2018

Maximising the contributions of PHD graduates to national development: the case of the Seychelles

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MAXIMISING THE CONTRIBUTIONS OF PHD GRADUATES TO NATIONAL DEVELOPMENT: THE CASE OF THE SEYCHELLES

This thesis is presented for the degree of

Doctor of Philosophy

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School of Education
2018

Abstract

A Doctor of Philosophy (PhD) degree is the pinnacle of educational attainment and the most respected of the doctoral programs. The degree certifies the holder as an independent researcher, an expert with extensive knowledge about the chosen field of study, and a professional with a wide range of transferable skills. As such, PhD graduates have the capability to make important contributions to knowledge and drive change in society. Furthermore, PhD graduates represent accumulated human capital, a valuable human resource with potential for making significant contributions to a country's development. This can materialise through enhancing the knowledge of others, performing various roles that benefit society, applying acquired skills to research projects, improving the performance of work colleagues and making breakthroughs in research. Yet, not much is known about the extent to which the contributions of PhD graduates are maximised at institutional and national levels, since much of the literature does not focus beyond employability or career paths of PhD graduates.

Informed by the human capital theory (Becker, 1993), this study explored the expertise and perceived contributions of Seychellois PhD graduates to national development, and made recommendations for initiatives to maximise their input. Case study was used to gather multiple perspectives to obtain insights into the views of Seychellois PhD graduates and key stakeholder groups in the Seychelles, a Small Island Developing State (SIDS). The research methodology was informed by a phenomenological paradigm and utilised four data collection methods. An online questionnaire provided data for constructing a profile of the Seychellois PhD graduates. This was supplemented by 38 individual interviews and three focus group interviews. Document analysis was also undertaken. The research sample comprised 53 participants, of whom 24 were PhD graduates and 29 were participants from the university, industry, government and community stakeholder groups.

The data were analysed thematically to identify systemic weaknesses, and generated three key findings: a) Seychelles' lack of readiness for doctoral education; b) limited support and opportunities for PhD graduates; and c) underutilisation of PhD graduates' expertise. These issues have led to their limited involvement in national development.

In response to the findings, three initiatives have been proposed to capitalise on the potential of Seychellois PhD graduates. Firstly, it is vital for a national strategy for doctoral education to include a policy, plan and budget. Secondly, support and opportunities for PhD graduates, actualised through appropriate remuneration, engagement schemes and greater collaboration between PhD graduates and key stakeholder groups to foster participation. Thirdly, better alignment between PhD graduates' expertise and employment, as well as enhanced visibility of their knowledge and skills.

This study has created new knowledge and provided insights into the contribution of PhD graduates to the national development of a SIDS. It addresses a knowledge gap in the literature and offers initiatives for capitalising on the expertise of PhD graduates, paving the way for them to contribute to development in the Seychelles. This new knowledge could also be of significance to other similar small island developing states.

Declaration

I certify that this thesis does not, to the best of my knowledge and belief:

(i) incorporate without acknowledgement, any material previously submitted for a degree or diploma in any institution of higher education;

(ii) contain any material previously published or written by another person except what due reference is made in the text of this thesis; or

(iii) contain any defamatory material

Signed: 

Date: 7th March 2018

Acknowledgements

This thesis is the outcome of a four-year pursuit of knowledge and dedication to continuous learning in my quest for a PhD degree. I have been fortunate to have a supportive learning environment at Edith Cowan University, a network of mentors, helpful scholars, PhD colleagues, friends and family. They each gave input that culminated in the successful completion of the doctorate and the achievement of a lifelong goal. I would like to convey my appreciation and thanks to each and all.

Thank you to my Principal Supervisors, Associate Professor Glenda Campbell-Evans, previously Associate Professor Jan Gray, and Professor Joe Luca for their guidance and astute critiques that sharpened my theoretical thinking, conceptual understanding and grasp of the research process. They were present at all collective supervisory sessions, and mostly in unison, as well as insightful in their comments on the draft chapters. They kept me on track throughout my research journey.

I am grateful for the self-help guidebooks and seminal works of some eminent scholars who clarified my understanding of the research process and methods. I remember the days of self-teaching the 'nuts and bolts' of conducting research, distinguishing the complex concepts of conceptual and theoretical frameworks. I have now mastered the research techniques and feel confident in sharing my knowledge with aspiring PhD students, in addition to conducting research of high academic standards.

I am grateful to the Government of Seychelles for the award of the scholarship. I am also grateful to Agnes Constant and Nadia Lauricourt for their efficient administration of the scholarship.

There has been other support along the way. My PhD colleagues – Mayyada Mhanna, Michelle Tan, Hendrati Nastiti, Arman Abednia, Steve Cohen, Rosemary Allen and Lee Beatty – who provided advice and comfort during the PhD roller-coaster ride. Much appreciation to my special friends who took care of me – Dr Anne Twaite, Dr Fiona Budgen, Dr Susan Main and Christine Lovering – I enjoyed our socialisation.

Special thanks go to Dr Jo McFarlane, Dr John Hall, Associate Professor Helen Vella Bonavita, Dr Geoff Lummis, Dr Neil Ferguson, Dr Alistair Campbell and Bev Lurie. Each played supportive roles that eased the journey to the destination.

My appreciation goes to the research participants for their willingness to share their experiences, thoughtful answers and helpful insights in providing the data for this research. I was in awe of their truthfulness while sharing their experiences and perspectives, and felt proud of the doctoral capital in the Seychelles. These positive experiences motivated me to complete this study, cognisant of the many beneficiaries of the findings.

Finally, I would like to express my gratitude to my three children: Nelson, Ginesta and Ashley, who understand the value of education throughout life's passage; and my grandchildren, Tyler, Sean, Emma and Aiden who are at the beginning of their educational journeys. Social media allowed us to keep in close contact during my four-year absence and helped to overcome the distance that separated us. At last, I can reunite with my family to share my knowledge. I look forward to making my contribution to the ongoing development of the Seychelles.

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List of Acronyms

AfDB	African Development Bank
ANHRD	Agency for National Human Resource Development
AQF	Australian Qualifications Framework
CID	Carnegie Initiative on the Doctorate
CGSETS	Council of Graduate School and Educational Testing Service
CRC	Cooperative Research Centre
EU	European Union
EUA	European University Association
Go8	Group of Eight
HCT	Human Capital Theory
IAU-ACUP	International Association of Universities – Association of Catalan Public Universities
KTO	Knowledge Transfer Office
NBS	National Bureau of Statistics
NQF	National Qualifications Framework
OECD	Organisation of European Co-operation and Development
PhD	Doctor of Philosophy
QAA	Quality Assurance Authority
RDF	Researcher Development Framework
RCUK	Research Councils United Kingdom
RMIT	Royal Melbourne Institute of Technology
SARUA	Southern African Regional Universities Association
SIDS	Small Island Developing State
SQA	Seychelles Qualifications Authority
STEM	Science Technology Engineering and Mathematics
UCSIS	University Consortium of Small Island States
UK	United Kingdom
UNDP	United Nations Development Programme
UKCGE	United Kingdom Council of Graduate Education
USA	United States of America
USD	United States Dollar

Chapter One: Introduction

1.1 Background of the Study

This chapter presents the background of the study, the problem statement, the purpose of the study, the main of the research and research questions, the significance of the study, and an overview of the Seychelles context. It also describes the approach and scope of the research and concludes with a summary of each of the seven chapters.

In today's post-industrial era, many countries have set their sights on becoming knowledge-based economies, where knowledge, research and innovation are vital for competitiveness and wealth creation. Such economies require knowledge workers with doctoral education to generate knowledge for economic and social development (Bitzer, 2012). National prosperity depends on people with skills, knowledge and expertise to drive innovation and create a vibrant workforce (Group of Eight, 2013). Therefore, Doctor of Philosophy (PhD) graduates represent a vital asset for contributing to a country's development.

Doctoral education plays a critical role in fostering economic development (Stephan, Sumell, Black, & Adams, 2004). Furthermore, doctoral education is an investment in human capital, the cost of which is expected to render returns and generate significant benefits in the form of opportunities, greater productivity, better employment conditions and higher incomes (Istaiteyeh & Knerr, 2011). In these ways, investment can have positive outcomes for society and national development. Doctoral education is also a pathway for developing independent researchers with the capacity to produce and disseminate new knowledge and solve problems within society. PhD graduates contribute to innovation through breakthrough research, publishing and forging a competitive edge that feeds national development (Group of Eight, 2013; Lariviere, 2011).

The PhD degree was traditionally pursued as a step towards membership of the academic community. Conferral of the degree involves successful completion of substantial research in a chosen discipline under the guidance of an established scholar. In the process, the PhD graduate becomes part of a scholarly community, lays the foundation for future academic

research and establishes a network for future communication and collaboration. While the benefits of doctoral education have been widely acknowledged, aspects of PhD programs have also attracted criticism with regard to purpose, structure, quality and outcomes (Halse, 2007; Kehm, 2007; Nerad, 2004). In response to this criticism reforms were implemented (Cumming, 2010; Cuthbert & Molla, 2015a; Nerad, 2014), and over the years different models of doctoral training and modes of knowledge production have emerged and evolved. It is no longer acceptable merely to produce a quality thesis; now there is also a focus on developing the candidate. Today, doctoral education is characterised by greater participation rates and a diverse range of doctoral programs and degree types, to cater for the changing needs of society (Blessinger, 2016).

The contribution of PhD graduates to national development encompasses a human capital dimension; hence, this concept informs the study. Human capital refers to human resources with potential for high productivity to generate higher incomes in the labour market, and is therefore important to economic development. Human capital is embodied in the knowledge, skills and attributes possessed by individuals, and is developed through education and training (Organisation for Economic Co-operation and Development, 2001).

Three decades ago, the PhD degree became a reality in the Seychelles when the first native PhD graduate returned from overseas study. Over the years, the number of Seychellois PhD graduates has gradually increased, but little is known about the value, capacity and contributions of these graduates to national development.

1.2 Problem Statement

There is currently limited awareness of the knowledge and skills of Seychellois PhD graduates and the potential of this stock of human capital to contribute to national development. Seychellois were publicly raising concerns about the competencies of PhD graduates, their roles and their contribution to the advancement of Seychelles. In 2015, despite the extent of this contribution being unknown, there were suggestions that they could be enhanced. From a human capital perspective, the researcher, with a background in human resource development, was keen to explore the knowledge and skills of Seychellois

PhD graduates, specifically how their knowledge and skills are drawn upon, how they contribute to national development, and what initiatives could maximise their impact.

The goal of maximising PhD graduates' contributions to national development is also "a global concern" (Baker & Lattuca, 2010, p. 823). In the UK, Leonard, Becker, and Coate (2004) reported that little is known about the utilisation of PhD holders upon award of the qualification. This was supported by Raddon and Sung (2009) who found that "the direct impacts of PhD graduates in the workplace were not evident and a particular gap seems to exist" (p. iv). In Australia, Mowbray and Halse (2010) also questioned the real-world value and impact of the PhD degree. A study in South Africa revealed that the capacity for research of many employed PhDs were not maximised (Herman, 2011). This is consistent with the results of a study by Schwabe (2011) that examined the career paths of doctoral graduates in Austria and identified discrepancies between the purpose of doctoral education and the employment of Austrian doctoral graduates, observing that sometimes they were employed in jobs irrelevant to their studies. Auriol, Schaaper, and Felix (2012) also queried how well the knowledge and skills of this highly educated group of academic graduates are used in society. These studies indicate a problem of limited contribution by PhD graduates.

Given the realities and constraints of the Seychelles as a Small Island Developing State (henceforth SIDS), there were concerns regarding the potential contribution of PhD graduates in this context. The concerns indicate, in general, that the contributions of doctoral graduates do not appear to be optimal. There is also limited awareness of the contributions of PhD graduates in the context of SIDS. Furthermore, the Seychelles Government has aspirations of becoming a knowledge-based society and regional knowledge hub. Since doctoral education is a platform for knowledge production, an in-depth understanding of how Seychellois PhD graduates can help the country achieve its ambitions is vital.

1.3 Purpose of the Study

The main purpose of this study was to seek an understanding of how Seychellois PhD graduates contribute to national development through the multiple perspectives of

Seychellois PhD graduates and four key stakeholder groups. This required identification of the factors that influence the contributions of Seychellois PhD graduates. Furthermore, the study sought insights into the engagement and collaboration of the four key stakeholder groups: the university, industry, government and community, with the Seychellois PhD graduates. Utilisation of the knowledge and skills of Seychellois PhD graduates and their contributions to national development through their employment roles were also investigated.

Other objectives of this study included recommendations for strategic initiatives that will help maximise the contributions of Seychellois PhD graduates to national development, and investigation into the current contributions of PhD graduates. This study therefore contributes to conversations around capacity, roles and achievements of PhD graduates post-graduation and their contribution to national development. The results add new knowledge to the limited research in the field, particularly PhD graduates' contribution in the context of a SIDS. The final purpose of this study was to raise awareness of the potential capacity of PhD graduates, thereby creating opportunities for their effective utilisation and contribution to national development.

1.4 Research Aim and Questions

In response to the problem statement, this study investigated harnessing the knowledge, skills and contributions of Seychellois PhD graduates for national development, and made recommendations for strategic initiatives to help maximise their contributions. The main research aim was:

To generate insights on how Seychellois PhD graduates' contributions to national development can be maximized from a study of the perceptions of key stakeholders on the matter.

Three research questions further refined the main research aim:

(i) To what extent do Seychellois PhD graduates perceive that the knowledge and skills acquired from their PhDs have been utilised for national development?

(ii) How do key stakeholder groups engage with PhD graduates to maximise the use of their knowledge and skills?

(iii) What are the key elements of PhD education that help contribute to the development of a country?

The next section outlines the significance of this study.

1.5 Significance of the Study

This study provides insights into the extent of the contributions of Seychellois PhD graduates and offers initiatives to maximise their potential for national development. It also shows the value of the PhD degree as a driver for economic growth, the benefits PhD graduates bring to the workforce, and their role in national development. The study also uncovered reasons for the extent of the current contributions of Seychellois PhD graduates to national development, with a view to recommending evidence-based initiatives to enhance their contribution.

The findings of this study will help raise awareness of Seychellois PhD graduates among the university, industry, government and community stakeholders about the barriers to their contribution, as well as creating opportunities to make effective use of the expertise gained from their doctoral education. Furthermore, the findings highlighted strategies to encourage more engagement in doctoral education and increased collaboration between stakeholder groups and Seychellois PhD graduates. The findings of this study could also be applicable to other SIDS with similar characteristics to the Seychelles.

The context of the Seychelles is presented in the following section to facilitate understanding of the site of this study.

1.6 Context: The Seychelles

Five key aspects of the Seychelles are outlined to provide a context for this study, commencing with general country information and followed by a description of the national

development goals and economic challenges. Detailed information is provided about education, training, employment, and Seychelles as a SIDS.

1.6.1 General Country Information

The Seychelles is a relatively young nation, first settled in 1770. France ceded its colonisation to Britain in 1814 and Seychelles became a British colony. The Seychelles obtained independence from Britain in June 1976, became a Republic and a member of the British Commonwealth of Nations (Commonwealth Secretariat, 2015).

The Seychelles comprises 123 granitic and coral islands. Mahé, the site for this study, is the largest island in the archipelago with 87% of the population. The Seychelles is geographically remote, being over 1,600 kilometres from the African continent, east of Tanzania, Kenya and Somalia, and north of Madagascar (World Bank, 2017). The Seychelles consists of a small land mass of 455 square kilometers and a massive Exclusive Economic Zone covering more than 1.3 million square kilometers (Ministry of Foreign Affairs, 2013). The Seychelles is located in the western Indian Ocean, four degrees south of the equator and approximately 1,600 kilometers off the coast of East Africa (see Appendix A).

