



Higher and Technical Education Strategic Implementation Plan (2017-2038)

A road map to achieve the aims of the Higher and Technical
Education Sector in Papua New Guinea

THE PURPOSE OF THE STRATEGIC PLAN

In 2015, the Department of Higher Education, Research, Science and Technology (DHERST) launched a National Higher and Technical Education Plan (2015-2024) that detailed nine strategic goals the sectors is to achieve. However, since that time the Department developed Twelve Standards for Quality Assurance and Papua New Guinea National Qualification Framework (PNG NQF). Therefore, there was a need to make significant amendments to the plan mentioned above to ensure that the strategic plan aims at achieving the Twelve Standards for Quality Assurance within the framework of the PNG NQF. This document details a Strategic Implementation Plan Matrix that sets out how the strategic goals of the Sector will be achieved over the next twenty-one years. This implementation plan details actionable tasks that provide a road map for the Sector to follow to realise the aims of the Higher Education Sector in Papua New Guinea.



Message from the Prime Minister

The reformation, transformation and unification of the higher education sector in Papua New Guinea is long overdue. Whilst my Government continues to place a high priority on the provision of quality education at all levels, long-term investment in higher education brings with it not only the prospect of sound economic growth and a host of employment opportunities, but also the potential to resolve many of the social issues that affect the life chances of so many Papua New Guineans.

In its twenty-one-year span, this Strategic Implementation Plan for Higher and Technical Education will impact beneficially upon the lives of generations of students who enter our universities and colleges, bringing them closer to the laudable aspiration in Vision 2050 of Papua New Guinea as a 'smart, wise, fair, healthy and happy society'.

I wish to stress that as a Government, we are convinced that long-term planning of the kind enshrined in this document robustly marks higher education out as a public good, forging a clear pathway for capacity development, investment and fiscal and economic growth across all sectors.

It is a matter of great personal satisfaction that, contained within the Strategic Plan, we now have a rigorous, well-designed, set of National Standards for Higher Education in place that will allow us to benchmark our universities and colleges locally, nationally and internationally. These are demanding standards but, over time, they will lift the quality of student entitlements in learning and teaching to the very highest levels.

I am delighted therefore to commend this plan to the many audiences at home and abroad with a deep interest in the higher education sector in Papua New Guinea representing, as it does, my wish to unite the endeavours of all who serve in universities and colleges in the interests of the nation and its people.

A handwritten signature in black ink, appearing to be 'Peter O'Neill', written over a horizontal line.

Honourable Peter O'Neill, CMG
Prime Minister of Papua New Guinea

Foreword

The proposed strategic planning which aims at reforming and transforming the Higher Education System in Papua New Guinea is going to be challenging. Those challenges are multiplied due to the access to resources that are limited in comparison to the developed world, and the competition for those scarce resources is intense. Primary and secondary education, health care, roads, clean water, electricity, safety, and security are among the many worthy contenders for resources, all of which see their needs as of equal or greater merit than higher education.

As we look at our people, we have to ask ourselves: What are the chances that our students, faculty members, parents, public servants, business people, professionals, and other citizens, will be able to find the quality education they desire? What should be done to realize their dreams of students finishing grade 12, in 2017, 28,800 students? How might this strategic planning assist in achieving these goals?

The Higher Education Sector is not a burden to a nation, but it is a long-term investment. What do we say in response to the aspirations of our children? Do we have answers for our children with high hopes for the future, with dreams of quality education? Are our people destined to perpetual poverty, to poor-quality institutions, to lack of opportunities for a better future, to failure? We think not. This strategic planning can help find solutions to those challenges and facilitate a positive change in the Higher Education Sector. As we strive to have the necessary resources and the authority to change the current situation, we have an opportunity to invent a better future by investing in the higher education sector. As Stiglitz put it, "Development is about transforming the lives of people, not just transforming economies" (Stiglitz 2006, p. 50). Part of that transformation results from quality higher education that opens up minds to the notion that change is possible, that there are other ways of organizing production, as it teaches the basic principles of modern science and the elements of analytic reasoning and enhances the capability to learn" (Stiglitz 2006, p. 50).

We do believe that PNG has the financial resources needed to create the level of quality of higher education required for sustained development. Also, we are aware that reaching the full potential of our people will require Government's commitment to invest in the higher education sector, some national sacrifices, and external assistance.

This strategic plan aims at introducing necessary changes to the Higher Education Sector, one of the most important changes in higher education is the recognition that increasing access to Higher Education Institutions(HEI) is not enough. **The objective of this strategic plan is to help as many students as possible to gain entry to universities or colleges, to offer the quality of education and the most important to help them succeed once they have enrolled.** That fundamental reorientation in focus is profound. It means that our hardest work needs to involve finding the strategies and tactics that will best enable students to meet their educational goals, whether they are pursuing a degree or striving toward some other educational objective.

This strategic planning will not create miracles, but it will commence the process of reforming and transforming the Higher Education System. This includes thoughtful, well-executed plans and steps in the direction of high quality and academic excellence, which will provide the keys to higher education success, leading to social and economic development in the future.

