the Prime Minister with marginal engagement of the Council; b. the Chairperson of the Council (Prime Minister) is not in position to allocate time for due diligence; and c. the proceedings of the Council is totally controlled by the university management.

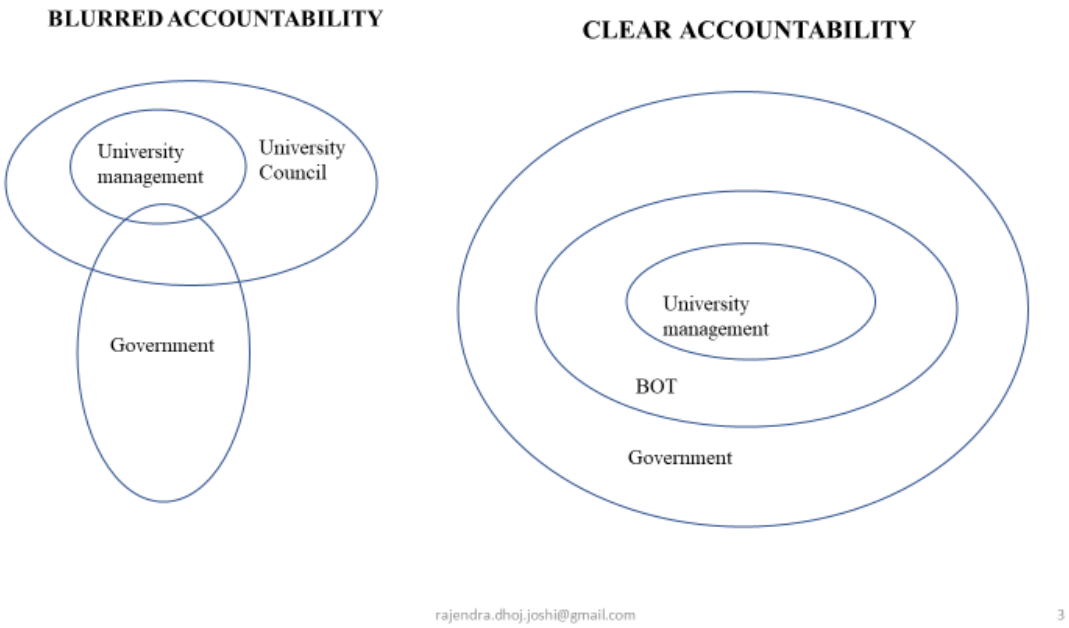


Figure 4.12 Blurred and clear accountability in university governance

Internal Management Structure of Universities

160. University acts *prescribe internal management structures* of universities in great detail. This makes administrative reforms to improve management of universities extremely difficult as it is difficult to amend acts. For example, TU act prescribes officials right down to the level of Dean, Assistant Dean, Executive Director and Campus Chief, whereas IIT Act prescribes only to the level of the Director, Deputy Director and Registrar. Similarly, the act also prescribes the composition of the Academic Council, which could have been left to be defined in the Rules [GON. 2010]. Acts of all universities follow the template of TU although they are different in size and must operate in unique environments. Briefer acts could have given broader space for universities to innovate by adopting Rules responding to their unique environments. The Charter of the George Washington University (US), which is just three-page long, is exemplary in this respect [US. 1977].

Higher Education Act

161. There is no *overarching legal framework* for higher education in Nepal. Higher education policies recommended by periodic education commissions and the recent higher education policy could not come into force as they are not backed by legislation. An initiative to draft a Higher Education Bill started over a decade ago. But the approval of the bill has dragged on because of the lack of

stakeholder consensus on the content of the bill. Some stakeholders are worried that the higher education sector may be stifled through excessive regulation, which seems to be a genuine concern. It is not an easy task to draft a bill aimed at facilitating the growth of higher education rather than stifling it. The downside of not having a higher education act is an ad-hoc management of the higher education sector resulting in the lack of a clear purpose and direction of the sector. Based on the experience of initiatives to reform higher education it is crystal clear that critical reforms required to deliver higher education outcomes required for supporting Nepal's aspirations for prosperity would not be possible without a higher education bill. The draft higher education bill in the Parliament would not be fit for the purpose as it was not prepared with a view to enable higher education to support Nepal's aspirations for attaining prosperity. The current practice of drafting bills, which entails an exercise to protect vested interests of powerful stakeholders rather than national interests, should be avoided while drafting a fresh higher education bill. The bill should be prepared by technical experts based on a higher education reform plan prepared by technical experts with deep knowledge of national and international experience. The political vetting process should take place only when the drafts are ready so that deep analysis of issues in the process of preparation of the reform plan and bill is not hijacked by vested interests.

Affiliation System

162. Education commissions have been emphasizing the need for granting greater *autonomy* to campuses under universities. The Higher Education Policy also recommends granting autonomy to affiliated and constituent campuses, which are not different from affiliated campuses in terms of academic autonomy. Notwithstanding the fact that only India, Bangladesh and Pakistan have the practice of affiliation of HEIs akin to that of Nepal, and India is moving away from it no meaningful progress is being made in the implementation of the policy of granting autonomy to campuses – both constituent and affiliated. The experience of implementation of autonomy reform indicates that without initiatives at the system level, that is above the university level, desired progress in terms of autonomy of campuses is unlikely.
163. The reliance on the affiliation system, including constituent campuses functioning like affiliated campuses in terms of academic autonomy, has inhibited the academic growth of campuses in Nepal. Tri-Chandra Campus, a constituent campus of TU established a century ago, has not only become a center of excellence but has also deteriorated academically. In this paradigm only one center designated as the lead institution is supposed to excel. Others simply do not get opportunity to excel as professors in non-lead campuses are not required to find out what knowledge and technology is required for the economy/society, they are not required to formulate a curriculum that is adequate to address the societal needs, they do not need to bother about preparing instructional materials for delivering the curriculum, and they do not need to participate in examinations of students. The role of professors become limited to delivering a course following textbooks, and as such the accountability of professors for learning of students become limited. Such professors would not be able to impart to students the cutting-edge knowledge and technology to students, which is the essence of higher education of the age of knowledge economy, because this system does not require them to be engaged in research activities.

164. In the context of the rapid pace of creation of new knowledge and technology, and dramatic reduction of the time lag between knowledge creation and innovation in recent decades the useful life of knowledge and technology is decreasing. Hence teaching the content available in textbooks alone, which is characteristic of an affiliation system, is not sufficient to create a competitive work force as well as building capacity of students to engage in research. Higher education graduates to be produced by universities to be meaningfully employed need to have skills, which robots or AI do not possess that is they have to be creative. This is not the type graduates that the affiliation system can produce.

Private Provision

165. *Private sector* higher education is growing all over the world, especially in developing countries. Nepal is among the few countries which do not have private universities. International experience indicates that not-for-profit private universities can make significant contribution to development. World-class universities like Harvard, MIT, Caltech are not-for-profit private universities. Private not-for-profit universities in India and Pakistan are also demonstrating that they can excel. Vellore Institute of Technology (VIT) in India ranks 16th in India and 1363th globally, andPAgha Khan University in Pakistan ranks 4th in Pakistan and 1578th globally. In terms of excellence ranking VIT ranks 696th, which is comparable to the ranking of the highest ranked public HEI - IIT Mumbai of 529th. Community campuses, which have outperformed public HEIs in QAA and implementation of academic autonomy, show the promise of non-government not-for-profit sector. Similarly, there are good private campuses, which could have made significant contribution to the economy should a path to university status opens to them.

Encroachment into University Affairs

166. According to MOE 2006, the MOE has the power to formulate norms for physical and academic infrastructure of campuses in technical areas, which include medical sciences (nursing, medical education and pharmacy), engineering, agriculture, forestry, information technology, accounting and management and others as specified by the MOE, and issues permission for their establishment through private investment – national and international - subject to affiliation by universities. This is an example of an encroachment of the university mandate by the government. TU Act grants the mandate of issuing permission for establishing private campuses to TU [GON. 2010]. In addition, formulating physical and academic norms for technical campuses is the area within the core competence of universities.
167. The MOEST policy of de facto taking the licensing role for establishment of technical campuses through private investment has created unfavorable environment for private sector investment in technical education, particularly medical sciences and engineering. Considering the large outflow of Nepali students for medical and engineering education, and the comparatively low share of graduates in engineering and medical education this policy is difficult to justify. This policy has effectively denied students' opportunity for getting medical and engineering education in the country even when they are ready to bear the full cost and investors are ready to invest on technical education.

University governance

168. The internal governance and management of universities in Nepal is analyzed based on the legal framework of TU. The governance and management framework of all universities, notwithstanding the difference in their nature and size, is similar to that of TU in most respects, which is presented in Annex 6. The distinctive features of TU are a large enrolment and a large number of campuses – 1,161, of which 60 are constituent campuses and 1,101 are affiliated campuses. The single most challenging aspect of TU governance is the centralized management of campuses of heterogenous nature spread across the country and operating under unique environments. Among others, the following aspects of campus management, as stipulated in Rules pertaining to Organization and Academic Administration, and Regulations pertaining to Affiliated Campuses, are centralized: a. personnel management; b. curriculum and examinations; and c. tuition fees. Other significant weakness in university governance is weak external accountability compromising the ability to safeguard public interests.

Centralized Rules

169. Out of 60 constituent campuses only 7 autonomous campuses do have power to frame bylaws (working procedures). Operation of heterogenous non-autonomous campuses by a single set of TU rules have hampered the efficient operation of these campuses. The power delegated to frame bylaws to autonomous campuses are severely constrained because of the detailed prescription of campus organizational structure and operating procedures in Autonomy Rules despite the unique environment each campus has to operate. In addition, Rules for non-autonomous campuses, many provisions of which are applicable to autonomous campuses also, further constrain the flexibility for operation of autonomous campuses. These constraints have not enabled autonomous campuses to develop their own identity. The initiatives related to autonomy, decentralization and formation of autonomous schools indicates that TU Act is not a binding constraint for decentralization of authority within TU.

Centralized Curriculum and Examinations

170. The problems associated with centralized curriculum and examinations have been discussed elsewhere, which are serious constraints for academic excellence. TU Act does not preclude decentralization of these authorities to campuses.

Centralized Personnel Management

171. Terms and conditions of services and recruitment is the same across constituent campuses, and faculty and administrative staff are recruited centrally and placed in campuses. Personnel can be transferred from campus to campus and such transfers are, as a rule, guided by personal interests than institutional interests. The ability of campuses to deliver good quality programs efficiently is severely constrained when they do not have control over personnel. This practice does not help to build identity of campuses and compromises responsibility of campuses to deliver good quality programs. This weakness is partly associated with the government involvement in formulation of Rules mimicking civil service rules and partly with the lack of initiative on the part of TU management to adopt rules befitting promotion of academic excellence.

Centralized Determination of Fees

172. The TU Act vests the power to determine students' fees on the Executive Council. The act allows delegation of this authority to any official or committee of the university. But to date this authority was delegated only once to the IOE. TU efforts to adjust tuition fees to the rising costs of regular or mainstream programs in constituent campuses have not been successful. The last university wide increase in tuition fees for regular programs of constituent campuses took place in 1991. Due to the inability of the university to meet the funding gap through fees constituent campuses remain severely underfunded affecting delivery of regular programs, to which the lion's share of students are enrolled. Decentralized and autonomous constituent campuses have been trying to meet the funding gap, albeit modestly, by raising additional fees (not the regular fees), which they have authority to raise.
173. Centralized powers to determine fees for regular academic programs have handicapped constituent campuses in three ways. First, the prevailing low tuition fees for regular programs limits the ability of campuses to supplement revenues from additional fees in any significant manner. Second, the students' willingness to pay for regular programs varies considerably from campus to campus as it is a function of the quality of instruction they are able to deliver, which differs from campus to campus. Centralized determination of fees makes it impossible to link the fees to the willingness to pay. Third, experience shows that centralized fee increment becomes more politicalized than campus-based fee increments.
174. The implementation of Full Fees for regular programs in the IOE, since 1997, is a glaring example of the promise of decentralized determination of fees, which became possible when the power to determine fees was delegated to the Dean of the IOE. This example shows that decentralized determination of fees for regular programs is politically feasible and financially prudent.
175. TU because of the inability to raise fees for regular programs started to offer new programs sought after by students on Full Fee basis. The first program initiated in this way was Bachelor's in Business Administration. At present, a few dozen Full Fee programs are offered by TU constituent campuses. Substantial revenues are being generated through such programs. With exception of the IOE fees for such programs are also being determined centrally. This approach has denied incentives to campuses for delivering programs better and attract higher fees.
176. While tuition fees constituent campuses have been determined centrally since the beginning of the university, the provision of central determination of fees for community campuses, which is yet be implemented, was introduced recently in the Regulations for Affiliated Campuses [TU. 2017]. Community campuses do not receive funding from TU. The recurrent funding it receives from the UGC constitute only a small fraction of their expenditures. Community campuses rely on entirely on tuition fees, which are being determined by themselves, for meeting operating costs and partially for meeting capital expenditures. If the provision for centralized fee determination is implemented the sustainability of community campuses will be at stake.

External and Internal Accountability of Campuses

177. Organizations operate effectively when there is a mechanism for ownership of and accountability to external and internal stakeholders. The existing internal governance framework of TU is not conductive to building external accountability. In regular constituent campuses (not decentralized or autonomous) there is no provision for campus management committees. Hence there is no space for external stakeholders to influence campus operation. In decentralized and autonomous

constituent campuses, which have management committees with representation of external stakeholders, they get little, if any, space for influencing the operation of campuses because of the inward oriented composition of management committee. Despite the internal stakeholder dominated management committees in constituent campuses, internal stakeholders do not feel campus ownership because campus office bearers and management committee chairpersons are appointed by the university. TU Act does not bar formation of management committees, which could ensure accountability to external and internal stakeholders. The current governance framework for constituent campuses is a glaring example of the unwillingness of the TU management to let external and internal stakeholders have a say in management of campuses.

178. A campus established by a community or cooperative or trust or academic institute or social organization or local agency is recognized as a community campus by TU. Community campuses are required to get its bye laws, and the chairperson of the BOG approved from TU [TU. 2017]. When countries are giving autonomy to public HEIs it is erroneous to deny autonomy to non-government campuses, which TU does not fund. This compromises the local ownership of campuses and has opened the window for extending political influence to community campuses, which can result in detrimental consequences. This weakness is associated with the tendency of TU management to centralize authority for political expediency.

Safeguarding Public Interests

179. Some policies and practices of universities which are detrimental to public interests are discussed here. Universities have powers to approve additional programs for affiliated campuses. This power looks benign from the perspective of quality control. But this power appears to have contributed to stifling of the expansion of academic programs fully financed from private resources. While TU continues to run many programs with low market demand it has been denying affiliated campuses permission to add programs with market demand under the disguise of quality control or inability to supervise programs or limited capacity to conduct examinations. Denial of permission for adding new programs cannot be fully justified because accredited campuses are also being denied this permission. In addition, since the examinations are conducted by affiliating universities there is little risk of deterioration of the quality of graduates. And it is not justifiable to deny program addition citing the capacity for supervision or examinations as students who are willing to finance the full cost of education should not be penalized for the inefficiency of the affiliating universities.
180. There is an intense debate about whether affiliated campuses should be granted permission to offer programs that are not offered by the affiliating university. While TU with few exceptions is sticking to this practice other universities are not. If other universities followed the TU practice many new programs simply would not have been offered in Nepal. The Bachelor's Degree in Biomedical Engineering offered by the College of Biomedical Engineering affiliated to Purbanchal University is such an example. This practice is not in the public interests as new programs should not be differed simply because of the lack of resources or initiatives on the part of public universities.
181. Universities have the policy of not allowing campuses affiliated to them to offer programs of other universities. This denies affiliated campuses an opportunity to offer programs in market demand, and therefore, constrains learning opportunity of students. Since the affiliating university are

responsible for programs affiliated to it there is no justification for this policy. This is yet another example of insensitivities of universities to the public interest.