At the time of this study in 2015, the population of the Seychelles was estimated at 93.4 thousands inhabitants (National Bureau of Statistics, 2016b). The people of Seychelles or Seychellois are multi-ethnic and comprise a mix of European, African and Asian ancestries, predominantly of Christian faith. They are multilingual, with English, French and Kreol as the official languages (World Bank, 2017). The adult literacy rate for both genders has been consistently high, at 94% in 2012 (National Bureau of Statistics, 2013a).

The Seychelles is a relatively young democracy with presidential and parliamentary elections held every five years. A one-party socialist system held sway from 1977 to 1992, during which time the opposition played a subordinate role (Veenendaal, 2015). The country returned to a multi-party democracy in 1993, when opposition parties were formed. Nevertheless, political power has remained with the same party since 1977 that has provided political stability. This led to other influences, such as political allegiance to access

employment opportunities as reported in a study by Philpot, Gray, and Stead (2015). In September 2016, parliamentary elections gave the opposition party a majority in the National Assembly, and as a result, the political system is in "cohabitation", a system of divided government. Nevertheless, the President and the leader of the main opposition party engage in dialogue on issues of national importance.

1.6.2 National Development Goals and Economic Challenges

The aim of the Seychelles Government's National Development Strategy 2015 to 2019 was to transform the country from a natural resources-based economy (tourism and fisheries) to a knowledge-based economy through improvements to the education system and in science, technology and innovation across all sectors (Ministry of Finance Trade and Blue Economy, 2015). The goal of a knowledge-based economy was supported by the Human Resource Development Strategy 2017, with the objective of ensuring that the Seychelles is transformed through building knowledge and skills to drive by economic activity and address skills and expertise gaps (Agency for National Human Resource Development, 2017).

Another key goal of the Seychelles National Development Strategy was to transform Seychelles into a sustainable Blue Economy (Ministry of Finance Trade and Blue Economy, 2015). The concept of a "Blue Economy" focuses on the economic potential of the country's Exclusive Economic Zone or marine area for inclusive growth and socio-economic development (AfDB, OECD, & UNDP, 2016).

The Seychelles National Development Strategy also articulates national strategic goals regarding education and human resource development. It indicates the following orientations: "Enhancing human resource capabilities to develop a Seychellois workforce that is adaptive, results-oriented, and fully prepared for the challenges ahead; and fostering participation and contribution of all Seychellois working together and enjoying the benefits of the development process" (Ministry of Finance Trade and Blue Economy, 2015, p. iv). This study explored the contribution of Seychellois PhD graduates in the light of national development goals. However, both the National Development Strategy and the National

Human Resource Development Policy do not refer specifically to the role of doctoral education or high-level knowledge production for achieving the set objectives.

The Seychelles economy is predominantly service-oriented and highly dependent on tourism and the fisheries sectors as the main drivers of growth (World Bank, 2017). The principal activity, tourism, accounts for 21% of total employment and 25% of gross domestic product (Philpot et al., 2015). During the last decade, the Seychelles suffered from a reduction in preferential terms of access to European Union markets and stiffer competition in both tourism and fisheries (Connell, 2013). Nonetheless, the Gross Domestic Product (GDP) per capita has been on the increase for the last six years, and stood at USD 15,577 in 2017 (Australian Department of Foreign Affairs and Trade, 2017). The outlook for medium-term growth is moderate, with the GDP projected to grow by 3.5% in 2017 and 3.3% in 2018 respectively, driven by tourism, information and communications technology, and fisheries (Temesgen & Alcindor, 2017).

Despite its impressive macro-economic performance, earnings were found to be unevenly distributed in the Seychelles (World Bank, 2017). Furthermore, poverty is on the increase. The Household Budget Survey of 2013 indicated that almost 40% of the Seychellois population were living below the Seychelles poverty line (equivalent of approximately USD 9.7 per adult per day) (National Bureau of Statistics, 2016a). The country's high cost of welfare, deficit balance of payments from rising levels of imports, and increasing inflation resulted in monitoring a structural adjustment program implemented by the International Monetary Fund (Philpot et al., 2015).

The Seychelles faces a number of economic challenges, including insufficient economic diversification and vulnerability to external factors. Seychelles is ranked low in terms of business and the private sector is weak, underdeveloped, and in need of a favourable environment for developing new business areas (World Bank, 2017). It is therefore likely that the country will benefit from greater contributions by PhD graduates.

1.6.3 Education and Training

The right to education for every Seychellois citizen is outlined in Article 33 of the Constitution of the Seychelles. The constitution empowers the State to provide free compulsory education in state schools for a minimum period of not less than ten years. Educational programs in all schools are aimed at the complete development of the person, and based on intellectual capability – every citizen has equal access to educational opportunities and facilities beyond the period of compulsory education (Seychelles Government, 1993). In addition, two legal frameworks, the Education Act of 2004 and the Tertiary Education Act of 2011, govern education in the Seychelles. The Education Act is administered by the Ministry of Education (2004) and provides free education for 10 years – six years primary and four years secondary. Furthermore, government provides transport subsidies and allowances for one to three years' post-secondary education. The Tertiary Education Act tasked the Tertiary Commission with a mandate to recommend policies and plans for the development of tertiary education in the Seychelles.

Since 1985, the Seychelles education system has been directed by three major policy principles: "education for all; education for life; and education for social and national development" (Ministry of Education, 1999, p. 9). The principle of education for national development endures according to the Seychelles Education Sector Medium-Term Strategic Plan 2013-2017, which envisions education as "a lifelong process and a contributor to both individual and national development needs" (Ministry of Education, 2014, p. 34). The educational priorities of the Strategic Plan 2013-2017 are: to improve education quality; enhance teacher education and teacher retention; improve school leadership; promote curriculum relevance and lifelong learning; and create responsible and empowered students (Ministry of Education, 2014). As a result of these education policies, Seychelles has achieved universal primary education of the Millennium Development Goals 2013 (Ministry of Foreign Affairs, 2013).

Education in the Seychelles is a comprehensive, integrated, inclusive and co-educational system comprised of five stages – formal early childhood, primary education, secondary

education, post-secondary education and tertiary education – in accordance with the Education Act 2004 (Ministry of Education, 2004). In 2009, in-country tertiary university education (undergraduate and Master degree) was introduced.

The latest population census of 2010 (Table 1) shows the majority (73.8%) of Seychellois had a secondary or vocational education. Only 3.4% had a university education.

Table 1: Highest Education Attainment as at 2010

Education level	Actual	%
Pre-Primary	1,815	2.6
Primary 1 to 6	11,544	16.5
Secondary (1-5 years)	31,107	44.6
Vocational/Academic (1-4 years) [post-secondary]	20,392	29.2
University (undergraduate)	1,620	2.3
University (postgraduate Master & Doctorate)	786	1.1
Other (Not stated)	2,492	3.6
Total	**69,756**	**99.9**

Source: Population and Housing Census Report 2010 (National Bureau of Statistics, 2012)

The National Qualifications Framework (NQF) determines the stages of education by age (Table 2). It is evident that most enrolments are in primary and secondary education, with low enrolments in tertiary non-university and university courses.

Table 2: Seychelles Education System by Age, Stage, NQF and Enrolment

Age (years)	Stage of Education	NQF Level	Enrolment (2015)*
18	University	7-10	952
16-17	Tertiary non-university	3-6	2,418
12-15	Secondary	2	6,952
8-11	Primary	1	8,974
4-5	Early childhood	0	2,986

Source: Seychelles Education Sector Medium-Term Strategic Plan (Ministry of Education, 2014)
*Enrolment compiled from Seychelles in Figures (National Bureau of Statistics, 2016b)

The education system makes tertiary education and training opportunities available to all Seychellois through a cost-sharing mechanism between the Government of Seychelles and means-tested parents of students who meet the criteria for tertiary education. Mature students are also considered for government scholarships on the recommendation of their

employing organisation or evaluation of individual applications. In addition, prospective students benefit from overseas-funded scholarships, offered by bilateral and multi-lateral agencies of the Seychelles Government, and other external sources of funding for tertiary university education.

The university predominantly offers joint undergraduate programs with other established international universities, complemented by a few local programs. As recently as 2015, a few Master degree programs were introduced in conjunction with international universities and tertiary institutions. As at 2010 (Table 3), undergraduate and postgraduate education in the Seychelles comprised small numbers and were male-dominated. At that time, the number of undergraduate students was twice the number of postgraduate students.

Table 3: Seychelles Graduate Education by Gender

Tertiary University Education	Male	Female	Total
Undergraduate	849	521	1,370
Master degree [post-graduate]	334	234	568

Source: Labour Force Survey Report 2011/2012 (National Bureau of Statistics, 2013a)

Higher education in the Seychelles – undergraduate and postgraduate – received greater attention in the early 1990s (Ts'ephe, 2012). Almost two decades later in 2009, Seychelles established its first public university, which is still in its infancy today.

Table 4: Seychelles University Education 2014-2015

Number	**2014**	**2015**
University	1	1
Enrolment	205	952
Student/Teacher ratio	7:1	19:1

Note: Compiled from Seychelles in Figures (National Bureau of Statistics, 2016b)

During 2014 and 2015 (Table 4), tertiary university education in the Seychelles consisted of a single university with low enrolment figures. A significant increase in enrolment figures in 2015 can be seen but there is no documented explanation for this increase.

The University of Seychelles is small and offers few home-grown undergraduate programs, mainly in environmental and social sciences. Most of its undergraduate and Master degree programs were developed around strategic partnerships with international universities in the UK, France and Australia. The majority of these courses are external undergraduate programs delivered under special agreement by the University of London. The university continually enhances its capacity and expands its offerings, but does not yet have the capacity to award doctoral degrees. Students who wish to pursue full-time doctoral degree programs travel overseas, particularly to Europe, or enrol in distance-learning programs.

The policy guiding the award of government scholarships in the Seychelles is focused on undergraduate degrees, but makes provision for training at Master degree level after a minimum of two years' post-undergraduate work experience (Agency for National Human Resource Development, 2014). Undergraduate and postgraduate programs, which are not available in the Seychelles, are undertaken overseas largely in the UK, South Africa and Mauritius, being approved training venues, funded by the Seychelles Government. Seychelles also receives scholarships, principally from China, Russia and New Zealand (Agency for National Human Resource Development, 2014). The training strategy is aimed at increasing university graduates in the workforce, which stands at less than 4% of the employed population (National Bureau of Statistics, 2013a). The Seychelles national training policy is currently silent on doctoral education.

1.6.4 Employment

In 2011 the Seychelles had a high labour force participation of 50,945, nearly full employment, with an unemployment rate of less than 5% (National Bureau of Statistics, 2013a). However, youth unemployment is about three times higher than the national unemployment rate (World Bank, 2017), which may be indicative of a lack of appropriate skills to match employment opportunities. The shortage of skilled human capital in the Seychelles has led to an increased reliance on expatriate labour (Ministry of Finance Trade and Blue Economy, 2015). In 2013, expatriate employment represented more than 20% of formal employment (Agency for National Human Resource Development, 2015).

The employed population across three broad sectors in the Seychelles and three data sources at different periods (Table 5) show consistent predominance of employment in the private sector or industry. At that time, the private sector employed almost two thirds of the working population, and the government sector (including parastatal organisations) employed the remaining one third.

Table 5: Employed Population by Sector 2011/2012

	Data sources		
Sector	**Census 2010 (%)**	**Labour Force Survey 2011/12 (%)**	**Statistical Abstract 2016 (%)**
Private	69.2	62.1	67.7
Government	18.7	25.1	19.7
Para-statal*	11.1	10.3	12.6
Other	1.0	2.5	0.0
Total	100	100	100
Employed persons	49,170	39,950	47,942

Source: (National Bureau of Statistics, 2012, 2013a, 2013b, 2016b) *quasi-governmental organisation.
Note: Private sector includes industry - the two terms are used interchangeably.

1.6.5 Small Island Developing State (SIDS)

The Seychelles is the smallest country in Africa and the 12th smallest state in the world as determined by territory size and population (Ministry of Education, 2014). It is classified as a "Small Island Developing State" and is referred as SIDS. The term SIDS has gained recent prominence among states in recognition of their specificity, unique characteristics and similar vulnerabilities (United Nations Office of the High Representative for the Least Developed Countries Landlocked Developing Countries and Small Island Developing States, 2011).

According to the latest Human Resource Development Policy 2017, Seychelles faces challenges related to economies of scale. This includes limited national financial and human resources and the challenges of creating opportunities for access to new markets (Agency for National Human Resource Development, 2017). The Seychelles Government aims to adopt a sector-based strategy to address these issues and align its resources to priority

areas. The policy also aims to provide Seychellois with appropriate qualifications to equip them for higher-level occupations, yet there is no mention of the role that doctoral education could play in policy achievement.

The vulnerability of SIDS is often associated with threats that encompass natural disasters, land degradation, marine pollution and economic crises (Philpot et al., 2015). The Seychelles is vulnerable to natural disasters, including floods, rising sea levels, tsunamis, and in recent years it has also been susceptible to piracy in the Indian Ocean region (World Bank, 2017). According to the findings of a recent study by Philpot et al. (2015), Seychelles is perceived to be both vulnerable and resilient.

Seychelles possesses a small cohort of university-educated nationals, and an even smaller number of postgraduate holders. One of its major challenges is the shortage of skilled human resources that hinders its ability to play an active and leading role internationally and build partnerships that foster a climate conducive to the development and prosperity of the Seychellois (Ministry of Finance Trade and Blue Economy, 2015).

The literature indicates that SIDS suffer from specific challenges due to their characteristics and therefore have a number of problems in common: their land mass size, population, small markets, remoteness and insularity. SIDS depend on foreign exchange from a small range of primary export products; and generally have limited local capital for productive investment (Briguglio, 1995). In short, opportunities for generating revenue in SIDS are limited.

According to Everest-Phillips (2014), political patronage is typical in SIDS where public resources are controlled by politics rather than public policy. Undue political interventions, linked to excessive administrative involvement and the power exerted by some politicians, can impinge on the performance of employees.

The issue of “smallness” in SIDS populations places into focus the need to address factors that constrain opportunities for Seychellois. Every person constitutes a large share of the

citizenry and their capacity to contribute is therefore critical to all (International Monetary Fund, 2017).

The foregoing provides an overview of the context and constraints for Seychellois PhD graduates. Given this background, the aim of this study was to understand how PhD graduates who studied in developed countries such as the UK, France and the USA, have translated their training, adapted to the SIDS context, and contributed to the development of Seychelles. The study also identified strategic initiatives for enabling PhD graduates to contribute to national development.

1.7 Research Approach and Scope

A case study design was used to examine the contributions of Seychellois PhD graduates to national development within a bounded context (Yin, 2014) and conducted in a natural setting (Lincoln & Guba, 1985) in the Seychelles. The study was informed by the Human Capital Theory (Becker, 1993) to help understand the knowledge and skills Seychellois PhD graduates add to the value chain of education and productivity in relation to economic growth.

In addition to a quantitative online questionnaire, the research employed mainly qualitative methods – interviews and focus groups – and documentary evidence to gain insights into the profiles and experiences of 53 participants. The study followed the four-step research process advocated by Crotty (1998). The data collection and data analysis procedures were guided by Miles, Huberman, and Saldaña (2014) with the assistance of Nvivo 11 software, and guided by Bazeley and Jackson (2013).

A phenomenological approach was chosen to gain an understanding of the contribution of Seychellois PhD graduates from their own perspectives as well as those of four key stakeholder groups: the university, industry, government and community. Ethical considerations were taken into account in the data collection, analysis and reporting of the results.