On behalf of the Department of Higher Education, Research, Science and Technology.

Sincerely,

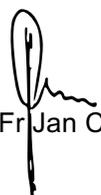

Professor Fr Jan Czuba

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ACRONYMS AND ABBREVIATIONS

CHE	Commission of Higher Education
CISCO	Computer Information System Company
COE	Centre of Excellence
DE	Distance Education
DoE	Department of Education
DHERST	Department of Higher Education, Research, Science and Technology
DL	Department of Labor
DPM	Department of Personnel Management
HEI	Higher Education Institution
HEGP	Act Higher Education (General Provisions) Act, 2014
ICT	Information and Communication Technology
IPTD	Infrastructure Planning for Technology Development
MHERST	Ministry for Higher Education, Research, Science and Technology
NEC	National Executive Council
NHTEB	National Higher, Technical, Education Board
NTP	National Training Packages
PNGQF	Papua New Guinea National Qualifications Framework
PNG	Papua New Guinea
PNG VCC	Papua New Guinea Vice-Chancellors' Committee
S&T	Science & Technology
STI	Science Technology Innovation
TDI	Technology Development Infrastructure
TVET	Technical, Vocational Education and Training
UNESCO	The United Nations Educational, Scientific and Cultural Organization

STRATEGIC PLAN FOR HIGHER EDUCATION, RESEARCH, SCIENCE AND TECHNOLOGY. TECHNICAL AND VOCATIONAL EDUCATION AND TRAINING.

Introduction

A Task Force on Higher Education and Society was organized by the World Bank and UNESCO to bring together experts from 13 countries for the purpose of exploring the future of higher education in the developing world. They concluded their research by publishing what has become a seminal document entitled: *“Higher Education in Developing Countries: Peril and Promise”*. In it the authors stated:

“The greatest desire of the Task Force is to catalyze dialogue in countries around the world. While the benefits of higher education continue to rise, the costs of being left behind are also growing. Higher education is no longer a luxury: it is essential to national social and economic development. (2000:14)

University education leads to higher earnings for individuals, often referred to as the graduate premium. It also leads to more tax revenue and the magnitude of this effect on economic growth is enormous.

There is a vast amount of literature concerning investment in higher education and, remarkably, there is a high degree of agreement that investment in higher education represents a good investment. Most economists make a distinction between “consumption goods and investment goods”. A simple definition of a consumption good is a good that is ‘used up’ when it has been consumed for example the hamburger, we buy and eat at McDonald’s or the fuel we put in our car. When it’s gone, it’s gone. In contrast, an investment good is a good that we consume and derive ‘utility’ from on multiple occasions over time; i.e., our home, our automobiles, even the latest laptop or iPhone. We acquire the good today but it has a useful life of a few or even many years.

Thus, some goods have characteristics of being both consumption goods and investment goods. Higher education has the characteristics of being a consumption good as well as an investment good. When we make a decision to attend a university, we are purchasing an investment good and, by extrapolation, we are spending a great deal of money to meet the academic and nonacademic requirements of the university. The education, we receive over time will pay dividends and provide benefits, in effect, the graduate premium, to each one of us for many years into the future. Economic analysis shows that those who have a university degree will, in general, earn a greater lifetime income than those with less education. In fact, in recent economic times with significantly and historically high unemployment rates, economists have shown the unemployment rate for those with a high school degree to be double than those with a University degree. In addition, it is often argued that those with a University degree tend to reap non-quantifiable benefits throughout their lifetime as a result of their education. i.e. healthier lifestyles, lower medical cost, greater utility from the consumption of the arts, etc.”¹

It goes almost without saying that the Government of PNG (GoPNG) needs to invest in the higher education sector, if the country is to implement its vision: “Vision 2050 will transform our people and our nation by reforming our mind-set and attitudes. It is envisaged that this will provide the direction to

¹ Consumer Behavior: The Case of Higher Education. Updated Dec 31, 2012: Dr. James Ramsey University of Louisville.

reform and align our institutions and systems to make ‘Papua New Guinea become a smart, wise, fair, healthy and happy Society by 2050’.

Vision 2050 is underpinned by seven Strategic Focus Areas, which are referred to as pillars:

1. Human Capital Development, Gender, Youth and People Empowerment;
2. Wealth Creation;
3. Institutional Development and Service Delivery;
4. Security and International Relations;
5. Environmental Sustainability and Climate Change;
6. Spiritual Cultural and Community Development; and
7. Strategic Planning, Integration and Control².

None of the above pillars can be successfully implemented without highly qualified human resources that only can come as positive outputs and outcomes of the Higher Education Sector.