182. The power to grant affiliation to campuses lies with the Executive Council. Since a decision to grant affiliation is related with an assessment of whether a campus is in compliance with academic requirements this power could have been decentralized to the Faculty Board Level within the broad framework of an affiliation policy approved by the Executive Council. This is an example of over centralization of powers leading to systemic inefficiencies and to decisions detached from ground realities.

Decentralization Initiatives

183. The need for providing greater autonomy to campuses with a view to improve governance is being felt since a very long time. Based on the analysis of the internal governance framework of TU it appears that all management problems of TU do not stem from TU Act. TU initiated reforms aimed at increasing *autonomy of campuses* by adopting Decentralization Rules in 1998 and Autonomy Rules in 2006. The main achievement of the decentralization has been mobilization of internal resources by campuses by offering some academic programs in high demand on full cost recovery basis. But this reform did not lead to the desired improvement in quality of education or accountability of campuses because of the flaws in the Decentralization Rules discussed above on the one hand, and on the other reported failure to stick to the spirit of the reform. It was implemented only in about half of the constituent campuses.

184. The progress with the implementation of Autonomy Rules has been more modest with 7 out of 60 constituent campuses functioning under governance autonomy, and four accredited community campuses under academic autonomy. The experience of implementation of autonomy revealed that academic autonomy is key to the improvement of performance of campuses. Achievements from the implementation of governance autonomy has been uneven across the campuses. Notable improvements were made after the implementation of autonomy in Mahendra Ratna Multiple Campus, Ilam and Central Food Technology Campus, Dharan. Overall, the governance autonomy in TU constituent campuses has not led to the desired improvement of quality of education or accountability of campuses for the same reasons as for decentralized campuses. But implementation of academic autonomy at community campuses is showing promise albeit they are at the early stage of implementation of this reform.

185. The process of granting academic autonomy has been cumbersome at times discouraging the autonomous campuses. The autonomy is given on program by program basis, which begins with approving implementation of a campus-owned academic program. The autonomy for a program does not include power to administer examinations. An autonomous campus applies for administrating examinations on its own after implementing an autonomous program. This practice has led to administration of examinations of an autonomous program by the university in some instances. There is no clarity about how all academic programs of the university will be converted into campus-owned programs. Based on the current arrangements it may take many years for campuses to offer campus-owned programs only, in other words, to implement academic autonomy fully. Administration of programs following different academic calendar and different academic norms is bound to create confusion. Hence, it will take many years to feel the true impact of academic autonomy, which may discourage the reform altogether.

186. When autonomous campuses are to institute their own (or new) academic degree, and start a program leading to this degree based on their own curriculum they are required to get the approval from the Academic Council upon recommendation by the Faculty Board. This procedure undermines the academic autonomy of campuses as referral to the Faculty Board is tantamount to not recognizing the Academic Committee at the autonomous campuses. In addition, the approval for initiating a program, which is not associated with commitment of resources from the university, should not be required for affiliated campuses not supported from university resources and for autonomous constituent campuses committing to finance the program from their own resources.
187. The reform of academic autonomy is not moving at a desired pace due to the fear that the prestige of the university may be damaged if examinations held by autonomous campuses are compromised. While this risk should not be underestimated there is no option other than venturing on academic autonomy because centralized curriculum and examinations cannot deliver the excellence that the age of knowledge economy requires. Since academic autonomy is being granted to campuses accredited by the UGC, upon compliance with requirements stipulated in TU Autonomy Rules, and TU central administration representatives are included in the Campus Examination Committee as well as the BOG the reputational risks of academic autonomy is deemed to be within acceptable limits. There is also tendency to compare the faculty of autonomous campuses with the best faculty of TU and draw an inference that autonomous campuses do not have high quality faculty. One should realize that such capacity cannot be built without having the responsibility for the full set of academic functions like curriculum preparation, teaching materials selection/preparation and final examinations.
188. To encourage autonomous campuses to pursue this reform with full rigor autonomy should be given for all programs and examinations by a single decision upon a determination that a campus is qualified for autonomy. This is the approach adopted in India, where the reform of college autonomy is being pursued successfully. As of September 2017, 621 colleges have been granted autonomy, of which 170 are government colleges and the rest non-government [UGCI. 2017]. The provision for academic autonomy in India is as stated in UGCI. 2012 reads, "Autonomy granted to the Institution is institutional and covers all the courses at U.G., P.G., Diploma, M.Phil. Level, which are being run by the Institution at the time of conferment of autonomous status. Also, all courses introduced by the Institution after the conferment of autonomous status shall automatically come under the purview of autonomy. Partial autonomy cannot be granted to any Institution."
189. The analysis of governance and management framework of TU shows that most of the weaknesses associated with it are not associated with the binding constraints of TU act but with TU's unresponsiveness to the public interests.

Challenges

190. This section describes promises and challenges of the higher education sector for delivering desired outcomes related to the participation rate, equitable access, share of graduates in S&T, quality and relevance and RDI identified in Chapter 3 including the challenges related to financing.

Participation Rate

191. The need for increasing the GER of 14.9% to about 70% by 2050 was discussed in Chapter 3. The Fourteenth Plan has set a GER target of 20% by 2019. Based on the recent trend of GER growth this target is unlikely to be achieved (Figure 3.3). From 2009 to 2015 higher education enrolment decreased form 432 thousand to 361 thousand, and the enrolment of constituent campuses from 197 thousand to 122 thousand (Figure 4.13). During the same period, while the enrolment of community campuses decreased moderately – from 126 thousand to 111 thousand, the enrolment of private campuses increased substantially – from 98 thousand to 128 thousand. Figure 4.14 shows that the decline in the share of constituent campuses was entirely captured by private campuses. It is interesting to note that while the share of constituent campuses receiving the bulk of public funding declined and the share of community campuses receiving only token funding remained at the same level. This trend questions the effectiveness of public spending from the perspective of increasing the participation rate.

Figure 4.13 Enrolment by type of campus 2009-15. '000

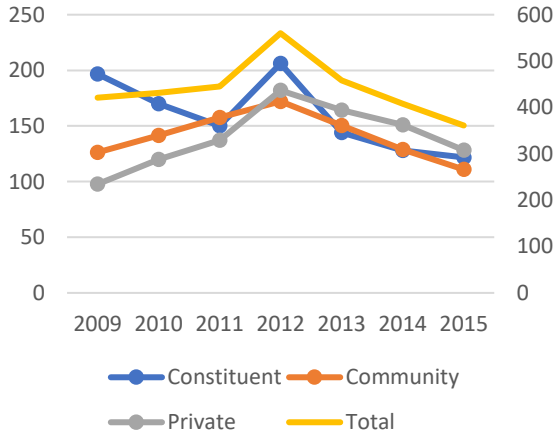
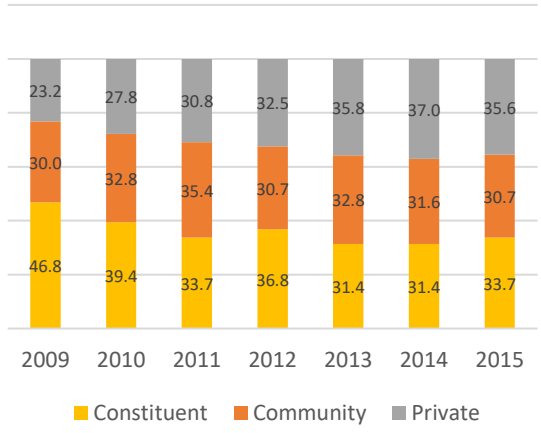
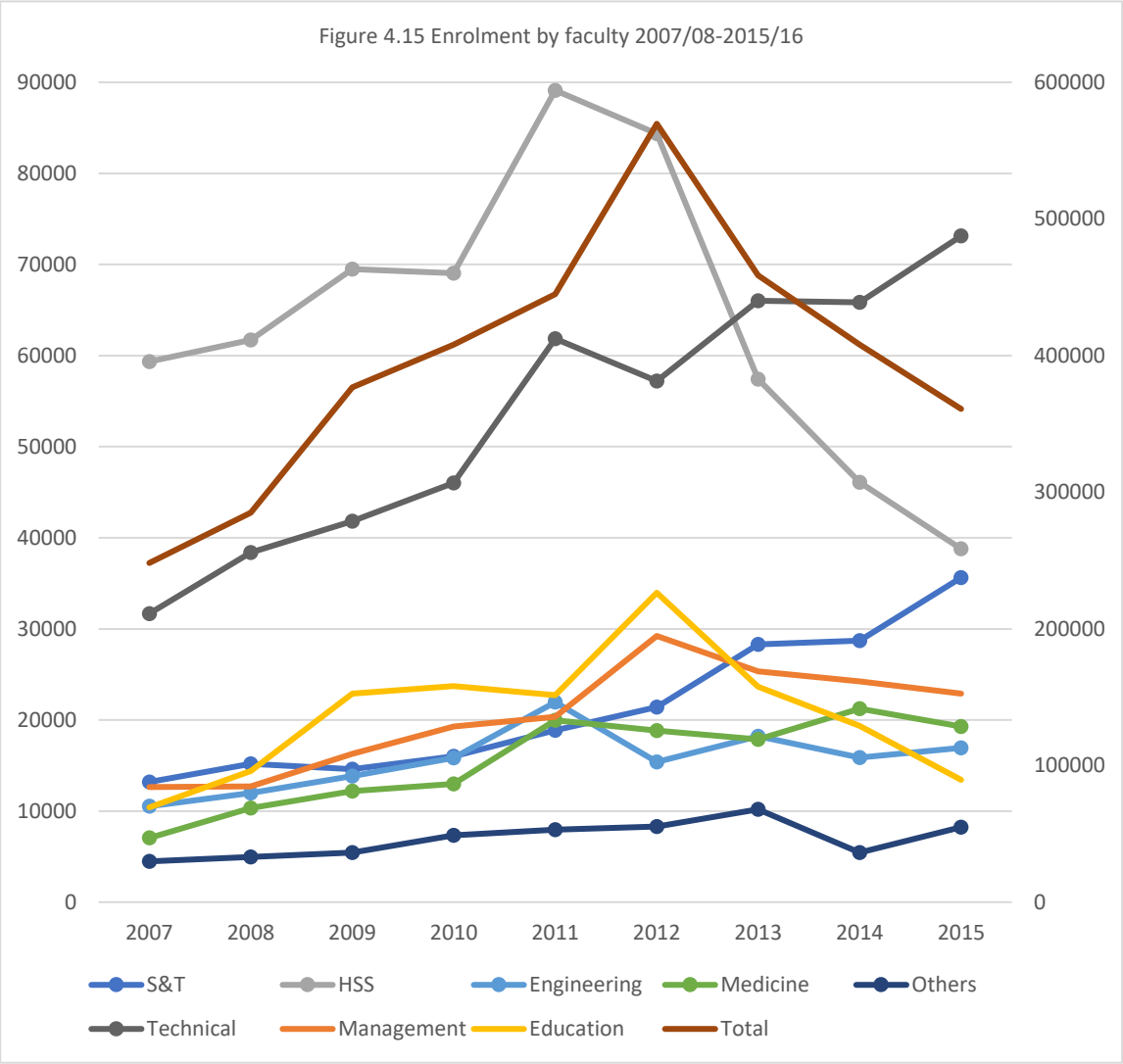


Figure 4.14 Share of enrolment by campus type 2009-15, %



192. The trend of enrolment by faculty presented in Figure 4.15 gives insights into why higher education enrolment has been declining over the recent years. This decline is largely associated with the decline of enrolment in faculties of Humanities and Social Sciences, and Education, where the bulk of students were enrolled. The enrolment in the faculty of S&T has been steadily rising whereas the growth of the enrolment in faculty of management has recently tapered off. The enrolment in the faculties of Medicine and Engineering increased steadily from 2007 to 2011. But then after while it declined in Engineering and it stagnated in Medicine. An

interplay of several factors, discussed below, contributed to the decline of higher education enrolment.

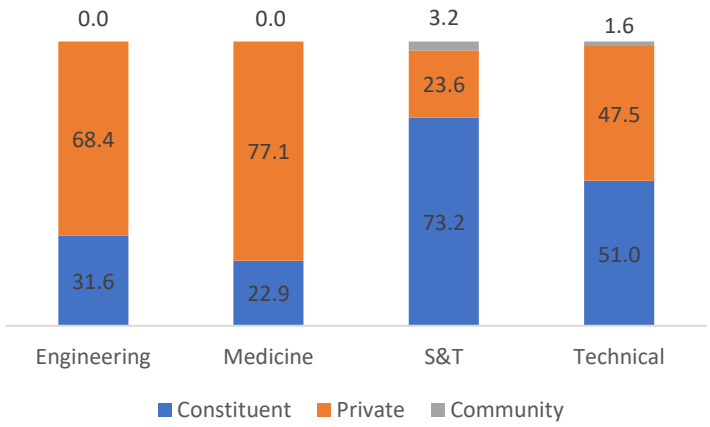


193. First, poor management of the universities manifested in terms of lack of or poor enforcement of the academic calendar leading to severe delays in completion of academic programs, poor adherence to academic norms and standards, low pass rates, and severe politicization of university management leading to marginalization of academic values, among others. For example, the average time taken for publication of results in five faculties of TU at the bachelor's level was 288 days for 2009-2011 (BS 2066-68), and the maximum time taken was 354 days for Bachelor's in Education [Acharya G.P. et al. 2013]. The poor management of universities is one of the factors contributing to the large exodus of students for higher education. For example, Nepal accounts for 17% (5,481) of foreign higher education students in India, which is the highest share of foreign students [MHRD. 2013]. The number of students leaving Nepal for higher education is estimated at around 59,000 in 2017/18.

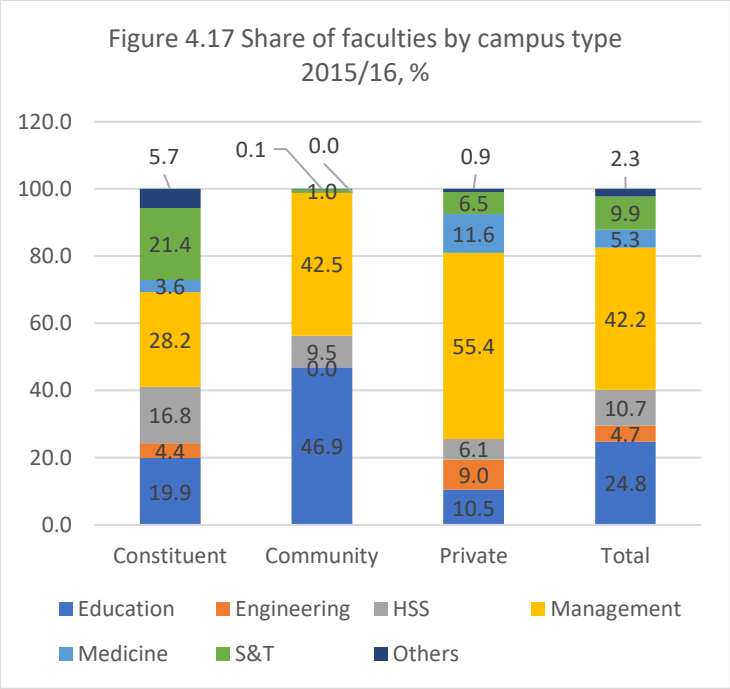
194. Second, more and more youth are leaving the country for foreign employment after the school. It was reported that in Lumbini Banijya Campus a significant number of students enrolled in the Bachelor's in Business Studies (BBS) program has dropped out – out of 702 students admitted only 457 appeared in examinations. Because of the high dropout it was reported that Glorious College - a private campus - discontinued BBS program altogether. Students are not likely to be attracted to join HEIs or those who join continue unless they are convinced that the wage premium for higher education graduates can offset the earning losses associated with foreign employment.