The study included only Seychellois who had earned their PhD degrees through academic research, and excluded holders of honorary or "*honoris causae*" PhDs, awarded to distinguished Seychellois in honour and recognition of significant achievements. It was also limited to Seychellois PhD graduates who were living in the Seychelles at the time of the research. Since the focus was on Seychellois PhD graduates' contribution to national development, non-Seychellois PhD graduates living and working in the Seychelles were also excluded. The objectives of this exploratory study were to gain insights into the contribution of Seychellois PhD graduates to national development and identify ways of maximising their contribution. The findings may be applicable to similar contexts.

1.8 Thesis Outline

This thesis consists of seven chapters (Figure 1): Introduction, Literature Review, Methodology and Methods, PhD Graduates' Perspectives, Stakeholder Groups' Perspectives, Discussion of Findings, Conclusions and Recommendations.

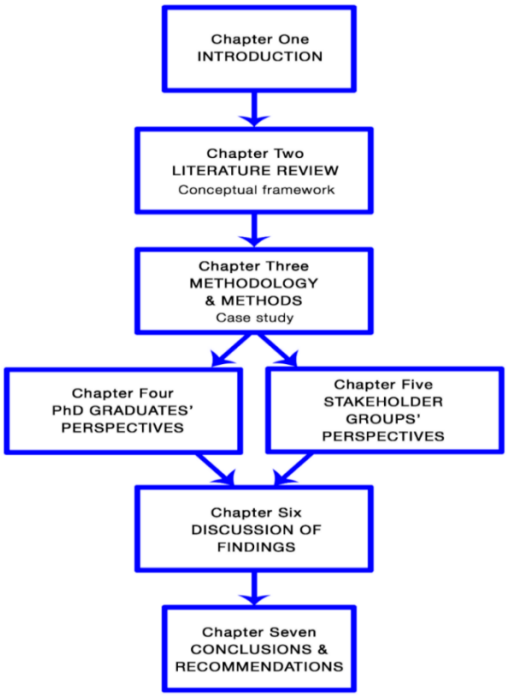

Figure 1: Thesis Outline

Chapter one sets the scene by stating the problem and research questions. It outlines the purpose and significance of the study, and provides the background and context of the case study.

Chapter two presents a review of the relevant academic literature which helped to identify gaps in knowledge and generate the research questions. It also outlines the historical evolution (models and modes), outcomes, critiques and reforms in doctoral education in different countries around the world. Next is a review of the core competencies and areas of contribution of PhD graduates internationally, followed by a description of Human Capital Theory that informed this study. Engagement and collaboration of key stakeholders are described before concluding with the conceptual framework.

Chapter three describes the case study methodology used in this research and justifies the choice of a qualitative research design. The major research instruments are described, viz., online questionnaires, semi-structured interviews, focus groups and document analysis, and the procedures outlined for data collection and analysis. The chapter also highlights the ethical considerations in relation to the anonymity of research participants.

Chapters four and five report on the key findings, based on a thematic analysis of the perspectives of 53 research participants: chapter four presents the perspectives of the 24 Seychellois PhD graduates, and chapter five presents the perspectives of the 29 participants from four key stakeholder groups: the university, industry, government and community. Their perspectives are supplemented by the results from relevant documents.

Chapter six discusses the findings that emerged from the cohort of Seychellois PhD graduates and the four stakeholder groups, and links these to the findings from previous, relevant literature. The chapter also discusses the contributions of Seychellois PhD graduates and potential initiatives for maximising their contribution to national development.

Chapter seven concludes the study with a summary of the findings in relation to the problem, and answers the research questions posed in chapter one. This chapter also identifies the limitations of the study, states the implications for further research, and makes

three recommendations for enhancing the contributions of Seychellois PhD graduates to national development.

The next chapter, chapter two, presents a review of the literature to understand the key concepts, and presents a snapshot of existing studies on the topic. It also outlines the theoretical orientation and the conceptual framework for this study.

Chapter Two: An Overview of Related Academic Literature

2.1 Introduction

Chapter one introduced the research topic, outlined the problem, stated the research questions that directed this study, indicated the purpose and significance of the study, and described the context of the Seychelles. Chapter two presents a review of the literature on doctoral education with a focus on the capabilities and contributions of PhD graduates to national development. It also discusses the purpose, outcomes and value of doctoral education, and the knowledge, skills and contributions of PhD graduates to national development. The literature review guided the theoretical orientation and formulation of the conceptual framework for this study.

Four broad topics are outlined from the literature review; each is discussed in more detail in the sections below. The first of these presents an overview of doctoral education, including the historical evolution of the research PhD, the reforms leading to different models and modes of knowledge production, and trends in doctoral education. The second section provides insights into the concept of human capital and introduces human capital theory (Becker, 1993) which informed this study. The third section reviews the value of PhD graduates in terms of their generic knowledge and skills, their employment, careers and income. The fourth section synthesises key stakeholder engagement and collaboration in doctoral education, particularly the university, industry and government, and concludes with the conceptual framework for this study.

2.2 Overview of Doctoral Education

This overview of doctoral education situates, defines and provides insights into the PhD or doctorate, both used interchangeably throughout this study. It comprises four sections: a) definition and purpose of the doctorate; b) history and evolution; c) reform of doctoral education; and d) trends in doctoral education.

2.2.1 Definition and Purpose of the Doctorate

The Doctor of Philosophy degree (abbreviated as PhD or Ph.D. or alternatively D.Phil., identical in meaning) comes from the Latin word *Doctor Philosophiae,* meaning teacher of philosophy (Clark, 2006). The PhD is a doctoral degree or doctorate, thus all three terms are used interchangeably in this thesis. On conferral of the PhD degree, the graduate is entitled to use the title of "Doctor" or "Dr" regardless of field of study, university, country or model of PhD (Poole, 2015, p. 1511). The acronym "PhD" has become the designation for research doctoral degrees in different fields (Torstendahl, 1993).

There is no universally agreed definition of a PhD degree. Standing (2010) defines a PhD as "a qualification that involves the equivalent of three years focused research culminating in a substantial thesis" (p. 1). However, the duration of a PhD can be longer depending on the mode. Standing's definition refers to the traditional full-time research PhD and minimal requirements. Yates (2004) described a PhD as "a form of accreditation that certifies that the holder has proved himself or herself as a researcher and warrants admission to the community of licensed academics or competent scholarly independent researchers" (p. 61). Phillips and Pugh (2000) argued that awarding the PhD "proclaims that the recipient is worthy of being listened to… the PhD holder is in command of the field of study and can make a worthwhile contribution to it" (pp. 20-21). All these definitions suggest that a PhD graduate is recognised as an expert in his or her field and is qualified to conduct research independently. The PhD is also awarded to demonstrate capacity, i.e. "*how* to do research to fully professional standards", and over time "gives the status to examine other people's PhD theses" (Phillips & Pugh, 2000, pp. 22-23). Around the world, the PhD degree is the pinnacle of formal educational achievement (Group of Eight, 2013). The degree is the most respected qualification of doctoral education programs. Green (2012) claimed the PhD "is the degree of preference, and the one with the highest status, the greatest prestige, even as it became the key marker of academicity, that is, of licensed academic identity" (p. 17). Noble (1994), and Phillips and Pugh (2000) referred to PhD education in such terms as "elite" and "secret club", inferring membership of exclusive association.

According to Ozturk (2001), doctoral education represents the most advanced level of formal education and lies at the heart of innovation. A doctoral degree implies intensive training through independent research under supervision, aimed at creating new knowledge. The expected outcome is an early-stage researcher with disciplinary knowledge, specialist research and transferable skills that can be used in a variety of careers (Sursock, 2017). A doctorate is considered "the epitome of an academic education… an internationally recognised award" (Kiley, 2009, p. 889). The main purpose of doctoral education is agency of a discipline, as outlined by Golde and Walker (2006):

> [T]o educate and prepare those to whom we can entrust vigour, quality and integrity to the field. This person is a scholar… someone who will creatively generate new knowledge, critically conserve valuable and useful ideas, and responsibly transform those understandings through writing, teaching and application. We call such a person a 'steward of the discipline' (p. 5).

Globally, doctoral education is recognised as an essential component of growth and sustainability of higher education institutions, and a foundation for knowledge production within societies (Kotecha, Steyn, & Vermeulen, 2012). Doctoral education develops the next generation of researchers and is important for its contribution to research. Accordingly, doctoral graduates are regarded as researchers of the future.

Most countries around the world appear to be convinced that scientific research is key to economic growth and prosperity, and are expanding their doctoral education programs (Benito & Romera, 2013). These nations have made the link between doctoral education and the economy to ensure a competitive foothold in the 21st century.

In the USA, doctoral education is viewed in terms of national demand, which is training researchers to grow the national research capacity, providing knowledge workers for the knowledge economy and academic staff for higher education. At an individual level the motivation to undertake a PhD ranges from access to better job prospects to personal growth (Mouton, 2001). Researchers predict that a doctoral degree will become the new bachelor degree in the knowledge economy, the minimum education that will be required

by employers seeking high-level skills (Council of Graduate Schools and Educational Testing Service, 2010).

In America, prosperity is associated with doctoral education because doctoral graduates contribute significantly to the economy (Stewart, 2010). American doctorates are highly regarded by other universities and nations who aspire to the same outcomes (Altbach, 2004a; Nerad, 2004). Graduate schools in the USA produce scholars and professionals with knowledge and skills in critical disciplines, and analytical judgement to synthesise complex information within their own and related fields (Stewart, 2010). Doctorate holders in the USA make a significant contribution to the creation of new knowledge, developing life-saving medical interventions, educating undergraduates and shaping social programs and policies (Walker, Golde, Jones, Bueschel, & Hutchings, 2008).

In the UK the doctoral degree is considered a "global brand" and viewed as preparation for employment (Clarke, 2014, p. 17). The country has a strong research base and is recognised as a world leader in research with a robust international reputation (Higher Education Funding Council for England, 2013). In the UK, the PhD is evolving in response to 21st century demands for a degree that promotes the development of personal and professional attributes to support careers.

In North America, the PhD qualification is mandatory for teaching in higher education, employment in research, and advisory work in government and business (Cude, 2001). The PhD degree has become an essential job qualification in non-academic sectors in Canada, as 60% to 70% of all Canadian PhD graduates work outside universities according to the Association of Universities and Colleges of Canada (as cited in Elgar, 2003) (Clarke, 2014).

In summary, the literature review indicates that doctoral education commands value, produces knowledge, serves as preparation for employment, and is key to economic growth. It also shows that doctoral graduates have the potential to make a significant contribution to research, and in turn, to society.

2.2.2 History and Evolution

The historical evolution of the doctorate is presented chronologically below in two main periods: the medieval and reformation Europe (12th to 18th centuries) and the modern research university (19th century to present).

2.2.2.1 Medieval and Reformation Europe (12th to 18th centuries)

The history of the doctorate can be traced back to medieval universities in the 12th century when it was a licence to teach at university. The doctoral degree has a European origin, with the first doctorate awarded in Paris in 1150 (Noble, 1994). At the time, a doctoral degree was "a means of accrediting teachers" (Taylor, 2012, p. 118). Traditionally, a doctoral degree was pursued to obtain membership of the academic community (Becher, 1989). The primary subject areas for doctorates were theology, law and medicine. Then the examination was oral and the teacher wrote the thesis, which the student had to defend or oppose. Later, in Europe during the Reformation, the purpose of doctoral education was to train priests in theology and church administrators in law, and examination was by a board of professors (Bernstein et al., 2014).

In the Middle Ages, possession of a doctoral degree denoted membership of a special, elite academic club of the most learned scholars in the field (Clark, 2006). In Germany, the "old academic and professional elites became more powerful and influential groups in society" (Enders, 2002, p. 496). Clark (2006) shared some "interesting" academic privileges enjoyed by doctoral degree holders in the late Middle Ages:

> To be able to silence the players of silly games interrupting their studies
> To be able to stop buildings that would block the light in their studies
> To be able to stop buildings that would block the light in their lecture halls
> To have their sons preferred for academic positions
> To be able to sit in the presence of magistrates
> To be able to give a legal deposition at home
> To be freed from quartering soldiers and performing night watch

> To be able, along with their wives, to wear the same clothing as nobles
> To have rights of social precedence over knights
> After twenty years, to be held as the equal of counts
> To receive the benefit of doubt in any suspicion of crime
> To be free from being either manacled or detained in prison
> And, happily, doctors could not be tortured (p. 187).

In the tradition of Plato and Socrates, doctoral education was described as "oral combat" (Clark, 2006, p. 203), whereby students argued in public in order to demonstrate their scholarly knowledge and skills. Later, academia was transformed from an oral into a written culture.

Doctoral education commenced in parts of Europe in the 1870s. In the 1800s, the doctoral degree acquired its contemporary status as the highest academic honour, "principally to develop members of an elite group of scholars employed mainly in universities or allied research institutes" (Evans, 2001, p. 276). Historically, the thesis or dissertation was confirmation of authoritative knowledge transmitted in modern universities (Pechar, Ates, & Andres, 2012). The thesis included research of significant original knowledge and was presented by PhD candidates for examination at the end of their candidature (Park, 2005). According to the University of Melbourne (cited in Park, 2005) a successful thesis "is a careful, rigorous and sustained piece of work demonstrating that a research 'apprenticeship' is completed and the holder is admitted to the community of scholars in the discipline" (p. 196). In other words, the thesis is an academic document that defines the transition from PhD candidate to scholar. The ability to design, carry out and defend an original piece of research or thesis was widely held to be adequate preparation for the professoriate (LaPidus, 1995). During that period, the aim of doctoral education was to create new knowledge and train future professors in philosophy, natural sciences and humanities, and examination was a written thesis by the student (Bernstein et al., 2014). Until around the middle of the 18th century, aspiring academics were expected to "perform their knowledge in a public disputation" (Barnacle & Mewburn, 2010, p. 434), defending

their knowledge against opponents who presented unorthodox arguments, thereby securing their right to occupy the position of academic and the authority of a scholar (Clark, 2006).

2.2.2.2 Modern Research University (19th century to present)

The PhD degree evolved from the early 19th century through the work of Wilhelm von Humboldt, the Prussian (modern-day German) philosopher, then Minister of Education. Humboldt established the research university, where creation of knowledge was as important as teaching (Noble, 1994; Pearson, 2005). He reformed both the role of the university and the PhD into an academic and research degree to prepare scholars and scientists in Germany during the early 1800s. The reform was "in response to major political, economic and social changes" (Pearson, 2005, p. 121). Friedrich Wilhelm University in Berlin was the first university to award a research PhD, becoming the world's first research university (Taylor, 2012; Taylor & Beasley, 2005) focused on national development.

At the outset of the doctorate in the 19th century, philosophy was the main subject of scholarly learning, but over time this shifted to a pursuit of scientific knowledge (Backhouse, 2009). The 1950s and 1960s saw research rise to the top of the political agenda as key to both economic growth and defence capability, and as a result, PhD programs in western European countries experienced rapid growth (Taylor, 2012). Doctoral education was primarily about research training for developing independent researchers to produce worthy contributions to knowledge. At the time, the typical perception of a doctoral student in Europe was as a white, young, middle-class male (Bendix Petersen, 2014).

In the middle of the 19th century, the USA adopted the European form of advanced learning, and in 1861, the PhD was conferred at Yale University, subsequently spreading to Canada in the 1900. By the beginning of the 20th century, Veysey reported that the PhD degree had become almost a mandatory qualification for academic appointments at leading universities in the USA (as cited in Noble, 1994).