² Papua New Guinea Vision 2050. National Strategic Plan Taskforce

Reforming and transforming the higher education system in Papua New Guinea

We are living in the 21st century, where scientific and technological achievements have become an everyday part of our lives. Science and Technology now make available more food, better health care and safe drinking water in developing countries like our own. People can travel around the globe physically, or on the internet they can engage in commercial activities or access goods and services, wherever they are needed. Computer and communication technologies are now opening up vast stores of knowledge, supporting not only economic and social growth and development, but also strengthening effective democracy and governance. Most of these scientific and technological innovations were conceived in tertiary education institutions within the higher education sector. However, in Papua New Guinea (PNG) the tertiary education sector is limited in what it can achieve because it does not receive enough support from the private sector. The private sector usually invests when there is a core skills base to guarantee a return on the investment. It is therefore one of our objectives to obtain more contributions from the private sector, by way of partnerships. The role of government in providing financial support and guaranteeing autonomy for institutions is critical for the innovative development of scientific and technological skills to enhance economic and social developments in PNG; to create new industries; to attract local and foreign investors and thus provide more employment opportunities to its citizens.

We perceive these challenges as opportunities to be realized in PNG. They are vital for PNG's development and thus the issues of education and training, new scholastic infrastructure, particularly in fields such as agriculture and engineering, need to be addressed, since, over the years, they have been under-rated, under-valued and under-resourced. Insufficient allocation of resources to the higher education and technical training institutions over the years has negatively impacted on the capacity to supply the much-needed skills base, especially in science and technology. Some institutions, because of increasing demand, were pressured to enroll more students, whilst not having the most basic resources in place to cope with this sudden influx of students. In other cases, we experienced conflicts of interest between different Ministries that resulted in a poor quality of education and the deterioration of institutions of higher learning and training. Also significant duplication of roles and responsibilities thus creating inefficient and ineffective utilization of scarce resource allocations to higher education and training. Such a situation does not, and cannot, enable the country to build its human resource capacities and address the widespread skills shortages in the labor market. We need to confront these challenges by unifying all post-secondary institutions under the Ministry for Higher Education, Research, Science and Technology (MHERST).

Reforming and transforming the higher education system in Papua New Guinea to energize and unlock the minds and potential of young people for brighter economic prospects is one of our main objectives and it becomes the principal strategy of the Department of Higher Education, Research, Science and Technology (DHERST). Quality of education at all levels is vitally important for increasing PNG's human and economic development, prosperity and competitiveness. The DHERST is proposing a strategy that aims at refining and providing greater focus in the implementation of the PNG's Government Education Sector Policy. It will contribute to the acceleration of economic growth through the provision of sorely needed expertise in science and technology, including intermediate and higher level vocational and technical skills. DHERST considers technical and vocational training as an integral part of the higher education sector and recognizes it as a critically important factor in skills development and in fostering science, technology and innovation, particularly in the application, adaptation and use of technologies. The building of a skilled workforce with the capacity to replace current large numbers of expatriate skilled workers also has significant sustainable benefits to the PNG economy and community.

The proposed strategy will focus on the following:

1. To implement recommendations emerging from the Review of Outcomes Based Education in Papua New Guinea.
 - 1.1. In 1995, Government, through NEC Decision 54/1995, directed the transfer of all higher education institutions and functions under various departments, including the Department of Education, to the Commission of Higher Education (CHE) to operate under the Higher Education Act and be administered by the Commission in accordance with the Act. For almost two decades, no attempt was made by the relevant departments to implement this key decision as commended by NEC, until 2012, when the Chief Secretary to Government directed immediate implementation. The call was prompted by the demands of Vision 2050 and the 2012 Development Strategic Plan supported by the Labour Market Assessment survey of 2009 and the TVET Needs Analysis of 2011. which highlighted serious skilled manpower shortages, imbalances and mismatches in the economy.
 - 1.2. Implementation of NEC Decision 54/1995 supports Government's intention to reform Higher Education Institutions(HEI) in order to build their capacities and improve the quality of education and training, to produce quality graduates to foster economic growth and move the country into the top 50 countries in the United Nations Human Development Index by the year 2050.
 - 1.3. The ultimate outcome of the implementation of NEC Decision 54/1995 will be to increase the number of enrolments and improve quality graduates in our various training colleges that meet industry needs in *skills, knowledge and values*. It will also develop the ability of the middle classes to contribute to the economic development of the country so as to achieve a middle income economy by 2030 and become a *Smart, Wise, Fair, Healthy and Happy society* by the year 2050.
 - 1.4. Higher Education Institutions comprise of private and public teachers' colleges, technical and polytechnic institutes, business colleges, fisheries, maritime and nursing colleges, and the PNG Institute of Public Administration. Although these institutions are categorized as HEI, several different government departments have administered them.
 - 1.5. The situation is unwieldy. Teachers', technical and business colleges and polytechnic institutes and the PNG Education Institute operate under the DoE. The Maritime College is controlled by the Department of Transport, whilst the Fisheries College is under the aegis of the National Fisheries Authority. The PNG Institute of Public Administration is answerable to the Department of Personnel Management. Private technical and business training providers are overseen by the Department of Labor and Industry through the National Training Council. Apprenticeships are also administered by the Department of Labor and Industry through the National Apprentice and Trade Testing Board. NEC Decision 54/1995 affects all of these institutions. Apart from Madang, Simbu and Enga Teachers' College, together with the PNG Education Institute, the churches administer all other teachers' colleges. All public technical and business colleges are state owned and managed through the DoE. Private training providers are required to register with the National Training Council. These tertiary institutions, according to their legal status, should operate under the Higher Education (General Provisions) Act, 2014 (HEGPA). Immediate transfer of these institutions and the related standards to the DHERST will ensure that focused attention is given to them.
 - 1.6. The DHERST will engage in a constructive dialogue with the Department of Education (DoE), since the DoE has been very reluctant to allow technical, polytechnic institutes, business and teachers' colleges, including the PNG Education Institute and other post-secondary institutions, to operate under the HEGPA, as directed by the NEC. Constructive dialogue will also be continued with the Department of Labour and Industry through the National Training Council and the National Apprentice and Trade Testing Board with the