195. Third, the government has not been able to make adequate policy interventions in response to the increased demand for technical programs and professional programs with high market demand. In spite of the fact that a large number of students go abroad for engineering and medical education the existing policies and practices are not conducive to expansion of engineering and medical education. The enrolment share of constituent campuses in Engineering and Medicine was 31.6% and 22.9% respectively (Figure 4.16). In spite of the fact that the government has not been able to invest for expansion of engineering and medical education government policies and practices are not conducive to private sector investment. For example, the introduction of the requirement to get a LOI approved from the MOE for private sector investment in technical education adds a layer of bureaucratic processing with no apparent advantage to the management of the technical education sector [MOE.2006, GON.2010]. Anecdotal evidence suggests that the procedure for affiliation as well as expanding enrolment by affiliated campuses are cumbersome. In addition, there are a number of restriction for opening medical campuses which has virtually stalled expansion of medical higher education.

Figure 4.16 Technical faculty enrolment share by campus type 2015/16, %



196. The share of faculties in the enrolment by campus type is presented in Figure 4.17. The decline in the enrolment in the Education faculty has hit hardest community campuses with an enrolment share of the Education faculty of 46.9%. They were not able to use the freed-up enrolment capacity by expanding enrolment in programs with market demand including technical programs because of the cumbersome processes for getting approval for such programs. It is an irony that the existing practice of affiliation and program addition has de facto denied an opportunity of citizens to get educated by bearing the full cost of education.



197. Fourth, public financing for higher education of 0.3 to 0.4% of the GDP during the last decade would not be enough to attain a sufficiently high GER to enable Nepal's economy to successfully compete in the global market. Nepal does not have a clearly articulated policy on financing higher education. The size of higher education budget is determined basically by the salary expenditures of staff positions funded by the government and financial assistance from development partners.

198. Fifth, the ability to expand higher education enrolment is also being constrained by the wastage of scarce resources available to the sector because of the inability to adjust staffing levels based on student numbers. There are many departments employing teaching staff in excess of what is justified based on the prescribed teaching load. The recent government decision to convert community campuses, which account for just 0.1% of the technical enrolment to constituent campuses, is bound to constrain resources available for expansion of technical education.

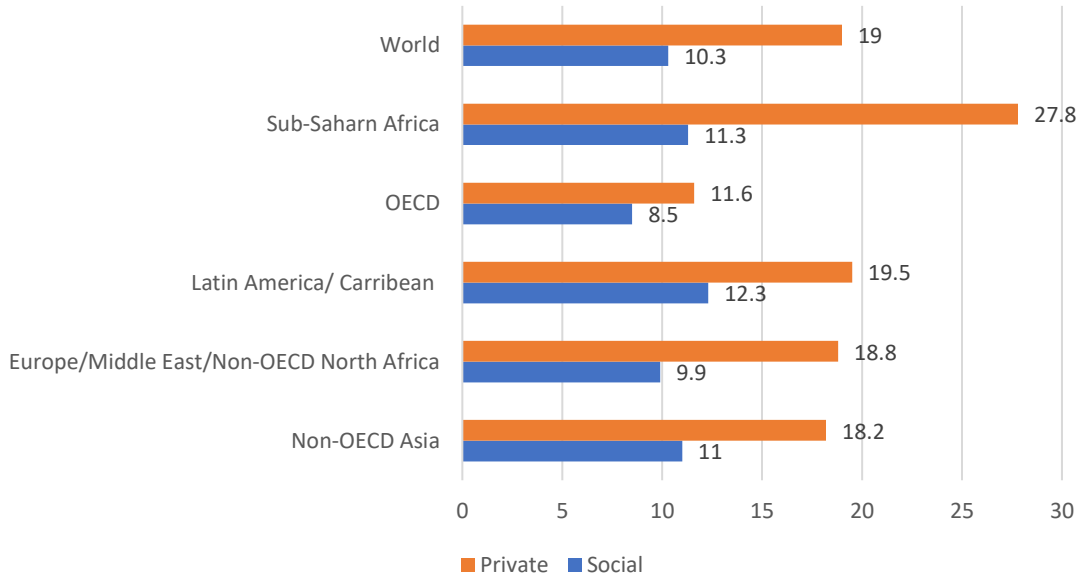
199. While the need for a significant increase in the higher education participation rate is obvious the expansion of higher education should be undertaken with due consideration of the risk of severe unemployment because a large number of unemployed higher education graduates can be a political risk. In this context, governments may choose to mitigate the risk of unemployment by waiting for economy to grow before expanding opportunity for higher education. But this strategy can inhibit economic growth as investors will prefer to invest in countries where there is a good supply of higher education graduates.

200. In a market economy while it would not be possible to closely match the supply of higher education graduates with the demand of the economy there are ways to mitigate the risk of serious oversupply of higher education graduates. First, this risk can be mitigated by introducing an appropriate level of cost sharing in higher education because when higher education is free or highly subsidized students tend to enroll even when employment opportunities are not high. But, in contrast, when higher education is provided on a cost sharing basis, students would choose to enroll only when they foresee reasonable returns to their investment. Second, it can be mitigated by maintaining an appropriate share of non-government provision of higher education, which can be scaled up and down responding to the market demand of graduates. Nepal is favorably placed to mitigate the risk of serious oversupply of higher education graduates because Nepal already has a large share of non-government provision and the policy of cost sharing in higher education.

201. The demand for tertiary education from students is increasing worldwide. This is associated with the perceived high private returns from investment in higher education as well as the increasing sophistication of technology of production raising the demand for higher education graduates.

Estimates of regional social and private rate of returns are presented in Figure 4.18 (Psacharopoulos & Patrinos 2002), which confirms this perception. As the technology of production gets upgraded the requirement for higher education graduates increases and as a result the unemployment rate of tertiary graduates become lower than that for job seekers without tertiary education. In OECD countries, unemployment rate among those having tertiary education is on an average 10 points lower than that of those having attend upper secondary and post-secondary non-tertiary education (OECD 2008). In this context, increasing the participation rate.

Figure 4.18 Returns on higher education, %



Source: Psacharopoulos & Patrinos 2002

Equitable Access

202. Means cum merit scholarship was introduced in TU with an aim of promoting equitable access to higher education. But this scholarship did not succeed in meeting the intended objective of supporting bright needy students because it was not able to target needy students. In 2007, the GON introduced poverty targeted scholarships under the World Bank supported Second Higher Education Project (SHEP) by establishing Student Financial Assistance Fund Development Board (SFAFDB). These scholarships continue to date with support from the Higher Education Reforms Project also assisted by the World Bank. These scholarships, which identify needy students through Proxy Means Testing, are the only truly poverty targeted financial assistance in the country. By 2020, when the HERP ends, the SFAFDB is expected to provide financial assistance to about 15,000 higher education students [World Bank.2014; World Bank.2015]. This would constitute only less than 1% of the total students estimated to be enrolled in higher education

during the period of 2007-2020. Therefore, scaling up the financial assistance remains a formidable challenge for equitable access to higher education. SFAFDB continues to be funded exclusively from donor funds. The plan to sustain it from regular funds following the end of the SHEP did not materialize. The sustainability of the financial assistance program is another significant challenge for ensuring equitable access.

Share of STEM Graduates

203. The GON has not made significant investment aimed at expanding technical higher education since the closing of the Engineering Education Project in 1999, and Higher Education Project in 2000. Nevertheless, technical higher education continued to expand responding to the market demand. While the expansion of enrolment in engineering was a result of private sector investment, and introduction of full fee (self-financing) programs in constituent campuses, the expansion of enrolment in medicine was primarily due to the private sector investment. And the expansion of enrolment in S&T was primarily driven by self-financing programs in constituent campuses and private sector investment.
204. In recent decades technology driven economic growth has accelerated in the world. In response to this, countries are increasing investments in technical higher education but Nepal has not been able to do so adequately. As mentioned earlier private campuses account for the lion's share of engineering and medical education but community campuses have not been able to offer these programs due to policy hurdles as well as lack of support from the government. While expansion of medical and engineering education, which have high market demand, to a large extent may be possible by creating a conducive environment for investments from private and community campuses, efforts from these sectors alone would not suffice for delivering high quality research oriented technical education. International experience indicates that for-profit HEIs have not make a great contribution to the development of knowledge and technology though they have been successful in delivering professional education. In this context, apart from efforts to develop world- class HEIs in the public sector the government should make efforts to tap the potential of community campuses for this purpose. They could develop as premier private/non-government not-for-profit HEIs.
205. The main challenges for increasing the share of technical higher education is increasing public sector investment, removing policy hurdles and introducing incentives for non-government sector – community and private campuses - investment.

Quality and Relevance

206. Quality Assurance and Accreditation (QAA) and global rankings are two tools used for assessment of quality of HEIs. The main purpose of QAA are to guarantee compliance with (minimum) standards and to support quality enhancement. To date out of over 1,407 HEIs only 26 have been accredited so far, and the QAA covers only campuses but not the universities, which control their curriculum and examinations. Therefore, there is no basis to claim that HEIs in Nepal meet minimum standards.
207. The most significant reasons behind the poor quality and relevance of higher education is the obsolete governance system. Key issues related to governance are: the practice of sharing

managerial and faculty positions between political parties; overcentralized management; weak accountability; the system of affiliation; marginalization of the role of external stakeholders; and inadequate public financing.

208. The practice of sharing managerial and faculty positions between political parties has seriously eroded academic leadership in higher education related institutions. As a result, the higher education sector lacks vision, academic norms and values have been marginalized, and no serious initiatives to reform higher education have been taken. This is the greatest challenge facing the higher education sector.
209. Over centralization of the management, which is the most deep rooted in TU, is common to all universities to different degrees. It has led to disempowerment of officials and entities, who are responsible for the delivery, and as a consequence, while the top management did not take, and perhaps could not have taken, the responsibility for addressing the problems at the delivery level the management responsible for the delivery did not have the authority to address the problems they were facing compelling them to be mere spectators than managers.
210. A blurred accountability structure discussed earlier is a common feature of all universities. As a consequence, managers as well as HEIs have not been held accountable for non-performance in spite of the dismal performance of the sector.
211. The choice of system of affiliating campuses instead of giving them authority to issue certificates on their own is one of the most damaging factors for inhibiting academic growth of institutions. It has compromised the academic growth potential of the affiliating university as well as affiliated campuses. This concept has also served as a justification for the overcentralized management of universities. Notwithstanding the obsolete nature of the affiliation system this system remains still deep rooted in the country. A shift from the affiliating system to each HEI being empowered to grant degree is a major psychological challenge.
212. Public HEIs are established and funded by the government for serving public interests. But the failure to ensure true representation stakeholders in the governance structure of HEIs has led to the capture of the management of HEIs by the vested interest groups. This is why universities have been perpetuating policies and practices, which are not in the public interests, and by doing so contributing to their own decline.
213. It is beyond doubt that universities are underfinanced by the state. The physical infrastructure of universities is in dilapidated condition. The poor state of physical infrastructure does constitute a binding constraint for delivery of higher education of quality and relevance. Yet, it has been difficult for universities to get increased funding due to the perception of poor utilization of resources by universities. Determined efforts by the university management for winning public trust would be critical for increasing the share of public funding for higher education.

Research, Development and Innovation

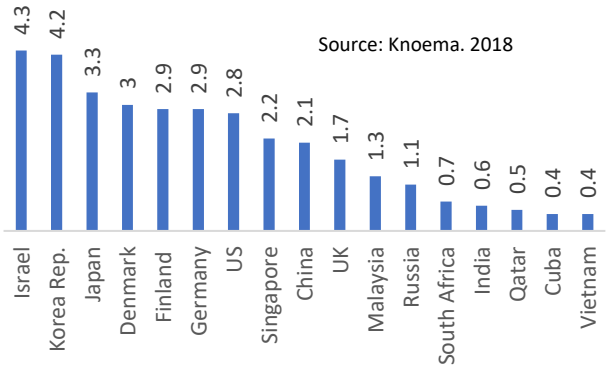
214. The key challenges for achieving excellence in RDI are grossly inadequate funding, the low share of post graduate enrolment and faculty promotion policies not conducive academic excellence. Recent data on spending on RDI is not available. According to theglobaleconomy.com research spending as share of GDP was 0.05%, 0.25% and 0.3% percent of GDP in 2008, 2009 and 2010 respectively [theglobaleconomy.com. 2018]. These figures need to be treated with caution, first, as it is unlikely that research spending could change six-fold within two years, and second, the expenditures on research in 2010 is almost equal to higher education expenditures, which is

unlikely. In recent years, the most significant source of funding for research has been the UGC. In FY2016, allocation for research from the regular budget was Rs.8 million compared to Rs.60 million from the HERP assisted by the World Bank. Based on rudimentary estimates in recent years expenditures on RDI, including the World Bank funding, is less than 0.01% of GDP, which is less than that of LMIC like Vietnam (0.4%), Cuba (0.4%) and India (0.6%) respectively by an order of a magnitude and that of UMIC like Russia (1.1%), Malaysia (1.3%) and China (2.1%) respectively by two orders of magnitudes [Figure 4.19].

215. The government is yet to accord a priority to research spending. An arrangement for sustained funding of a reasonable scale is not there. This has severely constrained the promotion of university research. Due to the lack of support for student research the involvement of students in research is very limited, and most of the faculty research is being funded through external sources. Hence the research areas are being more or less dictated by priority set by funding agencies.

216. Post graduate students play a significant role in university research. Therefore, universities according due priority to research do maintain a significant share of post graduate students in the university enrolment. The share of PG students in IITK is 45.6% (IITK. 2015) compared to 14% and 11.7% in KU and TU respectively (see Figure 4.6). The quality of university research also depends upon the quality of students admitted to post graduate programs. There is intense competence for post graduate students. While high quality universities abroad are able to provide financial assistance and career prospects for bright students, Nepali universities are not only unable to do so but also they charge fees from them. Lack of financial support for post graduate studies is a challenge for promoting research.

Figure 4.19. R&D expenditures as share of GDP, %



217. Universities are not giving due credit for research accomplishments while recruiting as well as promoting faculty. This practice has on the one hand restricted entry to new faculty with research excellence and on the other discouraged existing faculty to get engaged in research. Recently, TU has introduced a new pathway for recruitment of faculty, which is called "Open competition based on academic excellence", giving comparatively higher weighting for research accomplishment compared to that of the regular faculty recruitment pathway (see Table 4.6). The first batch of 9 faculty based on the new pathway has been recently recruited/promoted. This approach has helped to significantly enhance the research excellence of faculty promoted/recruited. Following the approval of regulations for recruitment through an open competition based on academic excellence the criteria for open competition under regular stream was also changed making it compatible with open competition based on academic excellence. The weighting for research accomplishments has increased from 21% for internal competition to 70%

for open competition. The low weighting for research for internal competition remains a serious constraint for promotion of research in Tribhuvan University and other universities.