In the UK, the PhD was first introduced at Oxford University in 1917 (Park, 2007), and later in 1927, it was awarded in New Zealand (Noble, 1994). The PhD was conferred at the

University of Melbourne in Australia in 1948 (Pearson, 2005). Noble (1994) argued that the PhD degree was brought to the UK and Australia for "political nationalism" (p. 20). Much later, in the 1990s, the PhD reached South Africa (Backhouse, 2009) and elsewhere. In its long history, doctoral degrees have proliferated in mode and number, but the PhD is still the most widely preferred degree (Noble, 1994).

In European countries, doctoral education gained impetus in the 1990s (Karner & Puura, 2008). Since then, it has shifted from a master-apprenticeship model, and the product (thesis) has moved to a process of learning, including skills development and formal education at university (Kehm, 2006; Park, 2005). Today, doctoral training emphasises the development of competencies for doctoral graduates to become knowledge workers in response to the knowledge economy and a global market (Park, 2005). In his later work, Park (2007) attributed the change in emphasis from product to process to the influence of globalisation and development of knowledge economies. Today, doctoral education has become a labour market qualification (Park, 2007).

In the 20th century, the elite university system gave way to a higher education system that was increasingly massified (Henkel, 2000). The term "massification" connotes substantial expansion of student numbers with differing characteristics (Moreau & Leathwood, 2006). Noble (1994) identified three significant changes to the PhD since its emergence in Paris and establishment in Berlin: a) the requirement of a written thesis rather than a verbal public disputation; b) the degree no longer signifies the holder's competence in philosophy; and c) the holder possesses academic abilities to conduct independent research rather than merely a licence to teach. Disney, Harrowell, Mulhall, and Ronayne (2013) argued: "the change in focus of the research degree from an academic apprenticeship to a process-based qualification has highlighted the significance of the development of a wider and more transferable skill set during the research degree" (p. 14).

Over time, doctoral education has undergone significant transformation. Taylor (2012) identified twelve major developments; eight in 2009 and four in 2012. These are: "massification; internationalisation; diversification; commodification; McDonaldisation;

regulation; proliferation; capitalisation; casualization; dislocation; augmentation and cross-fertilisation" (p. 118). He argued that these developments altered the role of doctoral supervisors to one of researcher developers; hence, supervisors must enhance their "professionality" (p. 123) in order to support new, diverse early career researchers.

A paradigm shift was advocated for the PhD to encompass training rather than being a purely academic pursuit. Park (2005) promoted this view of the PhD as a process of research training and development of skills and expertise. The process or training view was also supported by Neumann (2007) who identified other pathways for obtaining PhDs, such as publication of a book of refereed articles instead of submission of a thesis.

In most countries, the traditional view of the PhD as commencement of an academic career prevails, and implies having the ability to carry out independent and original research embodied in a thesis. However, the PhD has increasingly become regarded as a "labour force qualification" (Chiang, 2003, p. 6). This utilitarian view looks upon PhD as professional, high-level education, and research as part of the broader training (Melin & Janson, 2006). Cuthbert and Molla (2015b) contended the PhD had a new political prominence as it was being reconceptualised to serve primarily the economic and innovation agenda.

While the doctorate has evolved over the years, the concept still stems from authority and command of the subject discipline. Historically, the main purpose of the PhD was to develop elite scholars destined for academia in universities and research institutes (Evans, 2001), with the goal of meeting perceived needs in research and research training, particularly in the sciences (Pearson, 2005). The PhD is no longer merely a pathway into a career in academia; it has become a qualification for work in diverse settings (H. Green, 2005).

2.2.3 Reforms in Doctoral Education

In the late 20th century, the doctorate came under scrutiny and was criticised for poor program quality and graduate employability (Altbach, 2004a; Harman, 2002; Manathunga et al., 2012; Nyquist, 2002; Usher, 2002). Criticism originated from various sources and stakeholders, such as: universities, government, industry, non-profit organisations and the

students themselves (Nyquist, 2002). Their concerns and criticisms have been clustered into two key areas: a) program quality and b) employability skills, and presented in turn below.

2.2.3.1 Program Quality

Criticisms of poor quality doctoral programs included: over-specialisation, too much focus on academic aspects, poor supervision, low completion rates, lack of transparency in admissions, duration, lack of structure and high attrition rates.

In the 1990s the traditional PhD was criticised for its epistemology and methodology (Lee, Brennan, & Green, 2009). This view was supported by Nerad (2004), who complained about doctoral programs being overly specialised and highlighted the failure of universities to provide professional skills development. Halse (2007) asserted the doctorate was in "crisis" because the PhD was overly geared to producing future academics with little regard for non-academic sectors. In the UK, the Harris Report criticised the over-specialisation and poor quality of doctoral education (Harris, 1996). Kemp (1999) identified poor supervision of doctoral students, and de Valero (2001) reported on low completion rates. Nyquist (2002) criticised doctoral programs for being too long and campus-based, and Green (2005) slated the heavy emphasis on a thesis rather than the process and ability of graduates to conduct research. According to Nerad (2004), doctoral programs were too theoretical in orientation and too narrow in scope. The admission process lacked quality assurance and transparency (Kehm, 2007). The duration of a doctoral qualification was too long and there was a lack of structure and systemisation (Enders, 2002).

Attrition or non-completion of doctoral education was also a major criticism. In the USA, many PhD candidates failed to complete and submit their theses, leading to the "All But Dissertation" (ABD) syndrome. The attrition rate of doctoral students was about 50% (Walker et al., 2008), and similarly, only about 50% of doctoral candidates in European universities completed their degree (Bitusikova, 2009). Some of the reasons for ABD were reportedly inadequate supervision, unmanageable research topics, unsustainable funding and inadequate structure and support (Blum, 2010).

In Africa, Bates et al. (2011) found some universities lacked the capacity to develop their own researchers and scientists. Hence, there was a push for funding support to create an enabling environment for domestic universities to produce their own doctorates. This called for strengthening the capacity of African universities to deliver quality doctoral programs. In another related study, Akuffo et al. (2014) advocated the need for reviewing doctoral education and strengthening institutional capacity in Uganda, and stated the requirements for an environment that would enable the research capacity of African universities. Most were consistent with those of Bates et al.'s (2011) framework for doctoral programs and included policies, strategies, budgets, communication infrastructure and career pathways.

A team of researchers investigated the structures and processes necessary to develop quality doctoral programs in African universities. Bates et al. (2011) responded to this gap in knowledge by developing and testing a framework (see Figure 2). In assessing the capacity for doctoral programs in African universities, these authors identified four essential components as follows: institutional policies and structures; research environment and infrastructure; doctoral life cycle; and the student experience.

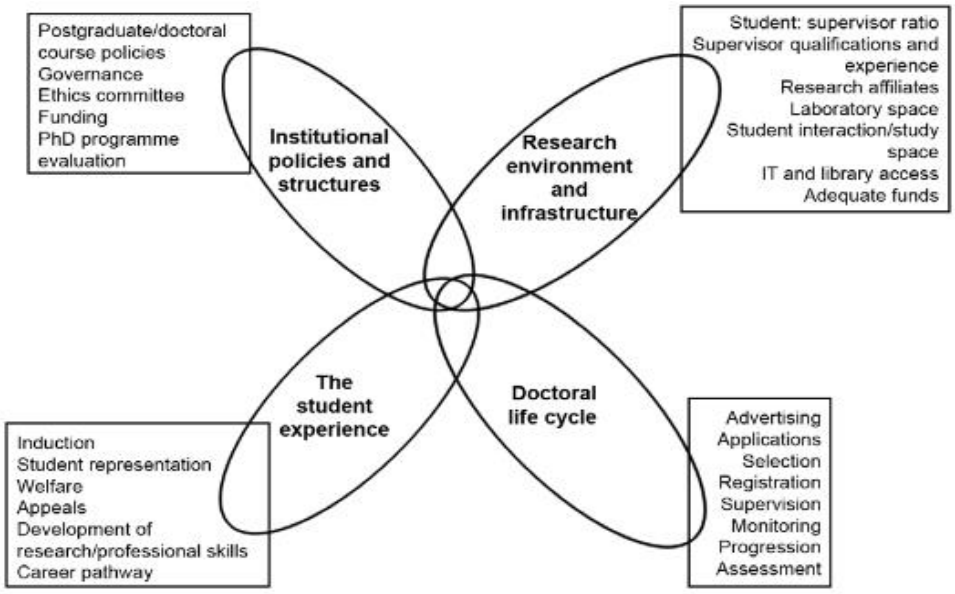

Figure 2: Framework of Four Components of Doctoral Programs
Source: Bates et al. (2011, p. 2)

Institutional policies and structures require policies, governance, ethics oversight, funding and evaluation of PhD processes for doctoral programs. Policies need to be accompanied by enabling infrastructure and a favourable research environment, including experienced supervisors, laboratories, information technology and library access. A further component of the framework, the doctoral life cycle, encompasses admission, supervision and assessment. The fourth component relates to the student experience in terms of researcher development, professional skills and career pathways. The framework offers a useful guide for universities to assess their readiness to offer quality doctoral programs.

The doctorate is considered the most expensive form of higher education (Johnsrud & Banaria, 2004). It involves substantial financial investment in the research and an average of four years' full-time study. Funding sources are diverse and include scholarships from universities, governments, organisations and industry project funds (Durette, Fournier, & Lafon, 2016). The investment can take the form of a combination of self-financing and working part-time; scholarships from national governments and Research Councils; private sponsorships; or a mix of small grants from charities, trustees, organisations and industry; and bilateral and multilateral donor organisations. Funding is a key issue as it influences the orientation of doctoral education and influences who gets to embark on an academic career (Elmgren, Forsberg, & Geschwind, 2016). In the UK and other European countries, the government funds doctoral education through distribution of funds to universities and research training providers. Other sources of funding include Research Councils; charities and institutions, industry, research grants, and the graduates themselves through bank loans and other sources. The basis of government funding policy in the UK and Australia was changed from student enrolment to doctoral completions (Neumann, 2007; Powell & Green, 2007), that is, universities receive funding for the number of completed doctoral graduates.

2.2.3.2 Employability Skills

Criticisms of PhD graduates' employability skills include limited generic skills, narrow disciplinary knowledge, emphasis on theoretical knowledge rather than practice, and massified enrolments.

A study by Green, Maxwell and Shanahan (2001) attested to the lack of employability skills of PhD graduates who encountered difficulties finding appropriate employment. In the UK, the doctorate was found to provide limited generic skills (Roberts, 2002). Harris (1996) reported doctoral graduates were ill equipped for workplaces outside of academia. In Australia there were complaints that the doctorate was too specialised, emphasised academic knowledge over practice, and graduates lacked employability skills leading to difficulties finding suitable work (Halse, 2007).

Another major issue with the doctorate was massification of enrolments resulting in an oversupply of PhD graduates (Cyranoski, Gilbert, Ledford, Nayar, & Yahia, 2011; Vedder, 2011). Siwinska (2013) considered quality assurance a challenge in view of the surfeit of doctoral graduates, and Taylor (2012) argued that the increasing graduation rates of PhDs had led to massification. Presumably, the increase of PhD stock worldwide was to grow the number of researchers across all sectors. The Organisation for Economic Co-operation and Development (2010) encouraged the expansion of a competitive edge and commercialisation of knowledge. However, industry was unable to absorb the glut of PhD graduates due to their perceived lack of appropriate skills (Enders, 2002). Walker et al. (2008) claimed: "the PhD is a route to many destinations, and those holding a doctorate follow diverse career paths" (p. 4). Some PhD holders seek jobs in academe, whereas others choose business, industry, government or non-profit organisations. In the UK, the number of future doctorates is largely unplanned and left to market forces (Green & Powell, 2005).

Park (2005, p. 199) proposed "a switch from content to competence", that is, a focus on students' doctoral experiences rather than the thesis. The fact that many doctoral graduates find work outside academia strengthens the argument for generic and flexible skills given the range of career destinations in expanding markets (Gilbert, Balatti, Turner, & Whitehouse, 2004). Other worldwide changes in the doctoral education landscape, such as diversification and new forms of doctoral programs, have also contributed to a higher number of doctoral graduates seeking employment outside academia (Borrell-Damian et al., 2010). It therefore appears that the challenges of doctoral education relate to both external, societal forces and those inherent in the academic system (Altbach, 2004a).

Despite criticism of the PhD degree "the doctorate is flourishing in universities around the world, with more doctoral graduates contributing to society and the economy than ever before" (Clarke, 2014, p. 19). Governments worldwide have invested in the expansion of doctoral education (Nerad, 2011). An OECD study by Borrell-Damian (2009) reported that large research and development companies in Europe preferred graduates with deep disciplinary knowledge and expertise, and not all employers in business valued soft skills in the workplace.

2.2.3.3 Reform Initiatives

More recently, national and international reports, conferences, and seminars have questioned the effectiveness of the traditional mode of doctoral education and called for its reform to better prepare graduates who are pursuing careers in and outside academia. Several scholars and researchers advocated for reforms in doctoral education. Kendall (2002) argued for "doctoral education to be reinvented, rapid and relevant and rigorous" (p. 132). Nyquist (2002) posited: "the PhD was not 'done wrong' but the changes in society create new requirements, and we need to honestly assess the efficacy of the PhD now…" (p. 13) because global forces are continuously impacting and changing national systems of education (Bawa, Gerdeman, Jayaram, & Kiley, 2014). In the USA, the Carnegie Foundation has been an ardent advocate of reforming the doctorate. Taylor (2011) recommended reforming the PhD or closing it down. He argued for comprehensive reform of PhD programs and skills development, claiming that pressure for change will come from many sources, such as students, administrators, the public and private sectors.

These proponents for PhD reforms questioned the adequacy of the training to foster creativity and prepare future professors (Buchanan & Herubel, 1995). Melin and Janson (2006) argued that PhD graduates ought to possess the following skills and abilities in order to meet the demands of potential employers:

- Managerial and leadership skills;
- The ability to communicate with the public;
- The ability to connect with foreign colleagues in networks;

- Administration of projects;
- Dealing with and understanding potential circumstances;
- Negotiating with business partners; and
- Cultural understanding (p. 109).

Furthermore, Melin and Janson (2006) postulated that society expects doctorate holders to be multi-skilled researchers, managers and entrepreneurs.

Over the past two decades, seven influential reviews were undertaken in the UK to evaluate and reform doctoral education. These reviews primarily recommended the integration of generic, transferable skills and promoting quality assurance in doctoral programs. They are summarised below:

- Harris (1996) investigated higher education and recommended quality assurance, including personal development plans for doctoral candidates.
- Dearing (1997) recommended the introduction of quality standards in doctoral education.
- The reviews of Roberts (2002) and Leitch (2006), which analysed career development of doctoral graduates, were particularly influential. Their reports recommended the integration of generic transferable skills in PhD programs. In addition, Roberts argued the advantage of doctoral graduates was the ability to contribute to making discoveries and creating new products and services.
- Park (2005) examined the product (thesis) and process (candidate) of doctoral education and advocated for an emphasis on the process of education.
- Warry (2006) emphasised the role of PhD graduates in research and the impact of their knowledge and skills, arguing that all doctoral researchers should receive enterprise training.
- Hodge (2010) recommended initiatives for funding the development of transferable skills for careers in academia and elsewhere.
- Witty (2013) emphasised the role of universities in teaching, research and enhancing economic growth.

The recommendations in these reports were aimed at improved outcomes and relevance of doctoral programs to the UK labour market, and encouraged better utilisation of doctoral research. The Government responded with policy initiatives and 24 of the UK's elite universities and colleges integrated transferable skills into their research training programs (The Russell Group, 2010). The policy also emphasised the importance of producing highly skilled knowledge workers to sustain the knowledge economy.