objective of developing a unified policy for the Technical and Vocational sections of Higher Education.

- 1.7. Strengthening national and regional centres of excellence of higher education in the following selected priority areas: agriculture and livestock, health sciences and health delivery support services, engineering, ICT, business enterprise, training of teachers and educational managers³.
2. Building and/or rehabilitating the existing science and technology infrastructure, including all tertiary education institutions.
3. Linking the higher education sector, science and technology to the National Policies as a productive sector in its own right. The focus of DHERST will be to support existing institutions of higher education. The scope and mix of interventions, will be determined through preliminary assessments.
4. The improved quality of primary and secondary education is a vital building block for the quality of education as a whole, and the cost effectiveness of the higher education sector. Hence, DHERST will continue to collaborate with the DoE and other development partners, involved in directing and supporting the other education sectors.
5. Establishing Western Pacific University as a Highlands regional centre of excellence in higher education, with campuses in Enga and the Western Highlands Provinces.
6. The strategy also recognizes the critical importance of well-trained public servants. Therefore, we will establish regional centres of excellence within the existing HEIs for the Department of Personnel Management (DPM) to provide quality programs for the Department, and its personnel.
7. There is also the need to take an expanded view of skills development to see it as including technical, vocational, entrepreneurial, scientific and technological aspects. This means that curriculum and program development must be informed by a selection of content and design considerations that cover low-level, intermediate-level and high-level skills hence providing clear pathways between each level .⁴
8. DHERST will engage with its HEIs to ensure that the governance, management and academic programs on offer are within the prescribed twelve standards for quality assurance in PNG, PNG National Qualification Framework and TVET Standards already developed by NTC in consultation with industry.
9. Implantation of the Funding Model for the Higher Education Sector in PNG.

An important part of this strategy will be the development of a realistic and fully funded implementation action plan, which clearly identifies indicators and deliverables for the proposed actions.⁵

³ There will be also a strong focus on the Trade Skill across all TVET Institutions.

⁴ TVET curriculum is competency based and is largely driven by industry requirements. Curriculum in each trade area is part of a Training Package which consists of Course, Units of Competency, Learner and Trainer Guides, Learner and Assessment Guides. The 'curriculum' should be developed Nationally and indeed, be sourced from existing overseas Training Packages as the core competencies for each trade area are similar internationally. Australian Training Packages are available under creative commons i.e. free if used for educational purposes and not for profit.

⁵ Recommendations emerging from the TVET Needs Analysis 2011 and a Capacity Needs Assessment of Primary Teacher Colleges in PNG will be considered and included in the action plan.

Funding Model for the Higher Education Sector in PNG

The Department of Higher Education, Research, Science and Technology with the Papua New Guinea Vice-Chancellors' Committee (PNG VCC) developed an alternative funding model that is equitable to all universities and postsecondary institutions, and, importantly, it is affordable for GoPNG. The proposed model is designed to be a 'relative funding model' for determining the funding position of institutions within existing and new resource levels. There are five components of the model:

1. Base Grants
2. Institutional Factor Grants
3. Innovation Grants
4. Performance Funding Grants and
5. Research Grants⁶

The diversified funding model for the higher education sector in PNG can address many issues encountered by the sector that a single funding model cannot.

Requirements for effective implementation of the proposed funding model include good governance structures; efficiency measures; transparency; accountability and capacity building for implementers.

This funding model for higher education is designed to facilitate the implementation of GoPNG national policy objectives in higher education, and it is regarded as an input, thereby, influencing the outputs and outcomes of higher education institutions. Consequently, we need to focus our attention and funding of the higher education sector on inputs. If adequate funds are available to institutions as inputs, then the outputs and outcomes could be measured as follows:

- *Facilitate equitable access to quality tertiary education.* For this policy goal, the emphasis is laid on gradual expansion of access to higher education through expansion in enrolment of new entrants, especially females; promotion of distance learning; establishment of an open university including TVET programs; promotion of access for students with disabilities, and the promotion of postgraduate education.⁷
- *Facilitate research in tertiary education, particularly in national development priority areas.*⁸ The focus of this objective is the expansion of postgraduate education; provision of resources for postgraduate education and the institution of an outcome-based funding scheme to facilitate research in tertiary education.
- *Promotion of quality and relevance:* Here, emphasis is laid on curriculum review; quality assessments, and training in outcomes-based quality assurance methods.
- *Promote effective regulation, management and planning of tertiary education.* The primary strategy behind this descriptor is the building of capacity of senior management staff in administration and planning through the development and implementation of training programs.
- *Facilitate Science, Technology and TVET in tertiary education.* The purpose here must be to facilitate industrial attachment for all students; the institution of competency-based and

⁶ ibid

⁷ Additional scholarships will be created and offered for particular disadvantaged sectors of the tertiary student population, including females, rural remote students, disabled etc.