Table 4.6 Criteria for recruitment /promotion of professors

Indicator	TU			KU	
	Regular stream, %				
	Internal competition (80%)	Open competition (20%)	Open competition based academic excellence, %	Internal candidates, %	External candidates, %
Academic qualification	25	0	0	20	20
Research and publications	21	70	50	20	30
Teaching experience	40	20	20	NA	NA
Performance evaluation	4	NA	NA	20	NA
PhD MPhil supervision	NA	NA	20	NA	NA
Interview	10	10	10	30	40
Professional contribution	NA	NA	NA	10	10

Financing Higher Education Expansion

218. To catch up with richer countries tertiary GER needs to be increased. The question is will poorer countries be able to do so sustainably. For assessing the capacity of developing countries to allocate significant public funding for higher education, the growth of public expenditures on higher education and GDP per capita over time in Republic of Korea is presented in Figure 4.20. In 1976, when GDP per capita of Korea was US$800, which is comparable to current GDP per capita of Nepal, Korea's public expenditures on higher education as a share of GDP was 0.3%, which is comparable to that of Nepal of 0.33% in 2015/16. Public expenditures on higher education as a share of GDP increased as GDP per capita increased, which has reached 1.05% of per capita GDP in 2015. Since the level of technology is around 1976 was relatively low there was no need for high spending on higher education. But at present the Nepal's public expenditures on higher education of 0.33 percent of GDP per capita would not allow Nepal to compete in the global economy as indicated by the level of expenditures in India and Vietnam (Figures 4.21 and 4.22), which are much higher. In 2006, when India's GNI per capita of US$790 was comparable to Nepal's GNI per capita of US$730 in 2016, India's public expenditures on higher education as a share of GDP was 0.63%. Between 2008 and 2015, when the GNI per capita of Vietnam increased from US$1,000 to 1,990 the least public expenditures on higher education as a share of GDP was 0.66% during this period.

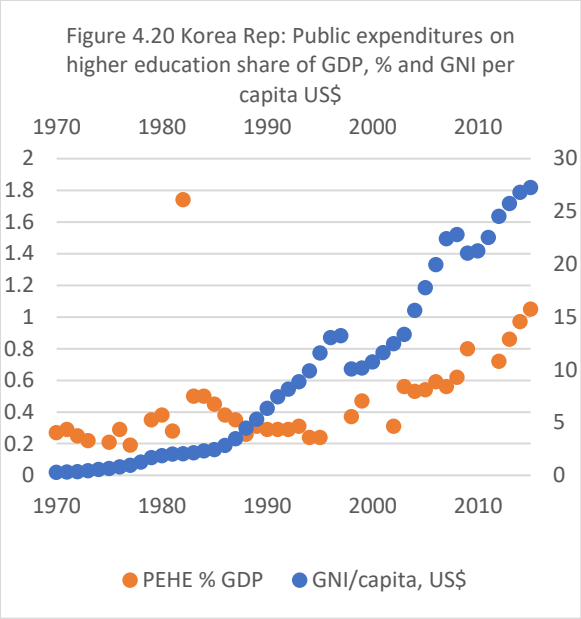


Figure 4.20 Korea Rep: Public expenditures on higher education share of GDP, % and GNI per capita US$

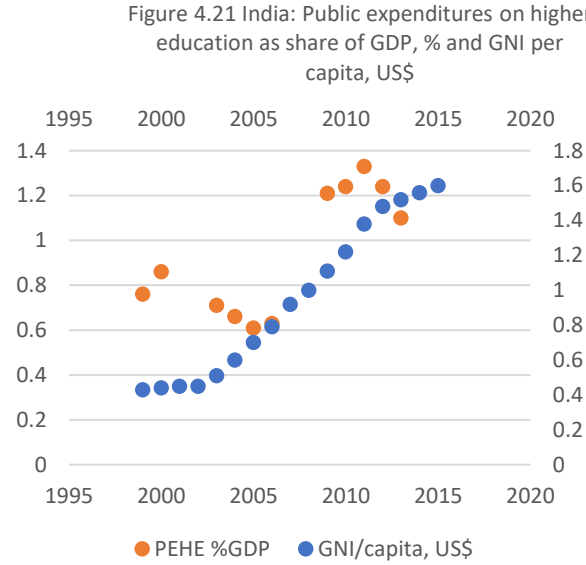


Figure 4.21 India: Public expenditures on higher education as share of GDP, % and GNI per capita, US$

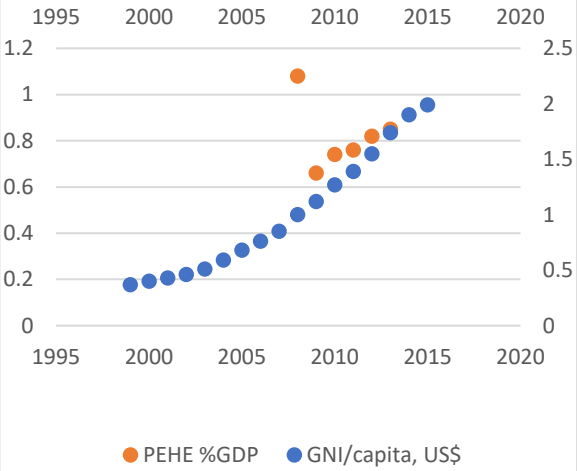


Figure 4.22 Vietnam: Public expenditures on higher education as share of GDP, % and GNI per capita, US$

219. It is obvious that developing countries like Nepal needs to increase their public expenditures on higher education to have a chance of competing in the globalized economy. The question is whether they will be able to do so. As seen from Figure 4.23, India's public expenditures on education are at the same level as that of Nepal. Between 1999 to 2013, while India's public expenditures on education as a share of GDP was within the range of 3.09 to 4.35% (GNI per capita range US$ 430-1520) Nepal's share, between 2006/07 to 2015/16 was within the range of 3.34 to 4.63% (GNI per capita range US$ 340-730). Between 2008 to 2013, Vietnam's public expenditures on education as a share of GDP was within the range of 4.81 to 5.66% when its GNI per capita increased from US$1,000 to 1,740 (Figure 4.24). Given that sub-sectoral needs of the education sector of Nepal are comparable to those of India and Vietnam, Nepal should be able increase public expenditures on higher education to about 1% of GDP. The commitment of the ruling party expressed in its manifesto to increase the share of education in public expenditures to 20% should give a space for this increment.

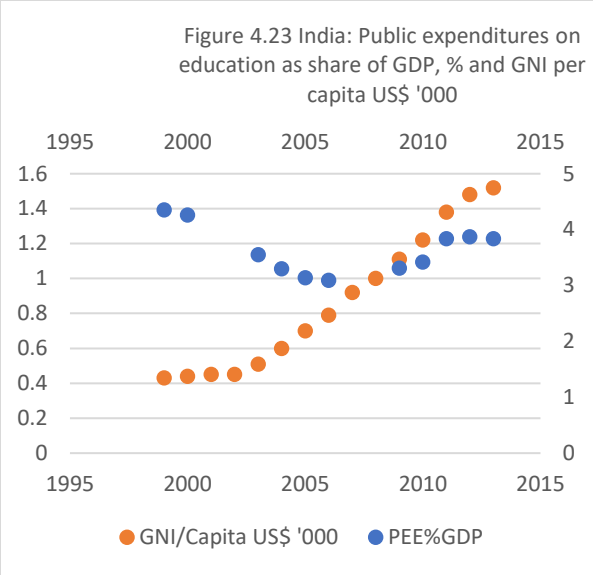


Figure 4.23 India: Public expenditures on education as share of GDP, % and GNI per capita US$ '000

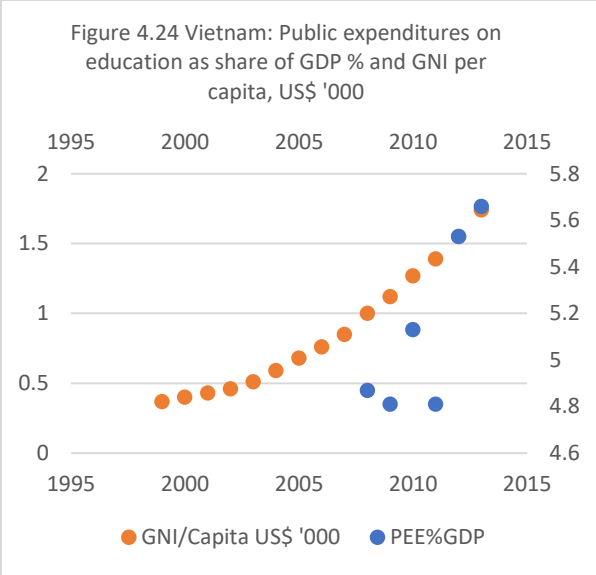


Figure 4.24 Vietnam: Public expenditures on education as share of GDP % and GNI per capita, US$ '000

220. Experience shows that countries have attained the same level of tertiary GER with different level of public expenditures depending upon the policy choices they have made. In 2014, Ghana's public expenditures on higher education as a share of GDP of 1.13%, which was higher than that of Republic of Korea of 0.97%, but Korea was able to attain significantly higher GER of 94.2%

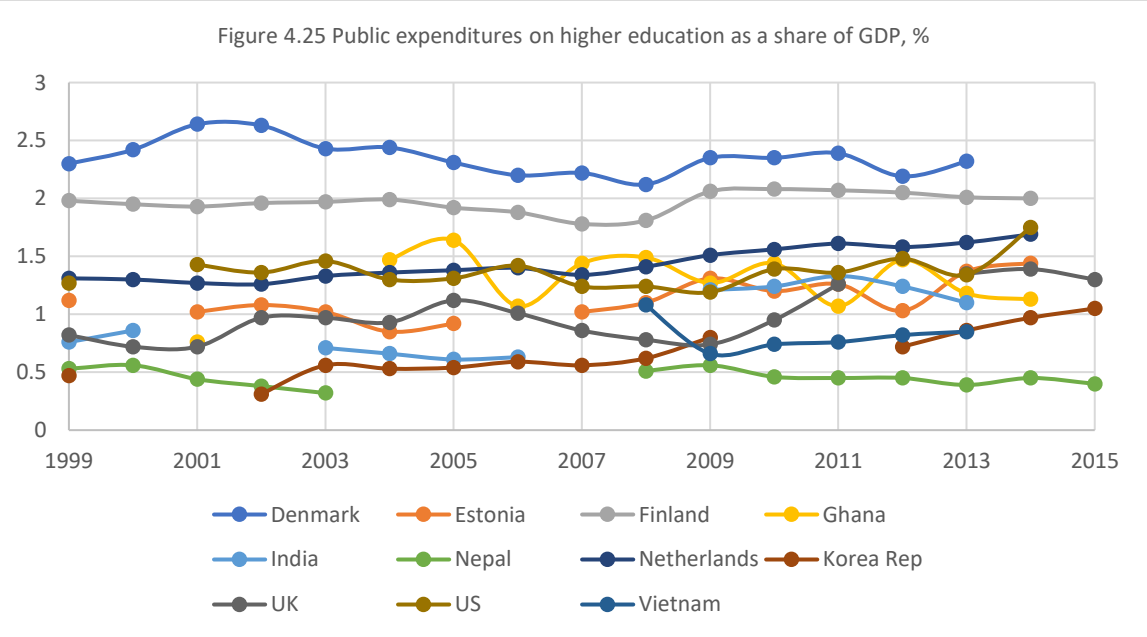


Figure 4.25 Public expenditures on higher education as a share of GDP, %

compared to that of Ghana of 15.9% (Figure 4.25). Denmark is among the countries with highest public expenditures on higher education as a share of GDP, which was 2.32% in 2013. But other countries have been able to attain similar high tertiary GER with much less public expenditures – Finland – 2.01, Netherlands – 1.62, and US -1.34. And the US and the UK has the same level of public expenditures - 1.35% for UK compared to 1.34% for the US in 2013. But the tertiary GERs of the US and UK are wide apart in 2013 with 56.9% for the UK compared to 88.8% for the US.

Chapter 5 Addressing the Challenges

221. Policy challenges for enabling the higher education system to deliver the desired outcomes for higher education identified in Chapter 3 have been identified in Chapter 4. Interventions for addressing these challenges and strategies for implementing them are discussed in this chapter.

Dismantling the Affiliation System

222. The system of affiliating campuses is one of the most significant hurdles for their academic excellence, and hence an urgent initiative is required to move away from the system of affiliation to that of autonomous HEIs. But there are formidable challenges for taking such an initiative and implementing it successfully. While the first set of factors – values or perceptions or preferences – associated with these challenges relate to the lack of understanding of the importance of this reform and the second set with the vested interests in retaining the existing system.
223. The key manifestations of the lack of understanding of the importance of the reform are: a. the perception that the quality of higher education is reasonably good; b. the lack of clear realization of the role of higher education in driving the socio-economic development of the country; c. the belief that the centralized examinations are helping to ensure the quality; and d. the belief that campuses do not have capacity to function autonomously. The key manifestations of the resentment to this reform because of the vested interests are: a. the strong preference of politicized teachers to see the size of TU maintained in spite of its unmanageable size because its large size serves as a platform for pursuing their political agenda; and b. the proposal, included in the higher education policy, to further centralize the recruitment of university teachers by establishing a University Teacher Service Commission similar to the Teacher Service Commission for schools so that politicized teachers get greater freedom to pursue their agenda by weakening their accountability to the university management [GON.2015].
224. For dismantling the affiliation system, a higher education act should be promulgated with a provision for dismantling the affiliation system. This act should have the following provisions, among others:
    a. Establishing all new HEIs – public, community and private - as universities without powers to affiliate campuses;
    b. Granting full autonomy – academic, administrative and financial - to all constituent campuses within the specified time frame;
    c. Granting academic autonomy to all accredited affiliated campuses;
    d. Establishing all new constituent and affiliated campuses as autonomous campuses;
    e. Granting university status to all accredited constituent and affiliated campuses meeting specified requirements.
225. Because of the urgency of dismantling the affiliation system initiatives should be taking within the existing legal framework to dismantle it. The first step in the direction should be a policy decision to stop establishing new affiliating universities. This decision can be taken at the Cabinet level.
226. The current model of constituent campuses is in essence an affiliation system. No new constituent should be established under the current model. All new constituent campuses should be

established as autonomous campuses with powers to formulate curriculum, deliver instruction consistent with the curriculum and administer final examinations. The role of the university should be limited to supervision and certification of the degree. A policy decision to this effect can be made through amendments to university rules within a framework of a policy adopted by the Cabinet. A similar decision needs to be made with reference to establishment of new affiliated campuses.

227. The next step for dismantling the affiliation system should be gradual conversion of affiliated and constituent campuses into autonomous campuses. This issue is covered in the paragraph related to campus autonomy.

Promoting Autonomy of Campuses

228. Experience of promoting autonomy to date shows that university level initiative would not yield expected results at a desired pace. Since university acts do not preclude granting greater autonomy to campuses a policy decision to this effect can be made through amendments to university rules within the framework of a policy adopted by the Cabinet. Autonomy should be granted to all constituent campuses except for those to be directly administered by the university central management.
229. The Rules governing autonomous campuses should have provisions for the following:
    a. To form governing boards with majority of external stakeholders and chaired by external stakeholders, with authority to appoint campus leadership, in all constituent campuses.
    b. To grant administrative and financial autonomy to all constituent campuses, and channel funds from the UGC directly to the campuses.
    c. Granting academic autonomy to all constituent campuses.
    d. Granting academic autonomy to all accredited affiliated campuses.
    e. Amend universities Rules to remove provisions compromising administrative and financial autonomy of community and private campuses.

Putting in Place a Clear Accountability Framework for HEIs

230. Apart from casual comments from the government about the poor performance of universities and equally casual defense of the existing performance by universities a rigorous evaluation of the performance of the higher education system with evidenced-based recommendations for improvement of the performance has never taken place. Reports of education or higher education commissions, which have been formed from time to time, represent a sort of compilation of opinions rather than a coherent set implementable actions aimed at the achievement of clear goals. Apparently because of this very few recommendations of such commissions have been implemented and borne the desired fruits.
231. In the absence of clears goals for the higher education system, the government has not been able to set clear goals to universities as well. This in turn has relieved the university leadership from the accountability. This problem has been exacerbated by the provisions in university acts giving the space of the government to influence executive decisions of universities. Among such critical

provisions are the power of the government to appoint university leadership and the blanket power to issue directives.