In Europe in the late 1990s and 2000s, initiatives were introduced for doctoral reform through the Bologna Review 2003 to help foster European competiveness. The Salzburg principles, which formulated guidelines for doctoral education and the European Higher Education Area, focused on research training (Kottmann, 2011). These changes were described as a "silent revolution" (Jørgensen, 2014, p. 84), while Kehm (2007) deemed the change a shift in responsibility from the individual in a master-apprenticeship model to the institution or university, giving rise to the Graduate School structure.

In the USA, a range of programs and projects, aimed at improving employability of doctoral graduates was implemented. Among the major initiatives were:

- Re-envisioning the PhD Project 1998-2000 investigated practices and concerns about the PhD (Nyquist & Woodford, 2000).
- Integrative Graduate Education and Research Traineeship (IGERT) program was established to develop a strong foundation of knowledge for encouraging discovery and inter-disciplinary collaboration.
- Woodrow Wilson National Fellowship Foundation was introduced in 2005 to offer support for PhDs in arts and sciences.
- The Carnegie Initiative on the Doctorate (CID) 2001-2005 made recommendations for more effective doctoral education.
- The Versatile PhD (since 2010) is a web-based community subscription service to help graduate students and new PhDs identify and prepare for non-academic careers.

The recommendations of the Carnegie Initiative had a major influence on doctoral education. Implemented over a five-year (2001-2005) period, the initiative was aimed at reviewing the purpose of the doctorate and improving the effectiveness of doctoral programs for employability. In 2001, the project team examined doctoral programs in six disciplines (chemistry, education, English, history, mathematics and neuroscience), and in 2003, undertook a thorough examination of doctoral programs in thirty-two partner organisations to design new doctoral programs in response to changes in society and academic contexts (Walker et al., 2008).

In Australia, there have also been a number of significant studies addressing the core skills and key competencies of PhD graduates. The Department of Education, Science and Training commissioned a study in 2004, which focused on PhD graduates from the Group of Eight Australian research-intensive universities, five to seven years' post-graduation. The study found that PhD graduates lacked generic skills required for workplace productivity. Moreover, employability outcomes of doctoral graduates were dependent on career-related skills acquired during their PhD training (Western et al., 2007). The 2008 Wissler Report (as cited in Poyatas Matas, 2012) reported on PhD graduates surveyed in Australia five to seven years after graduation, and showed a mismatch between the skills and capabilities acquired during the PhD and those required by the employment market. The report concluded that changes to policy and practice were necessary to reconceptualise the focus of the PhD on in-depth knowledge.

In 2010, the Department of Innovation, Industry, Science and Research commissioned Allen Consulting Group to investigate employers' needs of researchers. The findings of the study indicated most doctoral graduates were experts in their fields, but lacked the soft skills required in the workplace (Allen Consulting Group, 2010). In the last two decades there has been a "skills push" (Mowbray & Halse, 2010) to embed transferable skills into doctoral programs for greater employability and entrepreneurship. The recommendation prompted the introduction of three pro-skills doctoral programs in Australia: Australian Technology Network Universities' Industry Doctoral Training Centre research program, University of

Queensland's Career Advantage PhD, and Monash University's Monash PhD (Cuthbert & Molla, 2015a).

In 2013, the Group of Eight Australian universities produced "The Changing PhD", a discussion paper that diagnosed challenges associated with PhD programs from the perspectives of employers, PhD graduates and PhD providers. The paper highlighted job insecurity and underemployment as key weaknesses of the Australian PhD and stated that in some cases, PhD holders in Australia were found to be ''deficient in some of the generic attributes necessary for a good employee" (Group of Eight, 2013, p. 14). Cuthbert and Molla (2015a) concluded: "there is a wider consensus that employment trajectories of doctoral graduates have diversified and PhD training needs to be responsive to the changes" (p. 41).

Three main reform proposals emanated from studies and forums that criticised doctoral programs and were captured by Bogle, Dron, Eggermont and Van Henten (2011) and the Department of Education (2014) in Australia. These proposals were to:

- Broaden the focus of doctoral education beyond knowledge production to wide career pathways;
- Equip research students with a broad translational knowledge and skills set which can be applied in 21st century society; and
- Seek partnerships with stakeholders and strengthen university-industry links to increase strategic engagement with multiple scholars and communicate the changing needs of industry.

An emphasis on the concept of "translational research" or "translating research into practice" (Woolf, 2008, p. 11) has also emerged in doctoral education. Originally promoted by the Canadian National Institute of Health, the concept defined translational research as "the process of applying discoveries generated during research… research aimed at enhancing the adoption of best practices in the community" (Rubio et al., 2010, p. 3). This notion of research focuses on the application of research findings to the needs of business and society.

A strong proponent of employability, Harvey (2000) emphasised the need for graduates to be lifelong-learners, and the role of higher education in transforming doctoral students by empowering them as critical and reflective learners to become transformative agents in society. In Europe and China (Bao, Kehm, & Ma, 2016) quality assurance and internationalisation have been at the centre of debates and policy making.

This literature review described the reform of doctoral programs and outlined the reforms to content, structure and process to better respond to the needs of contemporary society. In terms of content, Nyquist and Woodford (2000) proposed re-envisioning the PhD; A. Lee et al. (2009) argued for re-imagining doctoral education; McAlpine and Norton (2006) recommended reframing doctoral education for the 21st century; and Cumming (2010) advocated breaking the mould of doctoral education. Walker et al. (2008) proposed re-thinking doctoral education and re-evaluating the structure to embrace modern approaches. Nerad (2004) called for alignment of doctoral programs with the work environment in the USA and the engagement of stakeholders. Walker et al. (2008) also advocated broadening and modifying the traditional apprenticeship model to create a new pedagogy and stewards of disciplines, making doctoral education more purposeful.

In many countries, there has been a shift in emphasis from solely creating knowledge to the acquisition of generic skills for employment in various sectors. Worldwide reforms in doctoral education have been shaped by the changing needs of society, research modes and changed labour markets for PhD graduates (Nerad, 2011). In Australia, agreement has been reached on the introduction of new PhD programs and re-badging existing offerings as pro-skills PhDs to develop research-related skills (Cuthbert & Molla, 2015a). Similarly, Universities Australia (2013) underscored the importance of ensuring the responsiveness of doctoral training to national priorities.

2.2.3.4 Doctoral Models

Criticism and subsequent reforms in doctoral education have led to diverse awards and models, and three modes of knowledge production. This sub-section presents a literature review on doctoral models, particularly the award and its distinguishing features. The two

major qualifications include the research doctorate (PhD) and the professional doctorate. Within each of these qualifications there are different programs reflective of significant developments in terms of integrating work-based structures and formal disciplinary output (Usher, 2002). The doctorate models are followed by an outline of the modes of doctoral education. The research doctorate or PhD stems from the traditional model of doctoral education and is often described as the master-apprentice model or learning-by-doing, under the direction of a master (Park, 2005, 2007). The apprenticeship entails PhD students working individually on their research under the guidance of their supervisors. PhD programs tend to operate without an explicit curriculum (Gilbert et al., 2004), whereby learning occurs and unfolds in a loosely defined space through a pedagogical relationship between candidates and their supervisors. Golde and Walker (2006) argued the award of a PhD brings with it a responsibility to operate as a steward for the discipline, a custodian, a designated, delegated representative.

Each type of PhD qualification has a distinct pathway to completion and award of title to its holders (Table 6).

Table 6: Research Doctorate

Model	Distinctive Features	Literature Source
Traditional PhD or Research PhD	Long, narrow and discipline-bound. Supervised research and examined thesis.	Boud and Tennant (2006) Park (2007)
PhD with Publication	Supervised research examined on a series of peer-reviewed academic papers either published or accepted for publication. Known in Germany as “cumulative dissertation”. The doctorate is evaluated predominantly on the product (thesis) and not the process.	Park (2007) Bao et al. (2016) H. Green (2005)
New Route PhD (UK)	Combines three elements: taught components of research methods and generic skills with a structured program of subject specialisation into a dissertation.	Bao et al. (2016)
Integrated or structured PhD	Developing academic and generic skills for quality.	Boud and Tennant (2006)

Some examples are research PhD or traditional PhD, PhD with Publication and the structured PhD – all lead to the award of a PhD in different disciplines. A PhD holder has deep, extensive knowledge and information about their field of study (Phillips & Pugh, 2000).

In the 1990s the traditional PhD degree was criticised and challenged for its inflexible structure and for being divorced from the world of practice, leading to alternative doctorates in the form of the professional doctorate (Moscati, 2004). The USA was the first to offer a professional doctorate in 1921, "conceived as a new form of higher degree and advanced-level professional education" (Green et al., 2001, p. 2).

The professional doctorate emphasised applied research and became prevalent in the 20th century, attracting mature, professional and part-time students. It is practice-based and aimed at resolving practical problems with a professional orientation. The professional doctorate was developed to improve alignment of doctoral research with industry needs and for building human capacity in the workforce. It is awarded in subjects like business administration, medicine and health care, engineering, education, social work and other subjects of relatively demarcated fields of professional practice (Table 7) where research work is regarded as a contribution to development of a professional domain (Bao et al., 2016).

Table 7: Professional Doctorate

Model	Distinctive Features	Literature Source
Professional doctorate	Includes examinable taught element and supervised research project. Shorter project than the traditional PhD.	Park (2007)
	The title usually indicates the professional field e.g. EdD, DBA.	Kehm (2006)
	Emphasises coursework to strengthen generic skills and multi-disciplinary approach to problem solving.	

The practice-based doctorate denotes the award of doctoral degrees in art and design (Bao et al., 2016). For example, a research project in performing arts could be music with a written exegesis. For creative art doctorates a novel may be produced, a portfolio for art and design, or performance pieces for theatre studies and music (Park, 2007). Practice-based doctorates can be awarded either a professional doctorate or a PhD qualification.

Doctoral education follows two main models: a) the apprenticeship model, whereby an individual program is based on a working alliance between a supervisor as the master and a doctoral candidate as the apprentice; and b) a structured program of two phases, a taught phase and a research phase (Phillips & Pugh, 2000). Enders (2002) defined the PhD curriculum as "experiential learning and apprenticeship training" (p. 495). The structured model is prominent in the USA and emerging in the UK and Australia through the integrated or structured PhD, where the first year is dedicated to coursework as part of a four-year PhD program. The compulsory coursework model aims to assist students in understanding, designing and implementing their research projects. It also provides a screening mechanism for the university to ensure that only top students progress to the supervised thesis stage. Projects vary; they can have an applied focus and can be conducted in the workplace or on site rather than in a laboratory or library at the university.

While countries such as the USA, the UK and Australia offer various doctoral awards, the traditional PhD remains the sole doctoral award in Germany, Japan, China, Netherlands, Mexico, Denmark, India and South Africa (Halse & Mowbray, 2011). China recently began diversifying its doctoral training by adding professional degrees in engineering and joint doctoral programs (Bao et al., 2016). The new doctorates range from PhD with Publication to coursework and professional doctorates, focusing on workplace practices and projects (Halse & Mowbray, 2011). The quality of the dissertation and research process in alternative doctorates are often ranked lower than the research doctorate (Bao et al., 2016). Bourner, Bowden, and Laing (2001) criticised the new types of doctorates for lacking clarity and coherence.

Despite the growth in different forms of doctoral training in the 20th and 21st centuries, the traditional PhD model has retained the key features of supervised research, significant

original contribution to knowledge, and submission of a dissertation or thesis (Taylor & Beasley, 2005). Earlier understanding of the PhD was primarily as a "nursery for future academy, and the site at which disciplinary knowledge is both preserved and advanced" (Cuthbert & Molla, 2015b, pp. 95-96). Today, the key role of the PhD is to serve as "the nursery of national innovation and economic growth" (Cuthbert & Molla, 2015a, p. 34).

Both research doctorates and professional doctorates are useful; research doctorates prepare researchers and professors, while professional doctorates prepare professionals and administrators. The PhD is in a state of change and moving away from the traditional master-apprenticeship model to structured programs, designed to prepare researchers for a broad range of careers. In addition to new models, reforms have also brought about an evolution in modes of knowledge production. These are discussed in the next section.

2.2.3.5 Modes of Knowledge Production

Reforming the doctorate to make it more relevant to the changing needs of the national economy has been an ongoing process in the UK, the USA, Australia and elsewhere. A new form of doctoral research emerged in the 20th century – one that is context-driven, problem-focused and interdisciplinary. This development in knowledge production was described by Gibbons et al. (1994) as occurring in two modes. "Mode 1" refers to knowledge production through traditional research; it is academic in nature, investigator-initiated and single discipline-based. "Mode 2" knowledge production refers to multidisciplinary, team-based research into real-world problems. Mode 2 research aims to equip doctoral graduates with skills and expertise to work effectively in different employment sectors and careers.

The professional doctorate, with a smaller research component and oriented to practice, was labelled Mode 2 by Gibbons et al. (1994). Marsh (2006) referred to this mode as "research undertaken in groups of researchers who work on a real-world problem in the context of its application" (p. 66). Marsh claimed that employers were seeking graduate researchers who could operate in Mode 2 environments. Nerad (2012) contended that Mode 2 doctoral education "involves several actors including universities, industry, business and Government" (p. 60). Mode 2 seeks to attract stakeholder engagement and

collaboration, and shifts the focus of doctoral education from disciplinary knowledge to broader training (Chiang, 2003). According to Crossouard (2010), doctoral education is increasingly becoming the training ground for professional researchers rather than entry into an academic career.

Both Modes 1 and 2 signal a changed understanding, from academics who traditionally advanced through publishing to successful identification and solutions of problems as demanded by the knowledge economy. The distinction between Mode 1, which is theoretical and single-disciplined, and Mode 2, which is multidisciplinary and presents an avenue for stakeholder collaboration (Gibbons et al., 1994) is that the latter results in more interdisciplinary, pluralistic research and a networked innovation system as shown in Table 8.

Table 8: Distinctions between Mode 1 and Mode 2 Knowledge Production

Mode 1 Knowledge Production	Mode 2 Knowledge Production
Knowledge is produced and tested in the academy by researchers	Knowledge is created and tested by practitioners outside the academy
Research is disciplinary.	Research is cross-disciplinary
Knowing through contemplation	Knowing through action
Knowledge for its own sake	Working knowledge
Knowing what	Knowing how
Knower as spectator	Knower as agent
Propositional knowledge	Knowledge as reflection on practice
Theoretical knowledge	Practical knowledge
Knowledge about the world	Knowledge in the world

Source: Adapted from Bourner et al. (2001, p. 56)

Proponents of Mode 2 doctoral education, Gibbons et al. (1994) advocated for greater linkages between providers of doctoral education and industry, in order to produce better equipped doctorates in response to labour market needs. Marsh (2006) described Mode 1 as "the old paradigm of discovery… circumscribed by disciplinary research… driven by autonomy of researchers" (p. 66).

To attain research objectives and outcomes of theory and practice simultaneously, Etzkowitz, Asplund, and Nordman (2001) proposed a third, unified mode of knowledge production. Mode 3 is aimed at establishing creative and innovative environments from which both industry and academics could benefit, and doctoral students act as innovation agents. Mode 3 knowledge production is described as a democratic approach to innovation involving strategic decision-making based on feedback from all stakeholders, and resulting in socially accountable policies and practices. This mode of knowledge production is dependent on human and intellectual capital shaped by social and financial capital for higher learning (Carayannis & Campbell, 2013). Mode 3 knowledge production advocates for well-rounded doctoral candidates to contribute to theory as well as context and methodology.