⁸ The DHERST will provide more scholarships for postgraduate's programs to encourage research in tertiary education.

entrepreneurial programs and the provision of resources for science and technology education.⁹

- *Facilitate collaboration in tertiary education:* This descriptor relates to the organization of joint research and extension programs with industry, commerce and civil society and other higher education institutions¹⁰.

An approach of this kind provides the basis for the development of a new funding model for higher education in PNG so that outcomes can be measured.

⁹ In TVET there is also a need for the Trainers to regularly 'return to industry' to ensure that their skills are current.

¹⁰ Funding of Higher Education: Models for innovative funding of Higher Education in Africa – The case in Ghana. Dr Emmanuel Newman and Prof Mahama Duwiejua (n.d.)

Strategy and Focus of the DHERST

	Higher Education Sector Policy	Higher Education, Research, Science and Technology Strategy
Objective	To primarily improve access to quality basic education, whilst recognizing the need to ensure balanced development of education systems (through giving appropriate attention to secondary, technical vocational training and tertiary education).	To assist Higher Education Institutions (HEI) and Research Institutions in developing quality of academic and trade and vocational programs, enhance the capacity of staff and the necessary science and technology- oriented skills to increase economic competitiveness and sustain growth.
Guiding Philosophies	<ul style="list-style-type: none"> • Holistic and integrated approach. • Ownership, responsibility, autonomy and control of HEIs. • Participatory approach and regional integration. • Private Sector, Churches and Non-Profit Education Providers. 	<p>Improved design and delivery of science and technology-oriented programs at secondary school.</p> <p>Regional Approach</p> <p>Case by Case Approach.</p> <p>Focus and selectivity.</p> <p>Functional relationship with public and private sector operations.</p> <p>Partnerships with Churches, private sector between themselves and other countries.</p> <p>Harnessing developments in Science, Technology and Innovation.</p>
Strategic Actions	<ul style="list-style-type: none"> • Improving access to educational opportunities, including TVET. • Improving equity in higher education. • Improving quality of learning, teaching and output. • Improving management and planning capacities. • Improving educational financing mechanisms. • Improve evidence-based planning. 	<p>Support to National and Regional Centers of Excellence.</p> <p>Building infrastructure and upgrading equipment for all HEI.</p> <p>Linking HEI with each other, and the Productive Private Sector.</p> <p>Targeted support to Universities, Teacher Colleges, Polytechnics and specialized Technical Training institutions.</p> <p>Upgrading of TVET trainer trade skills</p>

	<ul style="list-style-type: none">• Improving sector governance.	Support sector stakeholders undertake strategic management and base decisions on evidence-based planning. Strengthen systems at the national and HEI level to improve governance and transparency throughout the sector.
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Expected outcomes of effective implementation of the strategy

The benefits of education, and specifically the higher education related reforms, will not accrue immediately but rather increase over time. Thus, the immediate outcomes of effective implementation of the proposed strategy may not seem, in themselves, significant; however, within five to ten years of implementation, the outcomes listed below are anticipated.

- PNG as a whole will experience and appreciate how science, technology and innovation assists the Government, individual sectors, markets, provinces and regions to meet their economic and social targets.
- Each institution of higher learning in PNG will be equipped with a clear vision, a purpose, strategy and action plan. This will lead to more capable leadership in the higher education sector, workable policies, effective planning capacity and accountability with transparency will emerge.
- Better coherence and cooperation between HEIs will ensure that skills taught at primary, secondary, and higher educational levels and the needs of the market, public and private sector, and the informal sector are in tune with the national objectives. Hence, there will be more opportunities for short-term, work-based training.
- More research projects, technology development projects and innovation initiatives in which partners from more than one sector are involved (e.g., university, public, private, informal and regional).
- Efficient, unified and responsive cooperation between donors' strategies and the national higher education strategy.
- More participation of females in higher education and in science and technology related education at all levels will be encouraged including in non-traditional trade areas.
- A better articulated educational system will emerge in which industry-based, TVET, and university training are linked and unified with the PNG National Qualifications Framework (PNGNQF), providing accessible pathways opportunities to learners participating in lifelong learning. It will enhance the capacity of people, institutions, and the whole country to respond to the challenges of the 21st century, and beyond.
- Reduced need for foreign skilled workers – see my brief analysis of the indicative ROI from reducing currency leakage by foreign skilled workers.