232. The following provisions in university acts would help to establish a clear accountability framework for them:
    a. A Board of Trustees (BOT) accountable to the Government and responsible for supervision of a university is to be appointed by the Government.
    b. The BOT is to consist of mainly non-government trustees and few government and university representatives. A conflict of interest in the supervision of the university by the government is to be entirely avoided then it would be better to exclude government representatives in the BOT. If government representatives are to be included the BOT the representation should be of the high level so that the autonomy of the BOT from the government is not compromised.
    c. The BOT's responsibilities should exclude engagement in day to day operation of the university and its function should be limited to appointment of the university head accountable to the BOT, approving Rules, approving annual work plan and budget, approving audit report and monitoring performance of the university among others.
    d. To give to the BOT the flexibility for reforming the governance and management of the university the university act should be prescribe details of internal university governance and management framework of the university.
    e. All executive powers of the university should be vested on the university head with a provision for delegating authority.
233. The lack of clear accountability framework is also a serious problem with constituent campuses. Constituent campuses of the current model until they are phased out should also have a clear accountability framework similar to that of universities. The accountability framework for campuses may be established by amending university Rules.

Freeing Appointment of HEI Leadership from Political Influence

234. The most potent tool for securing political influence of ruling parties in universities has been the provision for appointment of Vice-Chancellors, Rectors and Registrars by the Chancellor, Prime Minister, of universities from a short list recommended by a search committee chaired by the Minister of Education [TU. 1998]. And the rather vague prerequisite qualification for Vice-Chancellors, which is defined as "an individual who has attained academic excellence" [TU. 1993], has given ample latitude for appointing individuals based on political expediency. All political parties have been recognizing damages to universities and campuses being inflicted through politicization of appointments to leadership positions through public statements. Yet no party has yet taken an initiative to move away from appointments guided by political expediency.
235. The appointment of the university leadership based on political expediency has been one of the most damaging factors for university excellence. The provision for the appointment of a non-political BOT proposed above should mitigate this problem. But the appointment a non-political BOT remains a challenge since for public universities it will have to be appointed by the government. Therefore, the government may entrust recommendation of BOT members to a non-political Search Committee comprising of three or five members. It may easier for the government to form a non-political Search Committee than a BOT if qualifications for the Search Committee

members is robustly defined in the acts. To reduce the chances of appointment of the university leadership under a political influence a provision can be made in the act to fill vacancies in the BOT by the remaining BOT members themselves making the BOT self-perpetuating.

236. For existing universities, should the appointment of a non-political Search Committee become infeasible, it can be formed through an election of its members by an electoral college of the relevant universities. In this case the electoral college should comprise of professors with exception academic standing as evidenced by their publications in indexed papers.
237. For freeing the appointment of the university leadership from political influence in non-government universities the appointment of university leadership should be left to their BOT, and the formation of the BOT should be left to the promoters/founders of the university. The provision for the appointment of the KU leadership by the government has seriously compromised its autonomy. The widely held view that the government needs to be represented in the BOT so that it can have better oversight of the university may not hold true, first, because it may constitute a conflict of interest for the government to question decisions of the BOT, in which the government is represented and, second, operation of the university can be evaluated through relevant documentation and other information.
238. The political influence in appointment of the leadership is also deep-rooted in constituent campuses. The approach similar to that for universities should also be adopted for constituent campuses. Provisions for mitigating political influence in the appointment of the leadership may be introduced by amending university Rules guided by a government policy in this respect.

Giving Decisive Role to External Stakeholders in Governing Bodies

239. Universities are funded by the public treasury to serve public interests. But increasingly they are serving interests of politicized faculty and administrative staff more than that of the public. This has happened because of the marginal role of external stakeholders in the university councils. Although university councils are large and are represented by a wide variety of external stakeholders these stakeholders have not been able to safeguard public interests because of several factors. First, the business procedures of the university councils, which are under the total control of the university management, make it virtually impossible for external stakeholders to influence the proceedings of the councils. Second, external stakeholders are in minority, which makes it difficult for them to break vested interests of the internal stakeholders. Third, both the positions of the chairperson and member-secretary of university councils are filled by the government and university management respectively, which marginalizes the role of external stakeholders. To protect public interests there is a practice of assigning the chair of governing boards to external stakeholders. For example, the governing boards of National University of Singapore, US universities and universities of Netherlands, and IITs are chaired by external non-government stakeholders. Nepal should consider assigning the positions of the university council chairperson to external stakeholders, allocating majority membership in the council to external stakeholders, and assigning a secretary from among non-managerial staff by the BOT.
240. To mitigate the existing marginalization of public interests, which has been observed across universities, the following provisions should be included in university acts:
    a. The BOT should have majority of external stakeholders and chaired by an external stakeholder.

b. The proceedings of the BOT should be within the control of the Chairperson. For making this sure the leadership of the university should not be assigned the position of the Member-Secretary of the BOT.

Expanding STEM Education

241. From 2007/08 to 2015/16 the share of technical faculties in the total higher education enrolment increased from 12.7% to 20.3%. This increase is partially due to the decrease in the enrolment in the faculties of Humanities and Social Sciences and Education with resulting decrease in the total higher education enrolment. Expanding science and technology education is costly and seldom possible without determined efforts from the government. Considering the critical importance of the high share of STEM for economic growth practically all countries have prioritized expansion of STEM. There are serious hurdles for expansion of S&T education. The government has not been able to prioritize its investments to STEM education – around 68% and 77% of the engineering and medical education enrolment capacity is in the private provision. Higher education enrolment expansion is primarily taking place in the non-government sector. Because of the limited capacity of community campuses in making investments required for STEM education and hurdles for getting approval for STEM programs they been increasing enrolment mostly in non-technical areas like HSS, Education and Management. Policies non-conducive to expansion of STEM education have also discouraged private investment, particularly, in engineering and medicine.
242. The following are the critical interventions for increasing the share of STEM areas in the higher education enrolment to 50%:
    a. The share of recurrent expenditures should be increased from about 40% in 2016 to at least 70-80% as early as feasible.
    b. The public investment on STEM areas should be increased.
    c. Existing public expenditures on non-STEM areas should be diverted to STEM areas following a planned strategy.
    d. It is highly unlikely that the share of STEM enrolment could be increased to 70% solely relying on expansion of STEM in constituent campuses. Therefore, hurdles for private sector entry to STEM area should be removed, among others, by withdrawing the current requirement for LOI to be cleared by the MOEST.
    e. Streamlining the approval process for capacity expansion of existing campuses by making it transparent and regular.
    f. Providing incentives to HEIs for increasing the enrolment in technical areas.
    g. Providing financial support for community campuses and not-for-profit private campuses for expansion of STEM enrolment.
    h. Increasing the share of students studying and science and mathematics at grades 11 and 12.

According a High Priority to Generation of New Knowledge and Technology

243. Given the unprecedented acceleration of the pace of creation of new knowledge and technology, and their use for the benefit of the mankind it is no longer possible for nations to prosper without developing the capacity for generation of new knowledge and technology. Universities, especially in developing countries, play a central role in supporting socio-economic development by availing

new knowledge and technology to enterprises. This role of universities is yet to be realized in Nepal. For example, TU campuses were envisaged as teaching institutions leaving research functions to central departments. And it is not mandatory for each faculty to get engaged in research. The concept of teaching only campus is obsolete so is the obsolete the notion of professors not engaged in research because countries cannot thrive by imparting an obsolete higher education that is higher education not enriched by the state of art knowledge in the discipline but based merely on the textbook information.

244. Three major challenges for promoting research are the low share of post-graduate enrolment, the lack of adequate funding for research and incentives for faculty research. Campuses should be encouraged to start and expand PG enrolment by providing incentives, including support for students.
245. The UGC has developed a good capacity for competitive funding of research projects with assistance from SHEP and HERP. The research funding by the UGC has produced impressive number of publications in peer reviewed and indexed journals, which serves as an evidence of the value of research outputs. Therefore, the government should expand research funding by complementing donor funds during the project period and maintaining it after donor funding ceases. Nepal should aim at gradually increasing the share of funding for RDI as a share of GDP to about 0.4% of the GDP within 10 years, which is equal to that of Vietnam in 2018. To professionally handle a large research funding, it is recommended to establish an autonomous agency for research funding.
246. To provide incentives to the faculty for their engagement in research the weightings for research outputs needs to be increased both for recruitment and promotion to faculty positions. The recent example of research excellence-based faculty recruitment/promotion in TU could serve as a model for initiatives in this direction.

Accelerating Quality Assurance and Accreditation of HEIs

247. Quality assurance and accreditation (QAA) was initiated by the UGC in 2007. After a decade 5 out of 98 constituent campuses, 20 out of 532 community campuses and 1 out of 777 private campuses have been accredited. This dismal performance indicates that QAA has not received due priority. The UGC has recently decided about mandatory participation of all HEIs in the QAA process within five years. But based on the capacity of the UGC, and the fringe nature of this activity within the UGC, it is unlikely that this target will be met. In addition, the inherent conflict of interests between the funding and quality assurance mandates of the UGC makes it challenging for the UGC to credibly shoulder this responsibility. The need for establishment of an independent agency for QAA is well recognized. This has been confirmed by the Higher Education Policy 2015.
248. For ensuring that graduates produced by Nepali HEIs meets at least minimum standards and assuring international recognition of degrees awarded by Nepali HEIs the following interventions are required:
    a. The current framework of QAA, which is designed for individual campuses but not for the universities, cannot fully ensure the quality of graduates as the assessment does not adequately cover curricular, examinations, academic calendar and faculty standards aspects of academic programs. Therefore, QAA of universities should start as early as feasible.

b. The mandatory requirement for accreditation of HEIs every five years should be strictly implemented. Non-compliance with this requirement should have consequences for HEIs.
c. An independent agency for accreditation should be established at the earliest possible date.

Nurturing the Non-Government Provision

249. There are a number of reasons why nurturing non-government provisions – community and private campuses - will be in the interests of the country. First, because of the financial constraints it would not be possible to attain a high participation rate in higher education required to have competitive edge in the global economy relying on constituent campuses alone. At present, the non-government provision accounts for over two-third of the total higher education enrolment. There is more scope for enrolment increase in the non-government sector than in the government sector. This situation is not unique to Nepal. In India, 73% of colleges are privately managed, of which 58% are unaided – similar to private campuses in Nepal - and 15% are aided – similar to community campuses in terms of its not-for-profit nature but different in terms of the financial support from the government towards operating costs, which is substantially higher than community campuses [MHRD. 2013]. Asian countries with very high shares of private sector enrolment are Republic of Korea (80.1%), Japan (77.4%) and Indonesia (70.9%). Socialist countries like China and Vietnam also have sizable enrolment in the private sector – 19.9% and 10.4% respectively [ADB.2012]. And Kazakhstan, a former Soviet Republic, has the share of 46.5% [OECD.2007].
250. Second, it would not be prudent to rely heavily on constituent campuses to deliver higher education of high quality and relevance in the short- to medium-term due to entrenched governance problems. Readiness of students to pay high fees at private colleges hint that they perceive education at private campuses of being higher quality and relevance than that of constituent campuses. The high rate of accreditation of TU community campuses compared to constituent campuses – 16 community campuses accredited compared to 3 constituent campus/schools – indicates that community campuses are more conscious about quality than constituent campuses. The ability of community campuses located at proximity of constituent campuses to attract students also indicates at the public satisfaction with the quality of community campuses.
251. Overall TU is not able to maintain basic academic norms like academic calendar and delivery of all scheduled classes. This is holding back the progress of non-government provision. Should community and private campuses receive academic autonomy they should be able to deliver even better-quality education. Their interest in enhancing the quality of education is demonstrated by the fact that three community campuses have been granted academic autonomy while none of the constituent campuses has applied for this status.
252. Third, the private provision is producing human resources at much lower costs to the public treasury compared to the government provision. While per students grants for constituent campuses is around Rs.48,000 per year it is only Rs.3,000 per year for community campuses. For private campuses there is no public subsidy.
253. Fourth, there may be a case for relying on non-government sector as well for high profile research-oriented universities. International experience indicates that public universities as well as not-for

profit-private institutions have excelled in research, development and innovation (RDI). In the US not-for-profit private universities are outperforming public universities. India is also trying to tap the potential of private universities in RDI. MHRD has solicited proposal from public and private universities aspiring to develop into world-class universities [MHRD. 2015].

254. Fifth, in the market economy the demand for human resources cannot be predicted with accuracy, hence, HEIs should be able to adjust the supply as demand changes. Private and community campuses have better ability to adjust the supply of graduates as the market demand changes than constituent campuses. Hence, maintaining a good share of private and community campuses should be advantageous.

Articulating Clear Policies on Non-Government Provision

255. Both Higher Education Policy 2015 [GON.2015] and TU Regulations [TU.2017] recognize community campuses and private campuses as providers of higher education on their own rights in addition to constituent campuses. The Higher Education Policy does not envisage conversion of community campuses into constituent campuses. There was no policy of conversion of community campuses into constituent campuses prior to the approval of the Higher Education Policy as well. Yet from time to time community campuses have been converted into constituent campuses. The first conversion of constituent campuses into community campuses took place in 1971 as a part of implementation of the New Education System Plan. Then all 45 community campuses were converted into constituent campuses, and they formed the backbone of public higher education [Pandey B.D. 1978]. There is little doubt that this conversion resulted in decline of these campuses primarily due to the poor governance. The country lost premiere colleges like Amrit Science College and Shankar Dev College. If community campuses were allowed to chart their own destiny Nepal's higher education would have only gained. Even though the bitter consequences of the conversion were obvious three more community were converted into community campuses 1997 to 2011. The results were no different. Recently, the government has decided to convert 25 community campuses, including the one which has been accredited and obtained the status of academic autonomy, into constituent campuses. All these conversions appear to be guided by political expediency rather than by the motivation to improve quality of education. If this practice continues Nepal will not be able to tap the significant potential of non-for-profit community campuses. Therefore, in the interest of higher education development the government should take a firm policy decision of not converting community campuses into constituent campuses and adhere to it.

256. The main factor motivating the faculty of community campuses to be attracted to get their campuses converted into community campuses is the lure of entering the permanent service in the public sector. There are also downsides of the conversion, which are the loss of community control and ownership of the campus, and administrative and financial autonomy of the campus resulting in the decline in the accountability and performance of the campus. Yet it is hard for the campus management or the community to withstand the faculty pressure. Based on the discussion with community campuses the push for the conversion could be significantly reduced if the government agrees to increase recurrent costs grants to community campuses, which are now negligible, to the level of around 25 to 40% of the per capita grants to constituent campuses. The proposition of increasing per capita grants to constituent campuses is an attractive option from the public interest perspective because this would allow the government to avail services of

higher quality than that of constituent campuses at a lower cost to the public compared to that of constituent campuses. If the government decides to increase the subsidy level for community campuses there is a risk that it may lead to compromise in autonomy of community campuses. While the government should demand greater accountability in lieu of funding but not compromise their autonomy because the loss of autonomy will compromise the strength of community campuses. It would be better to leave the funding level of community campuses unchanged if increasing it would entail the reduction in their autonomy.