The paradigm shifts in Modes 2 and 3 necessitate linkages between government, university and industry, often referred to as the "triple helix" (Etzkowitz & Leydesdorff, 2000). One example of cooperation in these new modes of knowledge production is the Australian Cooperative Research Centre (CRC), created by the Australian Government in 1990, with the goal of producing end-user-driven employment, i.e. graduates who are ready for industry and the public sector (Harman, 2004; Manathunga, Pitt, & Critchley, 2009). These Research Centres emphasised collaborative, multi-disciplinary and commercially-oriented research (Nerad, 2011) in response to the changing needs of society, research modes and the labour market (Nerad & Trzyna, 2010).

2.2.4 Trends in Doctoral Education

The status of doctoral education varies from country to country. Unlike Australia, China and India, countries such as Germany, the USA and the UK have long traditions of doctoral education. The USA produces the largest number of doctorates globally, while Germany is the largest producer in Europe (National Science Foundation, 2016). China outnumbered the USA in 2008 with 240,000 doctorates awarded over 30 years (Maslen, 2013). In other countries, doctoral education is at different stages of development.

A study of the literature on current trends in PhD studies identified a number of global trends. Some of these related to access and balancing excellence, and proposed

decentralisation of research infrastructure (Jørgensen, 2012a). An oversupply of doctorates (Maslen, 2013) also emerged as a growing trend, stemming from massification of PhD enrolments and ultimately, the inability of many graduates to secure academic tenure. Another trend was centred around doctoral mobility, in anticipation of increased numbers of doctoral students and improved prospects for those who earn their PhD abroad and return to their home countries (Choudaha, 2013). The final trend was the impact of globalisation on doctorates and global trends emerging in PhD education (Nerad, 2010). Nerad regarded doctoral education as preparation for the next generation of professionals and scholars in and outside of academia, and concluded that globalisation necessitates participation in the international scholarly community.

A synthesis of the literature showed a strong move towards alignment of doctoral education with national goals. For instance, Brazil's doctoral program is geared to national priorities (Ribeiro, 2007). In Africa, the plan is to ensure that doctoral education is relevant to the socio-economic needs and context of society (Cross & Backhouse, 2014). Other studies by Bawa et al. (2014) and Group of Eight (2013) also advocate for a link between doctoral research and national priorities.

Doctoral education has historically been associated with training overseas, since the early days when American students travelled to Germany to study before establishing their own national training system (Altbach, 2004a). The trend continues today: undertaking doctoral education abroad is seen as more prestigious and the qualification of higher quality than its local equivalent. It is therefore not unusual for developing countries to pay for students to undertake a doctorate abroad (Eggins, 2008). In 1985, fifty per cent of Brazilian doctoral holders graduated outside their country. Pakistan paid for 250 doctoral students per year to study in Germany, France, Australia and China. South Africa has formulated its policy to accelerate training of PhD graduates abroad (Cloete, Mouton, & Sheppard, 2015). Many other developing countries offer similar arrangements and have agreements in place with doctoral graduates to return to their home countries after graduation (Eggins, 2008). Overseas training seems a cost-effective pathway for training PhD graduates, and this

practice has become an economic pillar in the USA, the UK and Australia (Group of Eight, 2013).

To provide an understanding of the establishment and development of doctoral education, the literature on three research-intensive countries was reviewed, namely: the USA, the UK, and China. The USA triggered the growth of doctoral education abroad by sending its students to Germany before launching its own domestic programs in 1861 at Yale University (Altbach, 2004a; Nerad, 2012). Today, the USA is the largest producer of doctoral graduates globally (Organisation for Economic Co-operation and Development, 2016).

In 1996, the Council of Graduate Education in the UK reported that doctoral education started as a "cottage industry", prestigious yet somehow a fringe activity of higher education (as cited in Green, 2005, p. 4). Over the years and with government support, doctoral education has grown into one of the pillars of the British economy. In 2014, the UK was the third largest producer of doctoral graduates in the world (Organisation for Economic Co-operation and Development, 2016).

China commenced delivery of doctoral education in the early 1980s with only a PhD by Research (Yang, 2012) and has since become one of the largest producers of doctoral graduates in the world (Maslen, 2013). This is a direct result of Chinese government support and financing by the China Scholarship Council in collaboration with international universities. Furthermore, doctoral education was a strategic priority in China's national policy, which included medium and long-term strategic plans for increasing the number of its doctoral graduates (Bao et al., 2016).

These three examples illustrate various progression pathways for doctoral education and the importance of government support. However, the literature on doctoral education in SIDS is scant and existing studies focus only on context and tertiary education. Bray (2011) argued that SIDS are vulnerable, have limited resources, lack economies of scale, have an "ecology of their own" and an underdeveloped tertiary education system. Everest-Phillips (2014) contended that SIDS are associated with the concept of "islandness" or islanders, implying isolation, narrow-mindedness, self-sufficiency and strong social capital. He argued that SIDS

suffer from limited human capital, financial resources and technical capabilities due to the small numbers of people and narrow range of talent. As a result, people tend to fulfil multiple roles and perform a wide variety of duties.

In his investigation of SIDS, Everest-Phillips (2014) indicated that the "village nature of small states often creates extensive personalisation of politics" (p. 13). A study of four microstates – San Marino, St. Kitts and Nevis, Seychelles, and Palau – by Veenendaal (2013) analysed the effects of a small population on political participation and concluded that politics and democracy in microstates have implications: "supporting opposition [parties] has major negative consequences; victimisation and a climate of fear" (p. 12).

Today, both on and off-campus doctoral programs are available in many universities worldwide and extremely popular among doctoral candidates. Campus-based programs allow face-to-face interaction with supervisors, whereas off-campus programs can be completed anywhere in the world at a flexible pace. Given the cost of residential programs, online doctoral programs are growing in popularity because they offer flexible options and wider access. They also allow candidates to study while working, thereby developing their time management skills. However, programs that require laboratory work, such as medicine, chemistry and physics cannot be delivered online.

A comparison between traditional and contemporary doctorates of the 21st century (Table 9) indicates significant change in relation to responding to knowledge economies, diversity of students, the shift from independent work to more formal structures, and introduction of a time limit.

Table 9: Worldwide Trends in Doctoral Education

Traditional Doctorate	Contemporary Doctorate
Knowledge creation for academia and preparing professors	Knowledge creation for knowledge workers, global researchers and employment outside academia
Small numbers lead to an elite club	Massification of PhD graduates, commercialisation of the PhD degree, more part-time, older students, more international students
Informal admission, master-apprentice one supervisor	Formalised competitive admission, structured PhD, panel of supervisors
Self-funded	Various sources of funding: scholarships from government, industry, non-profit organisations
Traditional thesis	Traditional thesis as well as peer-reviewed articles, books, plays
Thesis focused (product)	Inclusion of transferable skills (process)
Singular disciplinary research approach	Emphasis on inter-disciplinary research
White, male, rich students	Diversity of students and increased number of females
Little attention to quality assurance	Greater emphasis on quality assurance frameworks
Only PhD degree	Proliferation of professional and practice-based doctorates
Emphasis on scientific research prepares scholars and scientists	Growth in applied research Prepares scholars, scientists and professionals

Compiled from LaPidus (1995), Nerad (2008) and Owler (2016).

This overview outlined the purpose of the doctorate and its historical evolution from medieval times to modern-day research universities, and highlighted the concerns, reforms,

and trends in doctoral education. The following section elaborates on Human Capital Theory, the second topic reviewed in the literature.

2.3 Human Capital Theory

Human Capital Theory refers to investments in individuals who can personally reap economic value and enable contribution to society. This theory is discussed below from three perspectives: the concept of human capital, the principles of human capital theory, and the concept of doctoral capital.

2.3.1 The Concept of Human Capital

The concept of human capital has its roots in the work of classical economists: Adam Smith in 1776, Alfred Marshall in 1890 and Jacob Mincer in 1958. Schultz (1961) and Becker (1993) further developed the concept as a theory to explain the benefits of education to individuals and society. The notion of human capital first emerged after World War II when it was proposed that investment in health, training and education could account for levels of economic growth (Becker, 1993). Becker focused on investment in and returns from education and argued that extended periods of education can increase national economic growth.

Viewing PhD graduates from a human capital perspective, the Organisation for Economic Co-operation and Development (2001) defined human capital as "the knowledge, skills, competencies and attributes in individuals that facilitate the creation of personal, social and economic well-being"(p. 18). The knowledge and skills acquired through education are at the centre of human capital and a source of economic development. PhD graduates are regarded as human capital for their individual possession of skills and knowledge (Burgess, 2015). Capital is acquired through PhD candidature by instilling a questioning and inquiring attitude with strong analytical and problem-solving skills, and building confidence to articulate and defend ideas and approaches. Doctoral study also promotes independence, discipline and resilience. Many employers recognise the attributes that PhD graduates can bring to their organisations, particularly finding better ways to tackle challenges.

In terms of human capital, knowledge and skills are valued because they contribute to increased productivity in the workplace. Incomes generally increase with higher levels of education, and people with high levels of competence are valuable assets, recognisable within a framework of human capital. The concept of human capital is defined from three perspectives. The first is the individual aspects of the productive capacity of human beings through their inherent knowledge and skills (Beach, 2009). According to Usher (2002) "human capital… points to the importance of the capital embodied in individuals which enables them to assume a productive place in the knowledge economy" (p. 5).

The second viewpoint is centered around human capital itself and its accumulation. This perspective emphasises the knowledge and skills gained through education and training (Alan, Altman, & Roussel, 2008). Learning is the core factor of increased human capital, and associated with the benefits that come from investing in people, particularly their education and development. Both human capital and investment in education and training advocate for enhanced performance and contributions to societal wellbeing (Nafukho, Hairston, & Brooks, 2004).

The third perspective is linked to a production-oriented perspective of human capital. This classical economic perspective views human capital as a source of economic productivity, whereby the knowledge and skills acquired by an individual can be transferred to goods and services (Romer, 1990).

According to Crawford (1991), the characteristics of human capital in all these perspectives are expandable, self-generating, transportable and shareable. 'Expandable' and 'self-generating' are closely connected. They refer to the possibility that the stock of knowledge can expand, develop and increase the human capital of individuals. From an economic perspective the characteristics of 'shareable' refer to the portability and distribution of knowledge and skills by the holder to others, also known as 'spillover' effects in Human Capital Theory (Becker, 1993). These characteristics permit extending the breadth and depth of knowledge and therefore expanding the range of human capital.

The impact of human capital can be understood in three ways: individual performance; productivity leading to organisational competitiveness; and raising social consciousness. Individual performance has the potential to increase personal income as a result of productivity (Becker, 1962). This could imply that individuals with a high level of human capital could access employment easily. Another way of making an impact from a human capital perspective is through organisations whose competitiveness and profits are maximised as a result of individuals' human capital and productivity. Hence, employers prefer highly productive workers who can move to higher levels (Sicherman & Galor, 1990). The third way in which human capital can make an impact is from a social perspective. According to Beach (2009) human capital increases social consciousness within communities, and in this way, fosters socio-political awareness (Grubb & Lazerson, 2004).

It is evident from the foregoing that effective use of human capital can impact society and national development on different levels. Simply put, human capital refers to the abilities and qualities of people that make them productive, with knowledge at the core.

2.3.2 Principles of Human Capital Theory

The term 'human capital' was coined by Schultz (1961) and advanced by Becker (1993) as a theory for understanding socio-economic change and important factors for national economic growth due to the productive capacity of human beings. Although based on economics, human capital theory embraces elements of both education and human resources, and is frequently used in education discourses. This theory is also based on the belief that the knowledge and skills of human beings are regarded as "capital" and a "resource" to be utilised effectively, the results of which are profit for the individual, organisation and society (Nafukho et al., 2004, p. 545). Schultz (1961) argued: "skills and knowledge are a form of capital" (p. 1) and "acquisition of knowledge and skill have economic value" (Schultz, 1961, p. 3). The theory of human capital postulates a relationship of reward for skills or educational attainment, in that the individual invests in higher education and expects a return on the investment (Psacharopoulos & Patrinos, 2004).

Education is a key element of human capital theory because of its capacity to develop people's knowledge and skills. Education helps to raise people's productivity and creativity, promotes entrepreneurship and technological advancement, and is key to economic growth (Crocker, 2006). Furthermore, education supplies the human resources needed for national development (Maekae, 2013). This is supported by Ajayi and Afolabi (2009), who argued that education inculcates knowledge, skills, character and values in the individual, which in turn, foster self-actualisation and national development. Having pursued education at the highest level, PhD graduates can be regarded as a resource with potential to drive national development (Auriol, 2010). PhD graduates can also be regarded as prime human capital in terms of their education, skills and health, in line with the concept of human capital.

Human Capital theory can be used to explore the relationship between investment in education and economic growth. It recognises the pivotal role of knowledge and skills when effectively utilised to positively impact on overall productivity, ultimately leading to economic growth. Countries such as Hong Kong, Korea, Singapore and Taiwan have achieved unprecedented rates of economic growth by making large investments in education (Almendarez, 2013). In recognition of the value of doctoral education from a human capital perspective, many countries are investing significantly in their doctoral stock of human capital and developing higher education as an effective way to grow their economies.

Scholars often use Human Capital Theory (Becker, 1993) in discourses about the knowledge economy and education studies. The theory has become a framework for understanding aspects of human capacity and social behaviour (Teixeira, 2014). The characteristics, impact and theory of human capital made it a suitable theoretical orientation for informing this study, which explores the knowledge, skills, performance and contributions of PhD graduates and the expanded capital acquired through doctoral education. According to the principles of human capital, generic economic benefits accrue from a well-educated and well-trained workforce.

The literature highlighted different aspects of human capital in terms of knowledge, skills, behaviour and other attributes that PhD graduates accumulate during their candidature. In

the process of completing a PhD degree, graduates gain disciplinary knowledge and knowledge of research skills through conducting research (Boote & Beile, 2005; Pallas, 2001). Having accumulated and expanded their human capital, they therefore have a deep knowledge of their discipline and a broad range of skills.

2.3.3 The Concept of Doctoral Capital

From the perspective of human capital, Walker and Yoon (2016) introduced a new concept of "doctoral capital" which refers to the "collective formation of acquired academic practices, attributes, dispositions and behaviors" (p. 1) acquired during candidature and used in the marketplace.

According to this concept, doctoral capital is viewed as a composite of various forms of capital relevant to academic success. These include experiences, qualifications and track record (Walker et al., 2008). Walker and Yoon (2016) argued that the more skills (doctoral capital) the candidate accumulates during doctoral candidature, the more likely he or she is to secure an academic position post-graduation. The concept of doctoral capital also encapsulates principles of human capital and the two are closely aligned (Eggins, 2008). Eggins suggested PhD graduates are a critical human capital resource in any country and contribute significantly to scientific and technological development as "part of the science and engineering labour force worldwide" (p.2).

Underpinned by Human Capital Theory (Becker, 1993), this study focused on the doctoral capital, that is, the knowledge and skills acquired by PhD graduates, and perceptions of how this doctoral capital equips graduates to contribute to national development. Translated into the workplace, the knowledge and skills of PhD graduates can be expanded and shared, leading to positive outcomes through spillover effects on work colleagues and ripple effects across nations and generations (Casey, 2009; Walker et al., 2008).

2.4 PhD Graduates

This section presents a literature review of PhD graduates generally, through the lens of a) knowledge and skills; b) employment prospects; and c) value and contributions. Each element is deliberated in turn.

2.4.1 Knowledge and Skills

This subsection distils the knowledge and skills, including the 'doctorateness' or identity of PhD graduates. Characteristics of the PhD degree are described in national qualifications frameworks, which specify and regulate the outcomes of the degree. Qualification frameworks help maintain standards and consistency, and articulate the expected attributes and professional skills level of graduates. For example, the Australian Qualifications Framework Council (2013) outlined three broad categories of knowledge and skills and the application expected of doctoral graduates.