Conclusion

In order to support rising growth in PNG, and enhance the linkages between higher education and society, the Government is requesting the re-examination of the developmental role of higher education as a whole. The proposed strategy is a response to such a call. The Ministry of Higher Education, Science, Research and Technology is convinced that investment in the higher education sector is important for economic growth, poverty reduction and in making PNG a *Smart, Wise, Fair, Healthy and Happy Society* by the year 2050.

Annex 1 Higher Education, Research, Science and Technology. Technical and Vocational Education and Training. Implementation Plan Matrix.

Stage I: Support to National and Regional Centers of Excellence					
Time-frame	Key actions to meet challenges in the 1st Stage	Essential Activities	Expected Outputs	Indicators	Potential Partners (Identified during field visits and other operations)
Short-term 2017	Task 1: Identify potential and existing Centers of Excellence (COE).	<p>1. Using 12 Standards for Quality Assurance in PNG as criteria for COEs.</p> <p>2. Conduct surveys to assess institutions on basis of defined criteria and standards.</p>	List of potential and existing COEs available.	Number of national COEs, Regional and Provincial COEs meeting PNG standards identified for strengthening.	DoE UNESCO
Medium-term 2018 – 2019	Task 1: Improve relevance and quality of learning & teaching at COEs.	<p>1. Review and upgrading of curricula and pedagogy to be in line with required PNGQF & DHERST policies in terms of content and best practice.</p> <p>2. Development of a National Training Packages (NTP) as part of TVET sector reform.</p>	<p>Curricula reviews launched at all identified COEs and the NTP.</p> <p>The National Training Packages for TVET launched.</p> <p>Long term plans prepared for qualified staff available for COEs.</p>	<p>Existence of revised and validated curricula and pedagogical approaches endorsed by the NHTEB and stakeholders.</p> <p>The National Training Packages for TVET developed and endorsed the NETEB and by stakeholders. All COEs have sufficient number of qualified staff per academic discipline.</p>	

		<p>3. Staff development through additional and supplemental training opportunities of a suitable duration.</p> <p>4. Review of the current noncompetitive pay structures and develop performance based contracts.</p>	New pay structures are developed with performance based contracts.	All COEs have all staff employed under the pay structures & performance based contracts.	
	Task 2: Strengthen physical infrastructure of COEs	<p>1. Assess infrastructure needs that must include needs for access by physically disabled people and women.</p> <p>2. Build modern Science and Technology infrastructures in agriculture and livestock, engineering, health services, ICT, TVET and teacher colleges.</p> <p>3. Provide state of art equipment.</p>	COEs operational. Technical staff trained on operation of equipment; Maintenance plans prepared and in use	<p>Number of COEs established.</p> <p>Levels of enrolment and graduation of students increased (particularly female) at COE faculties.</p> <p>Degree programs are offered within the framework of the PNGQF. Appropriate use and maintenance of COEs, ICT and specialized equipment.¹¹</p>	
Long-term 2020 – 2023	Task 1: Promote networking of COEs.	1. Develop cooperation and exchange programs of staff and students	Regional networks of COEs operational.	Number of functional regional COE networks.	

¹¹ The main demand in TVET is at Certificate 3 level. This is the level a student is required to meet the requirement to become a qualified and in many cases, licensed tradesperson.

	<p>Task 2: Establish Distance Education Systems with emphasis on quality-assured cross-border education an in support of regionally linked higher education provision in all Provinces.</p>	<p>nationally and internationally.</p> <p>2. Promote joint research activities within networks.</p> <p>3. Promote linkages of COEs with national and foreign institutions.</p> <p>4.Devolve close links with Commonwealth of Learning Flexible Open Learning.</p> <p>5. Needs assessment and feasibility studies in all Provinces. Design of Distance Education (DE) delivery methods, adaptation of programs, fulfilment of accreditation requirements.</p> <p>6. Build infrastructure, ICT system, acquire equipment, staff, orientation training of teaching staff.</p>	<p>Networks of COEs with national and foreign institutions established.</p> <p>Needs identified and validated Distance Education designed in accordance with needs.</p> <p>Infrastructure, ICT system and equipment available. Staff trained</p>	<p>Number of joint annual research and student exchange programs with affiliated national and foreign institutions.</p> <p>Number of training institutions in all Provinces offering Distance Education programs in collaboration with appropriate regional institutions.¹²</p> <p>Quality of education and enrolment rates in DE programs increased.</p>	
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¹² They will act as ‘agents’ for main, national Distance Education centre.