257. Advocates of the conversion of community campuses to constituent campuses argue that this has a merit on equity grounds implying that students can study in constituent campuses at lower fees compared to that of community campuses. This does not hold universally true. There are instances when fees of both types of campuses are comparable, and also instances when students are ready to pay higher fees at community campuses even when they have an option of studying in constituent campuses because of the perceived better quality of services of community campuses. If the government is indeed keen to reduce the burden of fees on students this can be achieved better by targeting needy students with financial support rather than regulating fees of community campuses, and thus compromising their autonomy.
258. The above deliberations are not to preclude establishment of new constituent campuses. They should be established for the purpose of delivering services, which are better delivered by constituent campuses than community campuses or cannot be delivered by community campuses. For example, science programs are not available in community campuses located at rural areas. Similarly, community campuses in rural areas are too small to attain financial viability and deliver quality education. Establishing new relatively big constituent campuses in rural areas providing, among others, technical and other capital-intensive programs with a view to deliver high quality programs would be fully justified. These objectives cannot be attained by converting small in community campuses rural areas into constituent campuses as evidenced by the experience of Dadeldhura Campus converted from community to constituent. New constituent campuses should be established guided by a clear objective, based on a feasibility study and committing required resources. Supporting small non-viable community campuses by converting them into constituent campuses would be unscrupulous spending of public resources.
259. Two types of private HEIs – for-profit and not-for-profit – are operating in other countries. But private HEIs operating is Nepal are almost exclusively for-profit type. These two types of HEIs serve distinctly different purposes and also financed differently. While for-profit type HEIs financed exclusively from student fees, not-for-profit type HEIs financed both from philanthropic donations and student fees. If the purpose of for-profit HEIs is to make profit the purpose of not-for-profits HEIs is social service. While for-profit HEIs have helped to increase access to higher education at no cost to the public treasury not-for-profit HEIs have helped to nurture excellence in higher education. Most top-class universities in the US like Harvard, MIT etc. are not-for-profit entities. Nepal should articulate a clear policy to tap potential of both type of private HEIs.

Increasing the Share of Higher Education in Public Expenditures

260. Nepal stands no chance of competing in the global economy with public expenditures on higher education of 0.3-0.4% of GDP range. For example, Switzerland spends 3% of GDP on research alone. But given the inefficiency of utilization of scarce public resources available to the higher

education sector the increase in public spending needs to be made in tandem with reforms discussed in this note. Given the constraints associated with significant increase in the public spending maximum efforts should be made to mobilize as much as possible private resources. Based on the level of public spending of countries aspiring for rapid economic growth Nepal should aim at allocating within ten years at least 1% of the GDP for higher education, which is close to the share of higher education in public expenditures in India of 1.1% and 0.85% of Vietnam in 2013.

Shift from Input-Based Financing to Output/Outcome-Based Financing of HEIs

261. TU, which receives the lion's share of public financing, is implicitly funded based on number of teacher positions agreed between the GON and TU. For over a decade this number has not changed notwithstanding the change in enrolment. For example, the TU enrolment decreased form 384 thousand in 2013 to 284 thousand in 2015 but the number of teacher positions financed has not changed. This modality of financing does not provide incentives to TU for performance. To the contrary it has allowed TU to recruit faculty and staff on a permanent basis and retain them notwithstanding whether they are justified based on the work load. There are departments in TU where number of students is less than the number of faculty, and likewise there is overstaffing in the administration. The practice of permanent recruitment of faculty and retention of the recruited faculty independent of their work load has seriously compromised the ability of TU to respond to the changing demand for academic programs. For example, for past several years the enrolment in the faculty of HSS has been decreasing, whereas the enrolment in the faculty of management has been increasing. But TU has not been able to adjust number of faculty in these faculties commensurate with the change in the enrolment.
262. The culture of permanent recruitment with job guarantee till the retirement age independent of the work load or satisfactory performance is deeply entrenched. In spite of the serious challenges associated with this culture this issue has not become an agenda for discussion. Without addressing this issue, it will be hardly possible to enhance the efficiency of TU in a meaningful way. It is to be underscored that as long as GON continues fund TU based on number of agreed positions independent of the enrolment and other performance indicators TU would have no incentives for attempting to address this issue. Therefore, the GON needs to move away from inputs-based financing to output/outcome-based financing.
263. A shift from inputs-based financing to output/outcome-based financing is very challenging on two counts. First, permanent recruitment practice continues in the public service it would be extremely challenging to discontinue this practice in universities unless incentives are attached to this reform. Second, the government practice of guaranteed funding for staff salaries but not for other category of expenditures may lead to the legitimate resentment of universities to this shift. In spite of the challenges associated with the shift from inputs-based financing to output/outcome-based financing it would be hardly possible to meaningfully improve the efficiency of public spending on higher education.
264. The government has recently started to fund, albeit at a very low level, recurrent costs of community campuses based on a formula which includes mostly input-based indicators. Since the funding is not linked to staff positions there is a good opportunity to fund community campuses

entirely based on output/outcome-based indicators. This should help to enhance efficiency of funding for community campuses.

265. It is extremely challenging to implement reforms associated with a shift from input-based to output-based financing. But there are examples of such reforms one of them was implemented in Kazakhstan. "In 1999, the government decided to replace the direct recurrent budget transfer to public tertiary education institutions with voucher-like education grants that beneficiary students can use to enroll in the public or private institution of their choice. But since government funding for recurrent expenses is sufficient to cover only about 20% of all full-time students in public universities and institutes, the other students enrolled in these institutions have to pay tuition fees equivalent to the amount of education grants"[OECD.2007]. In Mongolia, the government no longer fund salary of teachers. HEIs have to raise funds for salaries from student fees. These examples show that even radical reforms are possible when there is a strong political will [World Bank.2010].

Setting a Clear Policy on Student Fees

266. The Constitution states the following with respect to access to higher education: a. citizens with disabilities and economically indigent citizens shall have the right to get free higher education in accordance with law; b. provision for free education with scholarship, from primary to higher education, shall be made by law for Dalits; and c. to make higher education easy, qualitative and accessible, and free gradually [CAS, 2015]. The Higher Education Policy articulates the policy of cost sharing in higher education. Therefore, in short- and medium-term there is no policy obstacle to charging fees to raise necessary resources in constituent campuses. But in practice tuition fees have been and continue be a sensitive issue in spite of the fact that many programs in constituent campuses charge high fees, which are, in some instances, at par with fees at private campuses.
267. Since initiatives to raise fees across TU constituent campuses have been meeting serious resistance from students, fees have been raised through campus level initiatives. With respect to efforts to increase fees to meet funding challenges three approaches are being observed. The first approach is to enroll both full fee-paying and heavily subsidized fee-paying students for the same program. This was the approach was introduced at the Institute of Engineering (IOE) in 1997. In this approach subsidized and full fee-paying students get education of the same quality. This approach has helped to enhance or maintain the quality of programs across the campus in spite of the serious shortfall in public funding. The major advantage of this program is avoiding segregation between affluent and needy students. This approach has been copied by a number of institutions including Ayurveda Campus.
268. The second approach lies in starting new high-quality programs charging high fees with a view to recover full costs. In this approach existing programs or regular programs charging low fees are not improved, which entails offering high quality programs to affluent students and poor-quality programs to others. An example, of this approach is offering a relatively inferior Bachelor's in Business Studies program to regular fee-paying students and relatively superior Bachelor's degree in Business Administration program to full fee-paying students. This approach is more widespread than the first approach.
269. The third approach, which is dominant, is to increase fees for the existing programs marginally by charging additional fees through campus level initiatives. Although this has helped to some extent

ameliorate the funding gap the additional revenues generated have not been enough to meaningfully improve the quality of programs.

270. Low fees in constituent campuses for regular programs have made it difficult for community campuses to deliver good quality programs by charging adequate fees mainly for two reasons. First, since community campuses do not have academic autonomy, they are not able to offer market responsive programs and have to continue outdated academic norms, standards and practices followed by the affiliating university. Second, because of the perception that not-for-profit community campuses should deliver programs at a price affordable to every one based on the widely shared value that it is the obligation of the state to make higher education accessible to all citizens.
271. The recent TU decision to include a provision requiring tuition fees of community campuses to be approved by the Executive Council in Rules for Affiliated Campuses, 2017 has further compromised the ability of community campuses to raise required resources from student fees. This decision is based on the provision of the TU Act, which mandates the Executive Council to approve tuition fees. Contextually, this provision of the act is meant for constituent campuses receiving grants from TU, and not for community campuses, which do not receive TU grants. This misinterpretation of the act indicates at the tendency of the management to control community campuses than grant greater autonomy to them. The provision for regulation of fees of community campuses, if implemented, is bound to have crippling effect on them.
272. Though private campuses delivering high quality programs have been able to charge high fees the debate on fees charged by private campuses persists because of the widely held value that education services should not be delivered for profit and, consequently, the profit has to be regulated. This value is being reinforced by the government decision to fix price ceiling for medical programs. While private education needs to be regulated for protecting the interests of consumers, fixing the price for education, when education services are being delivered across the globe on a competitive basis, may lead to unintended distortions leading to decline in private education, which is the largest provider of higher education in Nepal.
273. Though there are public benefits to higher education private benefits outweigh the public benefits. Therefore, there is no justification for not charging the cost price for those who can afford in case if the public funding is not enough to provide free or cheap education to everyone as long as those who cannot afford but eligible for enrolment receive financial assistance. In this context, in the interest of promoting expansion of quality higher education, it would make sense to allow all types of campuses to charge cost price with provision for need-based student financial assistance rather than trying to impose fees for higher education.
274. The suggestion being made here is against the entrenched ideological position that most political parties share, which is "education should not be commercialized". It would not be possible to implement the proposed suggestion without extensive evidence-based debate. This debate is worth because without a rationale policy on fees it would not be possible to achieve the outcomes of higher education required for supporting the journey towards prosperity of Nepal.
275. The notion that "education should not be commercialized" is a value shared to various extent by many societies. In this sense Nepal is not an exception. As many others Nepal has not been strictly enforcing this value. But dubious interpretation of this value has harmed the expansion of education as a whole and higher education in particular. The validity of a value needs to be judged against the goal it is supposed to help achieve.

276. At present, more than one third of the higher education students are being served by for-profit private campuses. The private sector has been investing in the education sector because the profit it can make from the sector is competitive with that of other sectors. If the government succeeds in capping the profit that can be earned, which has been the intention of the government though not successful so far, the private sector would withdraw its investment in the education sector. The consequences of such an eventuality would be an increase in the outflow of resources for higher education due to exodus of more students for higher education abroad, more constrained access to higher education and deterioration of the quality of higher education. These consequences will only hurt the aspirations of people to build a prosperous society.
277. In 2014/15, universities generated £95 billion for the UK economy, of which £25.8 billion was generated by international students [Bothwell E.2017]. Sticking to the value that education should not be commercialized would also mean losing a significant potential for creation of wealth. Therefore, the government should have courage to adopt a policy on fees that is feasible rather trying to stick to a value, which does not help to achieve the goal. An example of an extreme but a feasible fee policy implemented in Mongolia is to fund the entirety of salaries by tuition fees, where salaries constitute about 60% of total expenditures on higher education [World Bank.2010].

Mainstreaming and Expanding Needs-Based Student Financial Assistance

278. As discussed in Chapter 3 two bottom quintiles are severely underrepresented in higher education. Their access to higher education is important not only on equity grounds but also for increasing the pool of bright of students in higher education. The need-based student financial assistance for needy but bright students, primarily available through the Student Financial Assistance Fund Development Board (SFAFDB), caters only a fraction of the needs. In addition, the amount of assistance available is grossly inadequate for technical education. The SFAFDB, a decade after its establishment, continues to rely only on donor funds, which raises the doubt about its sustainability. Based on the above, the government needs to mainstream the SFAFDB into the regular program of the government, increase allocation for student financial assistance, and administer all scholarships for higher education on need-based basis except some designed to attract very bright students.

Establishing Few New HEIs

279. Nepal has been making efforts to enhance the quality and relevance of higher education through reforms of HEIs supported by a number of World Bank Projects – Higher Education Project (HEP, 1994-2000), Second Higher Education Project (SHEP, 2007-14) and Higher Education Reforms Project (HERP, 2015-20). Undoubtedly these reforms have helped HEIs to modestly enhance physical infrastructure including laboratories, revise academic programs, introduce some market driven programs, initiate the replacement of annual programs by semester programs, sensitize HEIs about the modern trends of higher education reforms with special focus on institutional autonomy and accreditation, enhance internal revenue generation, nurture local accountability albeit modestly, introduce needs-based financial assistance for students and scale up competitive funding for research projects, and tap the potential of non-government provision – community

campuses – in a dramatic fashion. But none of the HEIs participating in reforms are likely to transform in foreseeable future into outstanding HEIs, which can help Nepali enterprises to gain competitive edge in the global economy by equipping them with new knowledge and technology.

280. Transforming mediocre universities into world-class institutions is a very difficult task primarily because this cannot be accomplished without changing the institutional culture, which can happen only in exceptional circumstances. Therefore, a number of countries have attempted to develop world-class universities by establishing new universities. A comparative study of successes in developing world-class universities by upgrading existing good universities – University of Chile, Pontifical Catholic University of Chile, Shanghai Jiao Tong University, Monterrey Institute of Science and Technology (Mexico), University of Ibadan (Nigeria), University of Malaya - and establishing new universities – Indian Institute of Technology Kharagpur, National University of Singapore, Pohang University of Science and Technology (South Korea), Hong Kong University of Science and Technology and Higher School of Economics (Russia) - has revealed that, "it is easier to reach academic excellence by establishing a new research university than attempting to upgrade existing one" [Altbach P.G. and Jamil Salmi. 2011]. The success of Pohang University of Science and Technology, which is a private university, indicates that replicating the success of private universities in the US may be possible in other countries too. Based on this it would be pragmatic for Nepal to aim at establishing a few universities with a view to develop them into world-class universities, while doing so opportunities for developing world-class universities should be opened to the private sector as well.

Higher Education Act

281. Based on the experience of initiatives to reform higher education it is crystal clear that critical reforms required to deliver higher education outcomes required for supporting Nepal's aspirations for prosperity would not be possible within the existing legal framework for universities. The draft higher education bill in the Parliament would not be fit for the purpose as it was not prepared with a view to enable higher education to support attaining Nepal's aspirations for attaining prosperity. The current practice of drafting bills, which entails an exercise to protect vested interests of powerful stakeholders rather than national interests, should be avoided while drafting a fresh higher education bill. To mitigate this challenge, first, the legislation should be formulated by a group of experts free from conflict of interests based on evidence, second, the proposed policies should be disseminated to all stakeholders in a transparent and easy to understand manner so that they are able to provide an informed feedback and, third, all stakeholders should be given opportunity to provide their inputs in the process of parliamentary deliberations on polices underpinning legislation.
282. The lead for higher education reforms should in principle be taken by the government and parliamentarians. But the obligation to inform them about the reform content lies with the academia, who are best placed to formulate the evidence-based reform content through rigorous scientific analysis.

Aligning the Higher Education System with the Federal Structure

281. Schedule 5 of the Constitution gives the Federal Government the mandate for central universities, and standards and regulation of higher education, and Schedule 6 gives the Provincial

Government for provincial universities and higher education [CAS.2015]. Diverse ideas are being considered in terms how the higher education system should be restructured to align it with the federal structure. All these ideas should be evaluated considering the need for serious reforms in the sector.

282. Research in the area of governance of higher education in federal states is scarce. Carnoy M. et. al. has concluded that each federalism is context nested and distinct, there are no general laws, and no models of optimal cases for higher education management for federal states. And it mentions that Australia, Russia, Brazil, India and Mexico have yet to find effective ways of consistently turning multi-level educational government into an asset in higher education [Carnoy M. et.al.2018]. Based on these observations it will take serious efforts and time to evolve a structure of effective management of higher education in the federal structure. Given the daunting challenges associated with reforms in higher education rapid transfer of responsibility for higher education to Provincial Governments would make reforms in higher education even more daunting if not impossible. In this context it would be desirable to sequence the transfer of responsibility for higher education to Provincial Governments in the following way:
    a. To Establish of non-affiliating universities funded by the Provincial Governments.
    b. To transfer of autonomous constituent campuses to Provincial Governments.
    c. To transfer of autonomous campuses upgraded to into universities to Provincial Governments.
    d. To transfer of selected universities under the Federal Government to Provincial Governments.