In terms of knowledge, PhD degree holders are expected to demonstrate comprehensive knowledge of their specific topics with a broad understanding of their field of research, and an ability to recognise national and international experts in the field. There is also an expectation that they have acquired the capacity to conceptualise research and necessary skills in research methods and methodologies in their field. Additionally, they must make contributions of original knowledge to the field of inquiry.

With respect to skills, PhD holders should be able to demonstrate expert technical and creative skills applicable to their field of work and learning. This implies high-level critical thinking skills to identify and solve problems, and transferable generic research skills, including negotiation and networking skills, to work collaboratively in teams.

In applying their knowledge and skills, PhD holders are expected to independently design and execute original research projects that are creative, significant, meet the highest standards of quality and ethics, and have high impact. They should also be able to position research within national and international contexts.

The foregoing descriptors are similar to those indicated in the Seychelles National Qualifications Framework (Seychelles Qualifications Authority, 2006), indicating two principal outputs from doctoral education related to the content, expertise and process:

1. The specialist expertise product (thesis) representing new knowledge in a specific field; and
2. The research experience inculcating professional skills; the three main ones being research, decision-making and communication skills.

Skills are important prerequisites for social and economic development. Leitch (2006) argued that "skills are the most important lever within our control to create wealth and to reduce social deprivation" (p. 2). Likewise, Bernstein et al. (2014) contended that "PhD graduates are sought worldwide for their ability to create and convey knowledge, provide leadership, drive the process of nation building, and foster innovation and prosperity" (p. 9).

Doctoral graduates are expected to be knowledgeable about how to undertake research. According to Nerad (2012, p. 60), doctoral graduates are "competent writers, speakers, managers and team members who can also communicate research goals and results effectively" within and outside academia. She ascribed the term "translational" to the translation of research findings into societal applications, alleged to go beyond "skills transferability from academia to non-academia settings" (Nerad, 2012, p. 61). In North America, these skills are referred to as "professional" or "transferable skills", and in the UK and Australia the term "generic skills" is used.

In Australia, PhD graduates make up a pool of highly skilled personnel for the workforce (Group of Eight, 2013). About half the doctoral graduates are employed outside academia (Neumann & Tan, 2011). Manathunga et al. (2012) called for all key stakeholders in Australia to make their required skills known so that the graduates can effectively prepare themselves.

In the USA, Walker et al. (2008) promoted the benefits of doctorates to the intellectual community and described them as "stewards of their disciplines, academic citizens and

contributors to the larger society" (p. 7). The increased globalisation of doctoral education has encouraged universities worldwide to re-examine their research training delivery models and place more emphasis on the development of skills. Market forces also demand that early career doctorates have additional transferable skills over and above their content knowledge and research skills, in order to be effective participants in economic development (Nerad, 2008).

The demand for higher-level skills in the labour market is predicted to grow (de Weert, 2011), with more people likely to seek a doctoral qualification. Nerad (2016) claimed that governments want "world-class" research capacity in order to attract investment and create new jobs. This situation has prompted supranational organisations, such as the Organisation for Economic Co-operation and Development (OECD), the European Union (EU), the United Nations Educational, Scientific and Cultural Organisation (UNESCO), and the World Bank to separately "develop policies to enhance the contribution of doctoral education to national and regional economic growth" (Nerad, 2010, p. 70).

Figure 3 depicts the Researcher Development Framework (RDF) and the knowledge and skills of researchers in four domains: a) knowledge and intellectual abilities; b) personal effectiveness; c) research governance and organisation; and d) engagement, influence and impact. The RDF provides a useful matrix of descriptors or attributes expected of researchers at different stages of their careers.

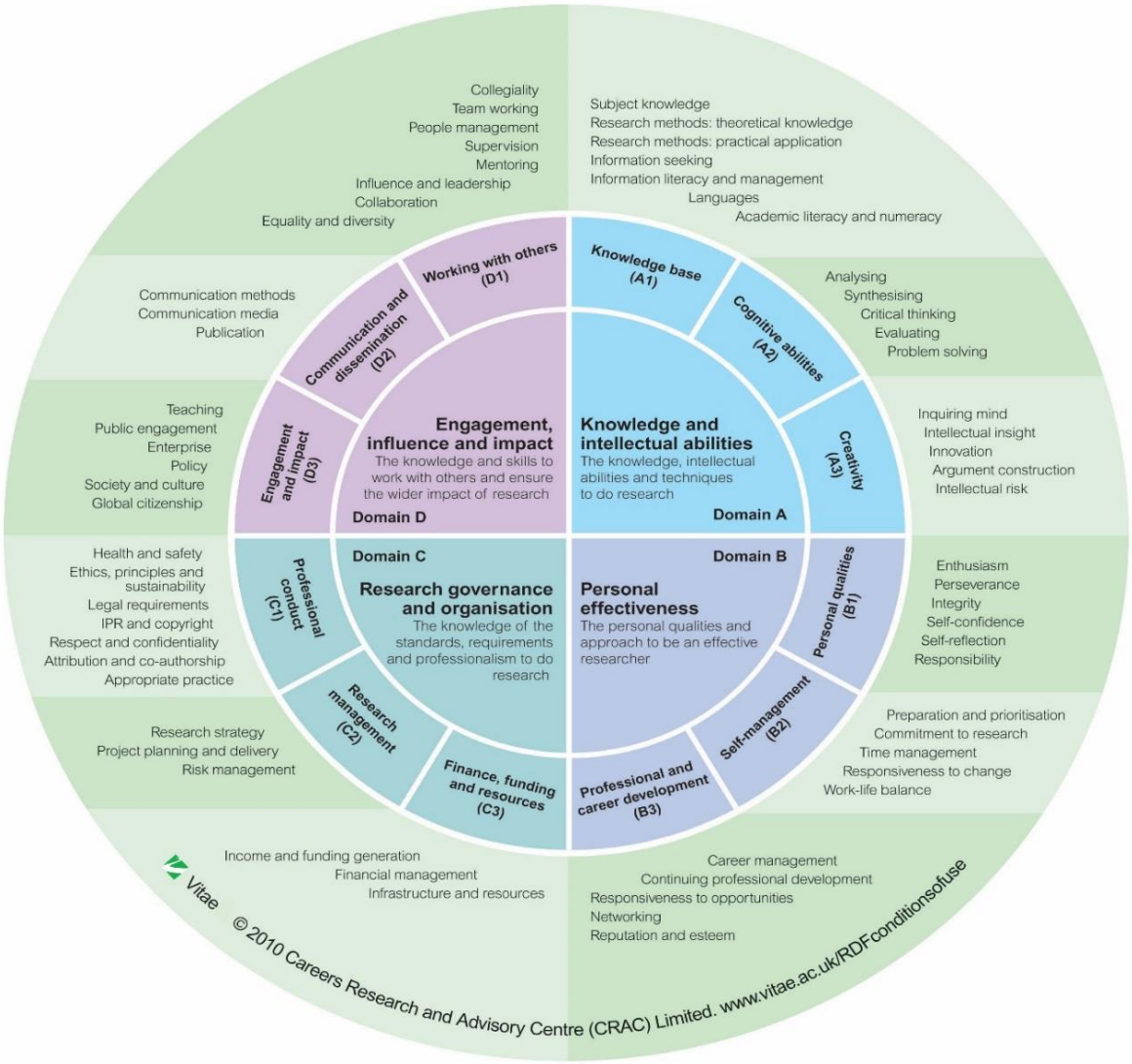

Figure 3: Knowledge and Skills of Doctoral Researchers

Source: (Vitae, 2010, p. 2)

Several studies have been undertaken in Europe (Bogle et al., 2011), the USA (Nyquist, 2002) and Australia (Platow, 2012) to identify core knowledge, skills and attributes acquired from the PhD experience and degree. The Researcher Development Framework (Vitae, 2010) articulated a comprehensive list of knowledge and skills for researchers, including doctoral researchers. Vitae is an organisation that champions the personal, professional and career development of doctoral researchers and research staff in UK higher education (Hooley, Bentley, & Marriott, 2011).

In the USA, Nerad (2012) tracked doctoral graduates in two major studies, five and ten years after graduation, and concluded that 21st century researchers need the following competencies:

- Traditional academic research competencies;
- Professional competencies; and
- Cultural competencies (p. 58).

Auriol (2010) considered PhD education to play a crucial role in the production and creation of knowledge through research, and viewed PhD holders as having the ability to perform well in complex, knowledge-intensive environments

The mastery of knowledge and skills of doctoral holders is referred to as 'doctorateness'. The UK Council for Graduate Education (as cited in Park, 2005) defined the concept of "doctorateness" as "mastery of the subject; mastery of analytical breadth (where methods, techniques, contexts and data are concerned); and mastery of depth (the contribution itself, judged to be competent and original and of high quality)" (p. 193). Park described this as the "T" or the depth versus the breadth. The depth refers to the discipline under study, while the breadth denotes the learning acquired throughout the doctoral journey. Doctoral graduates are "considered as the best qualified for creating, implementing and disseminating new knowledge and innovation" (Auriol et al., 2012, p. 6). As such, doctoral graduates are vital in knowledge-based economies.

Other studies have also investigated the 'doctorateness' of doctoral candidates and their dissertations [thesis], although the concept is illusive and has not gained worldwide acceptance (Poole, 2015; Wellington, 2013). The term 'doctorateness' originated in the UK and has been used in scholarly works over the last decade (Denicolo & Park, 2013; Murray, 2003). Trafford and Leshem (2009) referred to doctorateness as the scholarly attributes of doctoral theses. They developed a doctorateness model, which includes 12 different components of a doctoral thesis, ranging from contribution of original knowledge to appropriate methodology. Denicolo and Park (2013) had a different perspective, relating the doctorate to candidates' attributes, such as "intellectual quality and confidence,

independence of thinking, enthusiasm and commitment, and ability to adapt to changing circumstances and opportunities" (p. 193). The latter perspective embodies a utilitarian concept of doctorateness.

Doctoral education is "a complex process of formation… [w]hat is formed… is the scholar's professional identity… a process that students themselves must shape and direct" (Walker et al., 2008, p. 4). PhD graduates experience intellectual development and growth expressed in terms of constructing a new identity as an academic or a researcher. On becoming an academic, one constructs an identity as one joins and participates in collective practices (McAlpine & Asghar, 2010). Tonso (2006) and Carlone and Johnson (2007) characterised academic identity as thinking, performing, recognising oneself, and being recognised by others as a particular type of person, or being a member of a particular group. In other words, academic identity is constructed socially through collegial interactions with disciplinary programs, increased attention on skills, communication and networking.

The literature revealed mixed views about the value of PhD graduate skills in some countries. In Greece, a study conducted by Tzanakou (2014) about the perceptions of employers, found the knowledge of PhD graduates too narrow and lacking in soft, employability skills. In the UK and the USA, positive perceptions of PhD graduates prevailed, as having high-level skills and helping to make their employing institutions competitive (Clarke, 2014; Stewart, 2010).

2.4.2 Employment Prospects

The labour market and employability of doctoral graduates includes three topics, namely employability, careers and earnings.

2.4.2.1 Employability

National and multinational organisations forecast an increased demand for PhD graduates as a result of the development of knowledge economies and societies (The Royal Society, 2010). The demand for researchers, specialised and high-skilled workers across sectors and

disciplines is a requirement for governments worldwide to ensure availability of human capital for growth generation.

A PhD degree does not guarantee employment. The study discipline, state of the economy, researchers' abilities and drive, job preferences, luck and persistence all play a role. Several factors, such as choice and availability of jobs, temporary or permanent work conditions, and the employment sector influence the decisions of PhD graduates regarding employment. Temporary positions may entice some PhD graduates into academia, while others are attracted to non-academic careers due to advancement prospects. Career decisions of PhD graduates therefore entail several dimensions.

Labour market statistics worldwide indicate that large numbers of doctoral graduates are engaged in non-research related jobs (Auriol, 2007, 2010). There were also instances of PhD graduates being overeducated for their positions, indicating undergraduates could have filled them rather than PhD graduates (Auriol, 2007; Schwabe, 2011).

The demand pattern has added non-academic jobs to the traditional labour market with a focus on generic skills. International studies predict the demand for high-level skills will grow, signalling a need for higher-level qualifications (de Weert, 2011) for a larger proportion of the working population. Nonetheless, little is known about employer demand for PhDs (Green & Powell, 2005) – this lack of data is more prominent in non-academic sectors, particularly government.

Advanced economies such as the UK, the USA, France and Germany, employ more PhD holders in industry than developing economies. Austin (2002), Fox and Stephan (2001), and The Royal Society (2010) anticipated an increased flow of PhD graduates worldwide to other sectors and higher numbers of PhDs working outside the academic sector, with only a small proportion pursuing professorships. Despite a system-dependent demand pattern based on each country's education, socio-economic development, and history of the employment sectors favoured by PhD graduates, Schwabe (2011) noted that doctoral graduates were highly employable. This was confirmed by Auriol (2010), who found the unemployment rate of doctoral graduates in OECD countries was less than 3%.

Organisations such as OECD, EU, UNESCO and the World Bank are keen to improve the employment conditions of doctoral holders and have invested in projects to track graduates' careers and mobility (Auriol, 2010). Nerad and Heggelund (2008) claimed: "Governments and supranational organisations… hope to reap benefits of a labour force with a higher proportion of doctoral holders… to recognize and solve problems which are international and global in scope" (p. 5). In OECD countries, the number of PhD graduates is reported to be around 1% to 4.5% of their workforce (Auriol, 2010; Schwabe, 2011).

The mismatch between supply and demand of doctoral graduates led to the creation of post-doctoral employment during the transition period. "Post-doc" positions provide a pathway for early career researchers to strengthen their track record and develop as independent researchers (Evans & Denholm, 2009).

The foregoing indicates that the worldwide market for PhD graduates has widened, with multiple sectors offering a range of employment opportunities, both in and outside the academic sector. In the second decade of the 21st century, academic career prospects have been in flux due to increased competition and knowledge economies requiring more knowledge workers. Moreover, the growth of PhD production shows no sign of slowing.

Supply has outstripped demand for PhD graduates, and although the majority are employed many are taking jobs that do not require a PhD (Cuthbert & Molla, 2015a) suggesting inefficient use of human capital. Since the PhD market is driven by supply of research funding rather than the demands of the job market, having a PhD does not guarantee a tenured position either in academe or industry (Benito & Romera, 2013). These issues impact on the returns from education as advocated in the concept of human capital.

Much has been written about the saturation of the market, indicative of an oversupply and underdemand, to the extent that Cyranoski et al. (2011, p. 276) referred to the situation as "the PhD Factory". In addition, Paula Stephan, renowned USA labour economist who studies PhD trends, argued that the production of PhD graduates in the USA is more than the demand for research positions, and proposed reducing the number of PhD graduates (Stephan, 2005). Cyranoski et al. (2011) also reported an increased international trend in

PhDs, particularly in China, India, the USA and the UK. Exponential growth in the number of PhD graduates in 2008 resulted in China surpassing the USA as top annual producer of PhDs globally (Cyranoski et al., 2011).

In the USA, data from the Bureau of Labour Statistics in 2008 showed that "most doctoral degree holders worked in occupations in service industries, generally in professional, scientific and technical services or in government" (Council of Graduate Schools and Educational Testing Service, 2010, p. 19). Furthermore, a doctoral degree was the de facto entry degree for leadership in a wide array of fields.

Employability was described by Yorke (2006) as more than a set of skills and as "a set of achievements – skills, understandings and personal attributes – that make graduates more likely to find employment and be successful in their chosen occupations, which benefits themselves, the workforce, the community and the economy" (p. 8). In addition, Yorke distinguished between employability and employment, specifying that being employed means having a job and being employable means having the qualities for accessing, maintaining and progressing in employment. The process of completing a PhD enhances PhD graduates' employability because of the acquired experience and range of skills.