Stage II. Infrastructure Development for Institutions of Higher Education					
Time-frame	Key actions to meet challenges in the 2nd Stage	Essential Activities	Expected Outputs	Indicators	Potential Partners (Identified during field visits and other operations)
Short-term 2024 – 2025	Task 1: Enhance information and communication technologies (ICT) availability and training capacity in ICT in all HEI, TVET institutions	<p>1. Conduct national ICT-in-education needs assessment of training institutions (universities, secondary schools, TVET institutions, teacher training colleges, etc.).</p> <p>2. Upgrade connectivity and availability of computers in HEI to enhance teaching, learning, and research.</p> <p>3. Produce study of the most critical infrastructure constraints (e.g., transport, ICT, electricity, water etc.) constraining the potential of science and technology to contribute to the growth of PNG.</p> <p>4. Establish effective, user friendly student</p>	<p>ICT connectivity and hardware improvement projects initiated in all HEI institutions.</p> <p>Upgraded connectivity and computerization of libraries in higher education institutions (HEI) and effective access to on-line resources – Libraries become Learning Resource Centres</p> <p>National plans for Technology Development Infrastructure (TDI) prepared for all Provinces.</p>	<p>% of facilities and departments at training institutions effectively inter-connected through a local area network</p> <p>National Plan for Technology Development Infrastructure prepared and validated in all Provinces.</p>	<p>CISCO</p> <p>UNESCO</p> <p>Microsoft</p> <p>Commonwealth of Learning</p>

		management system and integrated knowledge and information management system.			
Medium-term 2026 – 2027	Task1: Enhance infrastructure for technology development.	<p>1.Build and/or rehabilitate HEIs infrastructure, especially in fragile states.</p> <p>2.Launch series of Infrastructure Planning for Technology Development (IPTD) workshops at the national level to allow for priority setting, awareness raising, and partnership cultivation.</p> <p>3.Design and implement national infrastructure master plan for each institution to ensure efficient redevelopment of existing institutions and development of new institutions.</p>	<p>HEIs Infrastructure built and/or rehabilitated.</p> <p>Projects to support Technology Development launched.</p>	<p>% of institutions built and/or rehabilitated.</p> <p>Degree of implementation of TDI National Plans.</p>	<p>Bilateral donors</p> <p>World Bank</p> <p>Asia Development Bank</p> <p>Tax Credit scheme</p> <p>Impact Bonds</p>
Long-term 2028 – 2030	Task 1: Develop and implement a long-term program to enhance HEI teaching &	1.Determine HEIs Infrastructure development and rehabilitation needs according to a rolling	HEI research infrastructure assessments conducted and renewal plans developed.	Extent to which the rolling program of infrastructure and equipment targets are up to schedule.	

	<p>research facilities and equipment.</p> <p>Task 2: Support the establishment of infrastructure & equipment for Science Technology Innovation (STI).</p>	<p>program of the DHERST per year.</p> <p>2.Run joint partnerships with development agencies and private sector interest groups for the implementation of a rolling program of infrastructure expansion and equipment of HEI facilities.</p> <p>3. Establishment of appropriate infrastructure and equipment for creation of innovation centers at select institutions.</p>	<p>Fund for infrastructure rehabilitation and renewal established.</p> <p>Private sector contributions to research infrastructure increase.</p> <p>Technology commercialization, dissemination institutions strengthened and/or developed.</p>	<p>Number of HEI facilities expanded/upgraded per year.</p> <p>Number of functional technology facilities and innovation centers.</p> <p>Effective maintenance plans integrated into annual budgets of institutions and linked to institution performance indicators.</p>	
Stage III: Linking HEI and the Productive Sector					
Time-frame	Key actions to meet challenges in the 3rd Stage	Essential Activities	Expected Outputs	Indicators	Potential Partners (Identified during field visits and other operations)
Short-term 2031 – 2032	Task 1: Support for identification of national Science, Technology and Innovation (STI) goals and priorities.	1. Conduct national Science & Technology (S&T) needs assessments: map provinces' economic and industrial needs and development goals against existing	Agreed framework for measuring and evaluating PNG's S&T capacity created National S&T Human Resources Development.	Annual rate production of National S&T HRD action plans. Endorsement of the data bases by the Department of Labor (DL) and Department of	DPM DL