Chapter 6 Implementing Higher Education Reforms

282. Based on the review of the socio-economic development context of the country, international development trends, aspirations of Nepalese people for building prosperous, equitable and just society, creation of an environment conductive for political stability and articulation of the vision of Prosperous Nepal and Happy Nepali by the Government of Nepal (GON) it was proposed in Chapter 1 to set the economic development target of Nepal as becoming a high-income country by 2050. Based on the review of the role of higher education in development of countries of various income groups the critical role of higher education for socio-economic development in terms of enhancing the competitiveness of the economy by providing high quality human resources, knowledge and technology through RDI was underscored in Chapter 2. Higher education outcomes to be attained for transforming Nepal into a HIC were articulated in Chapter 3 based on the review of higher education outcomes of LIC, LMIC, UMIC and HIC. Challenges for attaining these higher education outcomes were identified in Chapter 4 based on the review of the status of higher education in terms of number of higher education institutions, their enrolment, governance framework, financing and quality and relevance. Policy interventions necessary for addressing the challenges identified in Chapter 4 were identified in Chapter 5. This chapter provides a guidance for packaging and sequencing the implementation of reform interventions articulated in Chapter 5.
283. Reforms proposed are grouped into four clusters: governance, financing, STEM and RDI, and quality and relevance. In each cluster reforms are sequenced into three phases - short-term (year and two), medium-term (three to five years), and long-term (six to ten years) as illustrated in Table 6.1. Each reform proposed comprise one or more policy interventions identified in Chapter 5. Though all types of proposed reforms are to be initiated within ten years they are not expected to expand across the whole sector. Another five to ten years may be necessary for expanding and consolidating them throughout the higher education system.

Table 6.1 Reform packaging and sequencing matrix

Phase 1 (year 1 and 2)	**Phase 2 (year 3-5)**	**Phase 3 (year 6-10)**
Governance		
All new universities will be established as non-affiliating universities under a new governance framework.	New governance framework established in at least three universities. Introduction of provision for establishment of community and private (for-profit and not-for-profit) universities.	New governance framework in place in all universities.
All new constituent campuses will be established with academic, financial and administrative autonomy under a new governance framework.	All new affiliated campuses will be established with academic, financial and administrative autonomy.	

Phase 1 (year 1 and 2)	Phase 2 (year 3-5)	Phase 3 (year 6-10)
Governance		
	New governance framework to be established in at least twenty constituent campuses.	New governance framework to be established in remaining constituent campuses.
		At least ten accredited constituent campuses operating under new governance framework will be declared universities.
	Affiliated campuses have full administrative and financial autonomy. Academic autonomy granted to at least twenty-five accredited affiliated campuses.	Academic autonomy granted to at least fifty accredited affiliated campuses. At least ten accredited affiliated campuses will be declared universities.
		At least twenty constituent campuses operating under new governance framework will be brought under jurisdiction of Provincial Governments.
		At least five public universities operating under new governance framework and ten community/private universities will be brought under jurisdiction of the Provincial Governments.
Financing		
Policy on increasing funding for higher education approved.		Higher education expenditures reach 1**%** of GDP.
	Funding based on output/outcomes introduced in few universities. A framework of HEI funding based on outputs and outcomes instead of teacher positions approved.	Funding based on output/outcomes introduced in all universities.

Phase 1 (year 1 and 2)	Phase 2 (year 3-5)	Phase 3 (year 6-10)
Governance		
A policy on higher education tuition fees approved.	The policy allowing HEIs to determine fees to meet the funding gap through tuition fees with provisions for financial assistance to needy students and fair contractual relationship between students and HEIs in place. The policy introduced in selected HEIs.	The policy implemented in all HEIs.
A policy on student financial assistance approved.	The allocation for student financial assistance increased by 100%. An autonomous regular government agency for student financial assistance established.	
STEM and RDI		
Policy aimed at encouraging expansion of STEM in non-government sector adopted by the cabinet. University Rules, procedures and practices amended/ changed.	Community campuses receive capital and recurrent cost support for expansion of technical education. Private not-for-profit campuses receive tuition support for enrolling needy students in technical education.	
Policy for prioritizing research, development and innovation approved.	Incentives for increasing the share of post graduate programs in place. All universities introduce promotion/ recruitment for faculty with high weightings on research accomplishments. An independent research funding agency established.	Research funding as a share of GDP reaches 0.3% of GDP. All promotion/ recruitment of faculty is based on high weightings for research accomplishments.
	Incentives for increasing the share of post graduate programs in place. Universities introduce promotion/ recruitment for faculty with high weightings	Research funding as a share of GDP reaches 0.3% of GDP. All promotion/ recruitment of faculty is based on high weightings

Phase 1 (year 1 and 2)	Phase 2 (year 3-5)	Phase 3 (year 6-10)
Governance		
	on research accomplishments. An independent research funding agency established.	for research accomplishments.
A new university designated to become a world-class university established.		
Quality and relevance		
QAA of universities initiated. Rewards and sanctions to HEIs for participating in QAA in place.	An independent quality assurance and accreditation agency established.	All HEIs are subjected to regular QAA process.

Governance

284. Reform interventions proposed in the governance area for the first phase are establishing new universities at the federal and provincial levels as non-affiliating universities and establishing new constituent campuses only as autonomous campuses. The governance framework for new universities should incorporate all policy interventions proposed for improving governance of higher education, which are a clear accountability framework, strong external accountability, autonomy and freeing appointments from political influence. This reform should lay the foundation for a new generation of universities and put an end to the practice of establishing universities without ensuring adequate financing hoping to finance it through affiliation incomes. This reform is critical because it would hardly be possible to dismantle the affiliation system if universities continue to affiliate new campuses. This reform if implemented with proper communication should not face significant resistance from stakeholders. Policies underpinning these reforms should be incorporated into the Higher Education Policy well in advance so that they are not interpreted as hurdles for establishment of new universities.
285. The governance framework for new constituent campuses should incorporate all policy interventions proposed for improving governance of higher education, which are a clear accountability framework, strong external accountability, autonomy in academic, financial and administrative matters, and freeing appointments from political influence. The funding for such campuses should be directly channeled from the UGC, and these campuses should be independent from universities in terms of personnel and financial management. And academic oversight should be limited to mentoring and ex-post reviews. This reform will open the path for these campuses to become universities. This intervention would stop the practice of establishing new campuses without feasibility studies and committing due resources. This reform if implemented with proper communication should not face significant resistance from stakeholders. Amendments to university Rules should be sufficient for this reform. But based on the experience the initiative for this reform is unlikely to come from universities themselves. Therefore, the UGC should take an initiative for amendment to university Rules with support from the Pro-Chancellor and Chancellor.

286. The governance reforms proposed for the second phase are governance reforms in three existing universities including identification of a couple of campuses to be directly administered by universities, introduction of a provision for establishing community and private – for-profit and not-for-profit – universities, establishing all new community and private campuses as autonomous campuses, new governance framework implemented in twenty constituent campuses, full administrative and financial autonomy granted to all affiliated campuses, and academic autonomy granted to twenty-five accredited affiliated campuses.
287. The new governance framework for universities chosen for governance reform should include all provisions for new universities. This reform will be a major initiative for enhancing accountability and excellence of universities. This reform would be a difficult reform, which is long overdue. Without implementing this reform higher education would not be able to support attaining the vision of Prosperous Nepal and Happy Nepali. This initiative would require amendments to university acts as well as promulgation of a Higher Education Act. This act also should have a provision for introduction of a provision for establishing community, private – for-profit and not-for-profit – universities.
288. The new governance framework for constituent campuses selected for governance reforms should be similar to that for new autonomous constituent campuses. Twenty campuses to be selected for this reform should include campuses being operated under governance/academic autonomy. Given that autonomy of constituent campuses has been widely debated for over a decade it should be possible to implement this reform with due communication and preparation. This reform will set a stage for enhancement of accountability and performance of constituent campuses. University Rules will have to be amended for implementation of this reform under the leadership of the UGC supported by the Pro-Chancellor and Chancellor.
289. The provision for full financial and administrative autonomy of affiliated campuses by revoking the current provision for determination of tuition fees and appointment of the Chairperson of the Governing Board by the TU Executive Council, among others, should help to strengthen the capacity of affiliated campuses by enhancing the ownership of stakeholders, mitigating political influence from the university and bring certainty in planning. The provision for establishment of all new affiliated campuses as autonomous campuses would be a major milestone in development of higher education, and it would encourage the owners to develop these campuses into universities by enhancing accountability and performance. Granting academic autonomy to fifty accredited affiliated campuses should help academic growth of these campuses. It should be possible to implement these reforms without any significant resistance from stakeholders by revising university Rules under an initiative from the UGC supported by the Pro-Chancellor.
290. The third phase of governance reforms includes establishment of new governance framework in all remaining universities, establishment of new governance framework all remaining constituent campuses, declaration of at least ten accredited constituent campuses operating under new governance framework and twenty accredited autonomous affiliated campuses as universities, granting academic autonomy to at least fifty accredited affiliated campuses, declaring at least ten accredited affiliated campuses as universities, bringing under jurisdiction of Provincial Governments at least twenty constituent campuses operating under new governance framework, five public universities operating under new governance framework and ten community/private universities.

283. The on-going transition from the unitary system to the federal structure of governance requires the mandate for higher education to be shared with the provinces. In this connection discussions are underway to decide universities to be transferred to provincial jurisdiction. Given the daunting challenges associated with reforms in higher education rapid transfer of responsibility for higher education to Provincial Governments would make reforms in higher education even more daunting if not impossible. In this context it would be desirable to sequence the transfer of responsibility for higher education to Provincial Governments in the following way:
    a. To Establish of non-affiliating universities funded by the Provincial Governments.
    b. To transfer of autonomous constituent campuses to Provincial Governments.
    c. To transfer of autonomous campuses upgraded to into universities to Provincial Governments.
    d. To transfer of selected universities under the Federal Government to Provincial Governments.

291. By the end of the third phase there may be up to fifty universities and up to one hundred eighty autonomous campuses, which would constitute a solid foundation for transformation of higher education to make it capable of supporting the country's vision. The universities envisioned by the proposed reforms would not necessarily be large in terms of enrolment or land area. But they would have capacity to sustainably deliver high quality education and research. There is a perception that a large number of public universities may entail wastage of scarce public resources. But this perception is not necessarily accurate. Any expenditures associated with a university functioning accountably and delivering excellence will be more than justified in terms of the value for money.

292. The right number of universities for a country is context specific. Republic of Korea and Netherlands are among the countries with relatively large number of HEIs – 436 and 89 respectively for population of 51 million and 17 million respectively. Based on this experience it would not be abnormal for Nepal to have around 150 to 200 universities. The rationale of a large number of universities is associated with a large number of campuses, of which most are in the non-government sector. It is unlikely that all existing campuses would be able to survive and develop into universities. As universities are strengthened many small campuses would close down because of the lack of students. As the reforms in the third phase are expansion of reforms initiated in the second phase and supported by the legislation already passed no significant opposition is expected from stakeholders but the need serious efforts to implement reforms should not be underestimated.

Financing

293. Reforms related to financing of higher education to be undertaken in the first phase include approval of policies on financing of higher education, tuition fees and student financial assistance. The policy on higher education financing, approved by the Cabinet, should articulate the intention of increasing higher education expenditures as a share of GDP to at least 1% by the end of the third phase. An increase in the share of higher education would imply a decrease in the share of other sectors. Hence, this share should be fixed within the framework of overall allocation of public expenditures across sectors, which would be a serious exercise.

294. The policy on tuition fees should, among others, include the following explicit statements:

a. higher education in government owned HEIs will be delivered on a cost sharing basis, and HEIs will be free to supplement government financing through tuition fees to meet the gap in public financing. While doing so they have to arrange funding for needy qualified students equivalent to full fee waiver for not less than 20% of the enrolment.
b. community and not-for-profit private HEIs will be free to determine fees. And they will be subject to public disclosure of fees, terms and conditions for providing services to students and audited statements of income and expenditures. While doing so they have to arrange funding for needy qualified students equivalent to full fee waiver for not less than 10% of the enrolment.
c. private for-profit HEIs will be free to determine fees. And they will be subject to public disclosure of fees, terms and conditions for providing services to students, audited statements of income and expenditures including payment of applicable taxes. While doing so they have to arrange funding for needy qualified students equivalent to full fee waiver for not less than 20% of the enrolment.

295. Determination of tuition fees is one of the contentious issues. Building a consensus on this issue would be challenging. But without duly resolving this issue it would not be possible to mobilize adequate resources for delivering high quality research and education. Considering the challenging nature of implementation of the proposed tuition fee policy it is proposed that the policy is implemented in selected HEIs in the second phase and extended to all HEIs in the third phase.
296. Increasing the coverage of student financial assistance for needy qualified students is a very benign program yet this program has not gained due traction in spite of the fact that this program started over 10 years ago and has proved its efficacy. The policy with respect to financial assistance should, among others, include a commitment to increase the funding for students financial assistance at least by 100% during the second phase and increase its coverage in the third phase so that all students from bottom two quintiles enrolled in technical higher education and at least 50% enrolled in other education receive financial assistance and administration of all scholarship based on proxy means testing (PMT) by the end of this phase.
297. Financing reforms for the second phase include introduction of funding of universities based on approved staff positions to funding based on outputs/outcomes and establishment of an autonomous regular government agency for student financial assistance. A shift from financing of universities based on approved staff positions to that of financing based on outputs/outcomes is a major reform, which is likely to be meet strong resistance form the staff. Therefore, this reform should start from new universities. There is no reason to believe that this reform would not be able to overcome resistance from the staff though this is widely held perception now because such reforms have been implemented in other countries successfully. The ramifications of this reform go well beyond the education sector. The practice of guaranteeing salaries independent of outputs have led to suboptimal utilization of public resources. Engagement of external stakeholders is critical for successful implementation of this reform. Because of the challenging nature of this reform it is proposed that the reform is first implemented in new universities in the second phase and in other universities in the third phase.
298. The SFAFDB has been able to deliver because it is being staffed by a group of qualified technical individuals and have been kept away from political interference. The options for mainstreaming SFAFDB into a regular government structure by subsuming the function of PMT-based financial

assistance into regular government agencies like the MOEST and UGC, and establishment of an independent public agency for this purpose. Since it may not be possible to retain the above strength of the SFAFDB if it gets subsumed into the regular government agencies the government should consider establishment of an independent agency for financial assistance. This option would be justified also because based on the international experience this is a large-scale activity that would remain relevant forever.

STEM and RDI

299. First phase reforms in the area of STEM and RDI should include the following:
    a. a policy to gradually decrease the share of recurrent expenditures on non-STEM higher education to reach 20-30% by the end of the third phase,
    b. removal of barriers to expansion of technical education in the non-government sector including removal of the provision of LOI approval by the MOEST and expeditious approval of requests for expansion/initiation of technical programs from campuses meeting prescribed requirements,
    c. a policy to increase the shares of Ph.D and master's graduates so that they increase by 5 and 10 % point respectively by the end of the third phase.
    d. a policy to increase the share of faculty promoted/recruited based on high weightings for research accomplishments to 100% by the end of the third phase.
    e. a policy to increase the share of research funding as a share of GDP to at least 0.4% by the end of the third phase.
    f. Establishment of new universities designated to become world-class universities.
300. Decreasing the share of non-STEM regular expenditures to 50% would imply diversion of non-STEM faculty positions to STEM faculty positions. This target would not be achieved by diversions of faculty positions alone. But it should be achievable in tandem with increase in the share of higher education expenditures, which should be directed exclusively towards STEM.
301. At present, funding for research is allocated in the Red Book under the budget head Capital research and consultancy. It is not possible to determine what share of this funding is used for RDI though it appears that bulk of this funding is used for procurement of consulting services. Funding for RDI should be allocated under a separate budget head and disbursed competitively through research funding agencies.
302. The removal of barriers for expansion of technical education is likely to meet resistance from the management of universities and MOEST, among others, and the change in promotion/ recruitment criteria is also likely to meet resistance from faculty unions. Therefore, resolute commitment from the government and engagement of external stakeholders will be required for implementation of this reform.
303. The second phase of reforms should include:
    a. Community campuses receive capital and recurrent cost support for expansion of technical education.
    b. Private not-for-profit campuses receive tuition support for enrolling needy students in technical education.
    c. Incentives for increasing the share of post graduate programs in place.
    d. All universities introduce promotion/ recruitment for faculty with high weightings on research accomplishments.

e. An independent research funding agency established.