	<p>Task 2: Facilitate Higher Education Sector's articulation between HEI and international partners.</p>	<p>S&T human resources stocks and current S&T training capacity versus needed S&T human resources and needed skill mix (skills profiles).</p> <p>2. Establish national and/or regional consultative dialogues on S&T priorities and action plan setting to clarify/validate the relationship between S&T human resources needs and national/regional economic and industrial needs. Support for conduct of periodic skills audits, labor market surveys.</p> <p>3. Support studies to deepen understanding of global value chains for vertical capabilities strengthening and linkage creation in key sectors.</p> <p>4. Promote HEI and strategy alliances with partners in the Region.</p> <p>5. Facilitate technology transfer.</p>	<p>Action Plans formulated PNG STI Capacity Map and PNG Research and Technology Development Database.</p> <p>Linkage strategies created in which STI partners are identified and measures to link up with global supply chains, access foreign technology, and develop partnership are articulated.</p> <p>National strategies created for partnering and linkage with overseas partners.</p> <p>National Skills Development website developed and includes National Training Packages (Courses, Units of Competency, Learning and Trainer Guides, Learner and Trainer Assessment Guides.</p>	<p>Personnel Management (DPM) on behalf of the Government.</p> <p>Increase in the number of strategic alliances with STI partners in national plans. Mobilization of a dynamic HEI in the consortium actively involved in partnerships. Number of industry approved training packages developed</p> <p>National Skills Development Authority established & Website developed and regularly updated.</p>	
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		6. Ensure that National Training Packages reflect current and future industry needs.	National Skills Development Authority (Board) established with significant representation from industry.		
Medium-term 2033 – 2035	<p>Task 1: Increase HEIs' programs to strengthen industry- relevant, S&T key skills.</p> <p>Task 2: Invest in mechanisms to improve HEIs' quality assurance.</p>	<p>1. Sponsor industry, public sector - academia curricula reform councils to formulate market-relevant and high-quality curricula in S&T key skills.</p> <p>2. Address S&T key skills curricula reform at all educational levels—basic, secondary, and higher.</p> <p>3. Finance the development, launch and mainstreaming of teaching/training modules in entrepreneurship and S&T key skills at universities, polytechnics and TVET institutions.</p> <p>4. Strengthen existing quality assurance agencies and support the emergence of such institutions (e.g., NHTEB).</p>	<p>Industry, public sector-academia curricula reform councils operational.</p> <p>Programs launched to fund firm-participation in industry and public sector - based training as part of S&T degree programs at HEIs.</p> <p>Increase in number of people in informal and formal sector accessing S&T key skills upgrading opportunities.</p> <p>Quality assurance mechanisms improved. Accreditation systems strengthened and functional in all HEI.</p>	<p>Extent of increase in the number of training courses using block-release arrangements with industries. Annual statistics on the number of public and private sector workers having upgraded their skills.</p> <p>Equivalency of qualifications and accreditation within and across HEIs and Provinces recognized by the NHTEB: Utilizing 12 Standards for Quality Assurance, PNG National Qualification Framework and the National Training Packages for the TVET sector.</p>	

		5. Establish or reinforce national accreditation system/s as a means for monitoring and promoting quality among HEIs.			
Long-term 2036 – 2038	<p>Task 1: Improve students' (particularly females)¹³ job-readiness through firm exposure (including sponsored programs for firm-based learning).</p> <p>Task 2: Integrate indigenous knowledge into formal training and research programs.</p>	<p>1. Support industry-based internship programs for students in HEIs through which firm-based learning is incorporated into the curricula.</p> <p>2. Provide mentorship and internship programs in S&T that target females exclusively.</p> <p>3. Support studies on: the impact of indigenous inventions in local economies; the role of teaching and research institutions in exploring and developing knowledge; opportunities to mainstream indigenous knowledge in curricula at all</p>	<p>Potential private and public sectors partners and models of partnership for increased industrial exposure of students in S&T programs.</p> <p>Projects launched to support industry-based internships/training in S&T.</p> <p>Female-focused mentorship programs launched.</p> <p>Curricula at post-basic levels reformed to integrate indigenous knowledge.</p>	<p>Number of internships realized at various industries.</p> <p>Progressive increase in number of females benefiting from internships.</p> <p>Number of modules on indigenous knowledge developed and adopted into curricula.</p> <p>Significate number of eligible women entrepreneurs gain access to the grants program.</p>	

¹³ However, where there would be possibility then the mentorship of females in S&T will be introduce sooner and might include girls in Upper Secondary schools and in tertiary education (particularly those in S&T). It can be initiated in the short – medium term. We will encourage our development partners to provide such support at early stage.

		<p>education levels where appropriate; and capacity needs for protection and, in some cases, commercialization of indigenous knowledge.</p> <p>4.Create a female-centered grants program for emerging female entrepreneurs; connect the grants programs with targeted opportunities for informal and formal skill upgrading for girls and women.</p>	<p>Female-focused grants programs for emerging entrepreneurs.</p>		
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Annex 2 DHERST: PROJECTS 2017-2038

Year	Institution	Project Title	Amount K Million
2017	UNIVERSITIES		
	University of PNG		
	University of Goroka		
	PNG University of Technology		
	Divine Word University		
	PNG University of Natural Resources and Environment		
	Pacific Adventist University		
	Western Pacific University		
2017	TEACHER COLLEGES		
	DWU Campus - Kabaleo Teachers		

	DWU Campus - St. Barnabas Teachers		
	Madang Teachers College		
	Dauli Teachers College		
	Holy Trinity Teachers College		
	Balob Teachers College		
	Gaulim Teachers College		
2017	NURSING COLLEGES		
	Lae School of Nursing		
	DWU Campus - St. Mary's Nursing		
	Lutheran School of Nursing		
	Mendi School of Nursing		

	Highlands Regional School of Nursing		
	Nazarene School of Nursing		
	St. Barnabas School of Nursing		
	Enga School of Nursing		
2017	TECHNICAL, VOCATIONAL EDUCATION AND TRAINING INSTITUTIONS		
	Port Moresby Technical College		
	Port Moresby Business College		
	PNG National Polytechnic Institute		
	Bougainville Technical College		
	Kokopo Business College		

	PNG Maritime College		
	Madang Technical College		
	Goroka Technical College		
	Mt Hagen Technical College		
	West New Britain Technical College		
	Don Bosco Technical College - Simbu		
	Southern Highlands Technical College		