Quality and Relevance

304. Reforms in the area of quality and relevance in the first phase will include articulation of a comprehensive policy on QAA, which should, among others, include requirements for mandatory periodic QAA of HEIs including universities, rewards and sanctions based on performance of HEIs, and initiation of QAA of universities. QAA policies should be revised by the UGC for implementation of these reforms. In the second phase an independent quality assurance and accreditation agency should be established through promulgation of an act.
305. Based on the experience of initiatives to reform higher education it is crystal clear that critical reforms required to deliver higher education outcomes required for supporting Nepal's aspirations for prosperity would not be possible within the existing legal framework for universities. The draft higher education bill in the Parliament would not be fit for the purpose as it was not prepared with a view to enable higher education to support attaining Nepal's aspirations for attaining prosperity. The current practice of drafting bills, which entails an exercise to protect vested interests of powerful stakeholders rather than national interests, should be avoided while drafting a fresh higher education bill. The bill should be prepared by technical experts based on a higher education reform plan prepared by technical experts with deep knowledge of national and international experience. The political vetting process should take place only when the drafts are ready so that deep analysis of issues in the process of preparation of the reform plan and bill is not hijacked by vested interests.
306. Deep reforms in higher education are required to enable it to support country's aspirations for prosperity. Higher educations are politically challenging. The chances of success of these reforms would increase if they become part and parcel of reforms in the governance of the country with a view to attain the status of a HIC by 2050. Reforms generate resistance from stakeholders because reforms are about freeing up resources used in a suboptimal manner by some stakeholders and use them optimally for development of higher education. It is important to address these concerns by convincingly demonstrating that in the end there will no losers but only winners.
307. The scope of this note is limited to suggesting reforms to be undertaken in the higher education sector so that it can support the ambitions of Nepal to become a high-income country by 2050. It is obvious that achievements in higher education alone would not be sufficient to so. But achieving this ambition would certainly not be possible without achieving the higher education outcomes described in this note. Higher education reforms are not easy and it takes comparatively long gestation period to deliver results. Therefore, preparation for reforms should start as early as possible.
308. The content of this note has been shared widely during the course of its preparation. Many people feel arguments urging for reforms of the higher education sector in the note captivating. But given the track records of higher education reforms in Nepal there are only few who think these reforms might be successfully implemented. Of course, it is up to stakeholders including the government to accept or not the dauting challenges for implementing reforms. Shying away from these challenges will certainly make the country's aspirations for Prosperous Nepal and Happy Nepali merely a mirage. But the author, who had the privilege of being a member of the team which successfully implemented challenging reforms at the IOE, particularly the full-fee reform, is

convinced that it is within the capacity of Nepali society to accept the challenges of higher education reforms. This note is essentially a clarion call for brave Nepalese to come forward fearlessly to lead these reforms.

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Annexes

Annex 1. Economic Growth Scenario

Lower threshold for HIC, US$	12615
Assumptions	
GNI per capita doubles by 2022 based on GON Policy and Programs 2018	
Double digit growth from 2022 onwards based on GON Policy and Programs 2018	
Assumed growth rate for 2022-2027	10%
Assumed growth rate for 2028-2050	7.21%
GNI/capita	US$
2017	790
2022	1580
2023	1738
2024	1912
2025	2103
2026	2313
2027	2545
2028	2728
2029	2925
2030	3136
2031	3362
2032	3604
2033	3864
2034	4143
2035	4441
2036	4761
2037	5105
2038	5473
2039	5867
2040	6290
2041	6744
2042	7230
2043	7751
2044	8310
2045	8910
2046	9552
2047	10241
2048	10979
2049	11771
2050	12619

Annex 2. Number of Universities in Different Ranking Ranges according to ARWU

No.	Country	1-20	1-100	1-200	1-300	1-400	1-500	1-800	501-800
1	United States	16	48	70	99	119	135	190	55
2	United Kingdom	3	9	20	28	34	38	50	12
3	Switzerland	1	5	7	7	7	8	10	2
4	Australia	0	6	10	14	21	23	27	4
5	Germany	0	4	15	22	26	37	46	9
6	Netherlands	0	4	9	10	12	12	13	1
7	Canada	0	4	8	11	17	19	26	7
8	France	0	3	9	14	17	20	30	10
9	Japan	0	3	7	9	13	17	36	19
10	Sweden	0	3	5	9	10	11	11	0
11	China	0	2	11	23	38	50	99	49
12	China-Taiwan	0	0	2	2	6	7	13	6
13	Belgium	0	2	4	6	7	7	7	0
14	Denmark	0	2	3	4	5	5	6	1
15	Israel	0	1	4	4	4	6	7	1
16	Norway	0	1	2	3	3	3	4	1
17	Singapore	0	1	2	2	2	2	2	0
18	Finland	0	1	1	1	2	5	7	2
19	Russia	0	1	1	1	2	3	4	1
20	Italy	0	0	2	7	12	16	37	21
21	Austria	0	0	2	3	3	4	8	4
22	Saudi Arabia	0	0	2	3	3	4	4	0
23	South Korea	0	0	1	6	7	12	28	16
24	Brazil	0	0	1	1	3	6	13	7
25	Ireland	0	0	1	1	3	3	5	2
26	Portugal	0	0	1	1	2	5	6	1
27	Spain	0	0	0	3	7	11	26	15
28	New Zealand	0	0	0	1	3	4	7	3
29	South Africa	0	0	0	1	2	5	8	3
30	Czech	0	0	0	1	1	1	4	3
31	Argentina	0	0	0	1	1	1	3	2
32	Mexico	0	0	0	1	1	1	2	1
33	Serbia	0	0	0	1	1	1	1	0
34	Greece	0	0	0	0	1	3	3	0
35	Iran	0	0	0	0	1	2	8	6
36	Poland	0	0	0	0	1	2	6	4
37	Chile	0	0	0	0	1	2	4	2
38	India	0	0	0	0	1	1	7	6

39	Estonia	0	0	0	0	1	1	1	0
40	Malaysia	0	0	0	0	0	2	5	3
41	Turkey	0	0	0	0	0	1	7	6
42	Egypt	0	0	0	0	0	1	3	2
43	Thailand	0	0	0	0	0	1	3	2
44	Iceland	0	0	0	0	0	1	1	0
45	Slovenia	0	0	0	0	0	1	1	0
46	Hungary	0	0	0	0	0	0	3	3
47	Colombia	0	0	0	0	0	0	1	1
48	Croatia	0	0	0	0	0	0	1	1
49	Lithuania	0	0	0	0	0	0	1	1
50	Luxembourg	0	0	0	0	0	0	1	1
51	Puerto Rico	0	0	0	0	0	0	1	1
52	Qatar	0	0	0	0	0	0	1	1
53	Romania	0	0	0	0	0	0	1	1
54	Slovakia	0	0	0	0	0	0	1	1
	Total	20	100	200	300	400	500	800	300
		3	18	26	33	39	45	54	

Annex 3. Higher Education Policy - A Brief

1. The Fourteenth Plan (2016/17-2018/19) has set the goal of attaining the status of a middle-income country by 2030. The role assigned to higher education for supporting economic growth including the achievement the above target is analyzed in this section based on the Fourteenth Plan (2016/17-2018/19) and Higher Education Policy 2072 BS (2015). The statements describing this role in the Fourteenth Plan are as follows:
    f. To develop the education system as a vehicle for the socio-economic transformation [p. 131, NPC 2016].
    g. Policies and programs of the education sectors are aimed at achieving socio-economic development goals [p. 131, NPC 2016].
    h. The mission is to attain socio-economic transformation through formation of competitive, entrepreneurial and innovative human capital [p. 132, NPC 2016].
    i. The strategy is to make higher education accessible, competitive and research oriented [p. 132, NPC 2016].
    j. The working policy is to prioritize development and expansion of employment oriented higher education based on national priorities – agriculture, animal sciences, forestry, science and technology, medicine, Ayurveda, tourism, engineering, hydropower, renewable energy, industries and commerce [p. 135, NPC 2016].
    k. To develop knowledge-based and research oriented higher education with a view to attain prosperity [p. 138, NPC 2016].
    l. To prioritize development and expansion of employment oriented higher education based on national priorities – agriculture, animal sciences, forestry, science and technology, medicine, Ayurveda, tourism, engineering, hydropower, renewable energy, industries and commerce [p. 138, NPC 2016].
    m. By the end of 2019/20 to increase the share of science enrolment in higher education to 5% and the GER to 20% [p. 139, NPC 2016].
2. The vision mission and goals articulated in the Higher Education Policy are as follows:
    n. The vision is to develop higher education institutions into centers of academic excellence with a view to support all round development of the country by promoting research and knowledge generation and producing high quality human resources capable of aligning with international development [p. 3, GON 2015].
    o. The mission is to attain academic excellence and upgrading through operation of equitable, inclusive, competitive, quality and results oriented teaching and research HEIs [p. 3, GON 2015].
    p. The main goal of higher education is to develop qualified, skilled, internationally competitive and research oriented human resources capable of providing leadership in various sectors for the purpose of socio-economic development of the country. Others goals are as follows:
        i. To enhance access to higher education.
        ii. To develop competitive and entrepreneurial human resources motivated towards science and technology with a view to support socio-economic development.
        iii. To make higher education relevant, useful, qualitative and competitive in the international context by enhancing opportunities for learning and research.

iv. To focus higher education programs on national priorities.
v. To make research and innovation integral part of higher education.
vi. To develop higher education as a mechanism for development of human resources for national development [p. 3, GON 2015].

Annex 4. Provisions on Financing of Universities as Articulated in Respected Acts

University	Sources of funds	Preamble
TU	GON, loan, donation, fees and revenues from other sources	
NSU		
KU	Not mentioned	Non-government sector university
PU	GON grant, donation from individuals or organization, donation from individuals or organization engaged in enterprises, grants form local agencies, donation and loan from international agencies and individuals, fees and other sources	Operation primarily from the people's level
PokU	GON assistance or grant, donation from individuals or organization, donation from individuals or organization engaged in enterprises, donation and loan from international agencies and individuals, fees and other sources	With private sector participation
LBU	GON donation or grant, donation from individuals or organization, donation from individuals or organization engaged in enterprises, student fees, donation and loan from international agencies and individuals, fees and other sources, affiliation fees	Operation primarily from the people's level
AFU	GON grant, UGC grants, local government, donation from individuals or organization, donation from individuals or organization engaged in enterprises, donation and loan from international agencies and individuals, fees and other sources	Government investment
MWU	GON grant, UGC grants, local government, donation from individuals or organization, donation from individuals or organization engaged in enterprises, donation and loan from international agencies and individuals, fees and other sources	Government investment and maximum private sector participation
FWU	GON grant, UGC grants, local government, donation from individuals or organization, donation from individuals or organization engaged in enterprises, donation and loan from international agencies and individuals, fees and other sources	Government investment and maximum private sector participation

Annex 5. Governance and Management Framework of Higher Education

Powers		GON	University Council (chaired by Chancellor)	University
Legislative	Approval of legal instruments	* Act	* Rules	* Working procedures
	Establishment of university	*		
Academic	Granting affiliation to campuses		* For KU, PU, PokU, LBU	*[10]
	Formulation of norms for physical and academic infrastructure of technical campuses, and permission for their establishment	*[11]		
	Approval for new academic programs/degrees		*	
	Approval for additional programs for affiliated campuses			*
	Approval of curriculum, academic norms and standards			*
Administrative	Appointment of VC, Rector, Registrar, Service Commission chairperson and members	* Chancellor – Prime Minister		
	Permission for establishing private campuses	Technical campuses with national and foreign investments		* Non-technical campuses. This provision spelled out only for TU, but in practice other universities also exercising this power
	Approval of development program and budget	* NPC		

[10] The provision of affiliation is clearly spelled out in some acts like TU, MWU, FWU and AFU and only referred to others only.

[11] No reference to the legal framework from which this power is derived. Based on MOE Guidelines.

	Coordination between universities; quality assurance	* UGC		
	Approval of annual work plan and budget		*	
	Managerial and staff appointments and termination			*
	Appointment of management committee chairperson of affiliated campuses			*
	Terms of fixing salaries and benefits			*
	Fixing enrolment			*
	Buying and selling assets			*
Financial	Allocation of funds for higher education	* Parliament		
	Allocation of grants to universities	* UGC		
	Income generation			*
	Receiving donation from international sources	*		
	Determination of tuition and other fees			*
	Receiving donation from national sources			*
	Borrow funds			*

Annex 6. Governance and Management Framework of Tribhuvan University

Powers		University Council (chaired by Chancellor)	TU Service Commission	Academic Council	Executive Council	Faculty Board	Institute Dean's Office	Faculty Dean's Office	Controller of Examinations	Regular constituent Campus (11)	Decentralized Constituent campus (45)	Autonomous constituent campus (7)	Affiliated campus (1161)	Autonomous affiliated campus (3)
Legislative		*[12]			*[13]							*	*	*
Academic	Approval of degrees to be conferred			*		* [14]								
	Approval for starting new academic programs				*	* [5]								
	Approval of curriculum, academic norms and standards for students and faculty			*		* [5]						*[5]		*[5]
	Examinations						*	*	*			*		*
	Granting affiliation to campuses			*[5]	*	* [5]								
	Approval for additional programs for affiliated campuses			*[5]	*	* [5]								
	Formulation of norms for physical and academic infrastructure for constituent (affiliated) campuses					*								
Administrative	Appointment of office bearers				*									
	Faculty, staff appointment and termination				*							*[15]	*	*
	Creation of staff positions				*							*[6]	*	*
	Approval of annual work plan and budget	*					*				*	*	*	*

[12] Rules
[13] Working procedures
[14] Recommendation.
[15] For Campus funded staff.

Powers		University Council (chaired by Chancellor)	TU Service Commission	Academic Council	Executive Council	Faculty Board	Institute Dean's Office	Faculty Dean's Office	Controller of Examinations	Regular constituent Campus (11)	Decentralized Constituent campus (45)	Autonomous constituent campus (7)	Affiliated campus (1161)	Autonomous affiliated campus (3)
	Appointment of management committee chairperson of centralized and autonomous constituent campuses, and affiliated campuses				*									
	Fixing of salaries and benefits	*										*[16]	*	*
	Buying and selling assets				*								*	*
	Fixing enrolment				*[17]		*			*	*	*	*	*
	Permission for establishing private (affiliated) campuses				*[18]									
	Execution of AWPB		*				*	*	*	*	*	*	*	*
Financial	Income generation				*		*	*	*	*	*	*	*	
	Receiving donation from national sources				*		*	*	*	*	*	*	*	*
	Determination of tuition and other fees				*		* [19]					*[20]		
	Determination of additional fees						*	*	*	*	*	*		
	Receiving donation from national sources											*	*	*
	Borrow funds				*								*	*

[16] For campus positions

[17] For technical subjects

[18] MOE has withdrawn this authority in relation to some technical programs through a policy [MOE. 2006].

[19] Delegated authority. Not clear if it is still effective.

[20] Subject to delegation of authority from the Executive Council.