The unemployment rate (defined as the percentage of unemployed people in the total labour force) for doctoral holders in OECD countries has stabilised at around 3% since 2006 (Auriol, 2007). It is becoming more difficult for PhD graduates to find a job that corresponds with their qualifications (Benito & Romera, 2013). Boulos (2016) shared the challenges she encountered as a young, female, European PhD graduate in securing employment in France. Her auto-ethnography underscored the difficulties of finding employment aligned with a PhD qualification, salary expectation and personal satisfaction, and emphasised the relevance of PhD skills and attributes. PhD graduates enjoy low unemployment rates of less than 5% in European countries, with the majority satisfied with their careers (Auriol, 2010). Germany, cited in Bao et al. (2016), has the lowest unemployment rates among PhD holders compared to all other levels of education and training.

2.4.2.2 Careers

The labour market for PhD graduates was characterised by temporary research contracts, particularly in the early career category (Auriol, 2010; Kehm, 2006; H. Lee, Miozzo, & Laredo, 2010). Consequently, many had to engage in post-doctoral work or a period of research experience in transition to permanent employment. It is the highest level of education with potential for high-level outputs, yet the PhD degree is considered merely an "entrance qualification to the world of professional academia" (Hayton, 2015, p. 12) and commencement of a "scholar's professional identity" (Walker et al., 2008, p. 4). Hayton (2015) postulated that while the PhD represents a top-end qualification, it nevertheless occupies the lowest rung on the ladder of an academic career. This is illustrated in Figure 4.

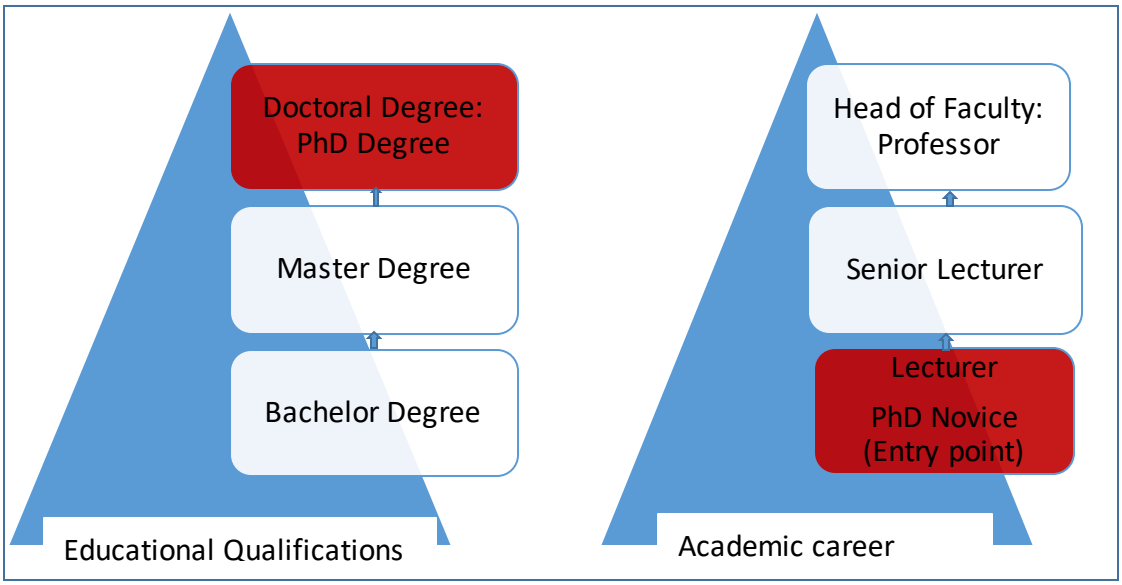

Figure 4: PhD Qualifications and Academic Careers (Based on Hayton, 2015)

In their analysis of the reform of doctoral education in Europe and China, Bao et al. (2016) observed that the doctorate is no longer an assured entrance qualification for an academic career – the need for experience, including publications, is now the norm. In the UK, the PhD is a prerequisite for becoming an academic or lecturer, and a professor in most countries, and considered an important qualification for people who wish to pursue academic and research careers. Bogle et al. (2011) argued that the doctoral degree trains talented researchers to drive change in society and make an important contribution to cutting-edge research.

The career paths of doctoral graduates in the UK and European Union between 2008 and 2010 show that approximately 43% of doctoral graduates found jobs in higher education within six months after graduation (Table 10) and after three and-a-half years 38% were still employed. The percentage of doctoral graduates employed outside higher education was around two-and-a-half times higher than those employed in higher education. Of the former, 40% worked in "other" business areas and occupations. The composition of "common doctoral occupations" was not provided.

Table 10: Career Paths of Doctoral Graduates in the UK and Europe

Occupational areas	6 months after graduation %	3.5 years after graduation %
Higher education research	23	17
Teaching/lecturing in higher education	20	21
Research outside higher education	14	12
Other teaching occupations	6	7
Common doctoral occupations	22	23
Other occupations	16	19

Source: (Vitae, 2013, p. 1)

According to a study by Connor and Brown (2009) on the value of postgraduates in the UK, some PhD graduates were employed in specialist roles, where their research skills and specific subject knowledge were valued. Melin and Janson (2006) concluded: "society needs PhDs as highly advanced experts with scientific experience but also with managerial and administrative skills as well as cultural and social competence" (p. 16). Nyquist (2002) urged new PhD graduates to perceive themselves as scholar-citizens with an ability to connect their knowledge to the needs of society. Nyquist also encouraged new PhD graduates in academic, corporate, government and non-profit positions to expand their focus to include not just research and writing, but also a multidimensional range of activities and commitments. Examples of this include team meetings, report-writing, teaching, worker training, planning, budgeting, recruitment, managerial oversight, and work on committees. The 21st century has witnessed an inability of academia to absorb all PhD graduates, and industry unable to accommodate the surplus. This phenomenon emerged from an analysis of

PhD graduate employment in the Spanish private sector by Benito and Romera (2013). The result was that PhD graduates took jobs lacking in status or security, were poorly paid and unable to effectively use their knowledge, skills and experience (Benito & Romera, 2013). National policy in Europe and China have legislated for increased numbers of doctoral degree holders, believing that high numbers of the most highly qualified will generate a competitive edge that will reverberate on a global economic scale (Bao et al., 2016).

2.4.2.3 Earnings

Studies on the earnings of PhD graduates are limited, but where they exist data are aggregated and group specific. According to the results of a survey on the mobility of doctoral holders by Auriol, Misu, and Freeman (2013), doctorate holders in the medical and health sciences are generally better paid and earnings are typically higher in the business sector than others, but not in all countries. Research by Casey (2009) suggested that PhDs provide an earning premium of 26% over those without university qualifications, but only 3% more than Master degree holders, which was considered a low margin given lost earnings and costs incurred by a PhD.

Despite falling median incomes in the USA, PhD graduates still earn a significant premium over other graduates in the labour market. Computer scientists earned US$121,300 in 2013, down from US$129,839 in 2008. Engineers saw a drop from US$125,511 to US$120,000, and social scientists' earnings fell from US$90,000 to US$85,000 (Belkin, 2016). The theory of human capital advocates differences in earnings in accordance with level of education or high wage premiums for higher level skills (Burgess, 2016). PhD graduate earnings are also impacted by other factors, such as field of research, career choices and the employment sector.

2.4.3 Value and Contribution of PhD Graduates

In this study, contribution refers to the advantages derived from a PhD qualification with regard to development of a nation, specifically Seychelles. It includes social and economic gains (Halse & Mowbray, 2011). The gains derived from doctoral education are complex

given the policy contexts, providers, models and variety of programs, as well as the profiles and career paths of doctoral graduates (Halse & Mowbray, 2011). It is for this reason that 'contribution' has been viewed as gains in national development in relation to the value and performance of PhD graduates. By way of explanation, two topics are discussed below: a) the value of a PhD degree to employment; and b) areas of contribution by PhD graduates.

Great value is placed on the specialist subject knowledge, research skills, analytical and problem solving abilities of PhD graduates (Diamond et al., 2014). A report by Auriol et al. (2012) showed that doctoral graduates are key actors in knowledge production, dissemination and application. Nerad and Heggelund (2008) claimed that investment in doctoral education can lead to significant national benefits:

> The important role of knowledge production for economic success makes doctoral education vital for nations wishing to remain or become important players in the global knowledge economy… Consequently, governments around the world have begun to expand doctoral training capacity (p. 5).

This emphasises the role of PhD graduates in countries aspiring to be knowledge societies. The Seychelles is such a country (Ministry of Finance Trade and Blue Economy, 2015) and therefore needs to develop the capacity of its doctoral graduates in order to realise the goal. Auriol (2010) supported this argument: "Doctoral holders represent a crucial human resource for research and innovation" (p. 3). However, the need to identify strategies to harness this resource for national benefit has been offset by worldwide concerns about the value and utilisation of PhD graduates.

Few studies have examined the benefits of PhD graduates to national development, particularly in SIDS. Several studies identified the value of PhD graduates: the report of the Group of Eight Australian universities in 2013 contended that PhD graduates in the workforce benefits society. In the UK, Roberts (2002) analysed the value added to individual skills and employability by a doctorate degree and the relative value of doctoral graduates to employers. The study considered PhD degrees valuable in the UK for their competitive advantage. A study by Bogle et al. (2011) also found that many employers in the UK valued

the creativity, originality and rigour of PhD graduates. In the USA, the PhD degree is a strategic national asset because of its propensity to drive economic prosperity (Council of Graduate Schools and Educational Testing Service, 2010). The PhD degree is also valuable because it advances solutions to problems through research and innovation, and fosters a national and international reputation for both the institution and the country. It is therefore of great value to governments worldwide for sustaining the national economy (Green & Powell, 2005).

The Royal Society (2010) claimed that a PhD is the gateway to a scientific career. The Council of Graduate Schools and Educational Testing Service (2010) reported on the value of people with doctoral degrees in teaching to drive innovation, attract investment and strengthen American prestige and economic power. In the UK, Smith et al. (2010) argued: "PhDs provide significant returns to organisations, individuals and to the economy as a whole. These higher level skills are key drivers of innovation, entrepreneurship, leadership and research and development" (p. 52).

In the last decade of the 20th century, the emergence of the knowledge economy emphasised the value of PhD graduate skill sets. Harman (2002) argued that the knowledge economy had at its core "the ideas that future economic performance will be closely based on the skill and innovation level of the labour force, underpinned by effective research and R & D capacity" (p.179). Knowledge economies depend on the generation of knowledge workers through doctoral education because they have the capacity to build knowledge societies with significant implications for a country's citizens. The United Nations Educational Scientific and Cultural Organization (2005) defined a knowledge society as "a society that is nurtured by its diversity and its capacities" (p. 17) – both attained from education and training.

Each society has its own knowledge assets that need to be recognised and nurtured. A strong university research system is crucial for the future prosperity and wellbeing of a nation; and PhD graduates are an essential part of growing research, stimulating innovation and delivering solutions for the economic and social challenges facing a nation. In other

words, research drives productivity, economic growth and social development (Universities Australia, 2013).

There is a paucity of literature on PhD graduates' contribution to national development. This was iterated by McAlpine, Amunsen, and Turner (2013) who claimed that little is known about PhD graduates' perceptions of navigating the transition from PhD to early career. Of the few studies available, Casey (2009, p. 224) investigated the economic contribution of PhDs in the UK and reported on the complexity of quantifying the gains from doctorates, which were mainly "spillovers" into the workplace that ultimately benefited wider society. Spillover effects occur when PhD doctorates influence the productivity of their work colleagues. Another study by Halse and Mowbray (2011) examined the contribution of the doctorate to economic development, and found it provides significant returns through the development of skilled, creative human capital.

The contribution of PhD graduates to national development is of interest worldwide (Baker & Lattuca, 2010). This is likely due to the prospect of high-level occupations, innovative inventions and their potential for significant contribution. Several studies in the UK (Leonard et al., 2004, Smith et al., 2010, Raddon & Sung, 2009); and in Australia (Mowbray and Halse, 2010; Halse and Mowbray, 2011; Group of Eight, 2013) found a knowledge gap and questioned the value, applicability of knowledge and skills, and the benefits to be gained from PhD graduates. They found this aspect of doctoral education under-researched. In South Africa, Herman (2011) discovered limited research on doctorates and a general lack of recognition for not only the value of a PhD and higher learning, but also an academic career. In Austria, Schwabe (2011) observed an underutilisation of the knowledge and skills of PhD graduates.

According to Halse and Mowbray (2011, p. 153) "around the world, government and private organisations are investing considerable time, energy and resources into identifying and tracking the social and economic contributions and impact of research and the doctorate". In line with this, the number of doctoral graduates in China, the USA, the UK, Japan, Singapore and India has been on the increase (Cyranoski et al., 2011). Australia too, has

taken a growing interest in harnessing the national benefits and contribution from its higher education research (Group of Eight, 2013).

Leitch (2006) conducted a study in the UK in the 2000s, and reported on doctoral graduates' contribution to the development of business, industry and the nation. He stated the potential of PhD graduates as follows:

> PhDs can provide significant returns to organisations, individuals and to the economy as a whole. These higher-level skills are key drivers of innovation, entrepreneurship, management, leadership and research and development. All of these are critical to a high-skills, high-performance economy and increasingly in demand from high-performance, global employers (p. 68).

The number of doctoral graduates is likely to grow as governments continue to invest in doctoral students as a means of gaining a competitive edge in a knowledge economy (Halse & Mowbray, 2011). Park (2007) described the contribution of PhD graduates as follows:

> …For employers, doctoral graduates can offer skilled and creative human capital, and access to innovative thinking and knowledge transfer. … for the nation, the obvious benefits of an active community of scholars engaged in doctoral level research include enhanced creativity and innovation, and the development of a skilled workforce and of intellectual capital and knowledge transfer, which drive the knowledge economy and are engines of the growth and cultural capital (p. 8).

Most of the literature on the contribution of doctoral education to national development focuses on aspects of employability, identity and career paths, and there is very little on the contribution of PhD graduates or strategies to maximise returns on this investment in human capital.

The literature review highlighted six ways in which doctoral graduates contribute: research capacity; promoting innovation; expert scholars; entrepreneurs; leaders; and knowledge workers. Each of these is discussed below.

Doctoral education fosters research capacity with potential to contribute to society through the creation of new knowledge and dissemination in the form of publications. A PhD by research is widely considered to impart significant public good in terms of research outputs (Council of Graduate Schools and Educational Testing Service, 2010; European Commission, 2011; Group of Eight, 2013).

Another avenue of contribution to society is through innovation, since they possess the capacity to innovate, pioneer ideas, new products and services, and can commercialise their inventions through intellectual property and patents (Auriol, 2007; Kemp, Archer, Gillingan, & Humfrey, 2008; Smith et al., 2010).

In addition to becoming the new generation of professors, the literature review defined doctoral graduates as highly specialised experts and teachers who prepare the next generation of scholars. PhD graduates have opportunities to form scholarly networks, participate in national think tanks and academic discourses, thereby contributing to the workplace and society in general (Akerlind, 2009; Bogle et al., 2011; Rowarth, 2009; Walker et al., 2008).

The literature also highlighted the capacity of doctoral graduates as entrepreneurs, to engage in new start-up projects and create new jobs. Consultancy work, which many were doing, also provides opportunities for contributing to society (Franich, 2009; Hooley et al., 2011; Maheu, Scholz, Balan, Graybill, & Strugnell, 2014; Mitchell, 2009). Doctoral graduates are considered global citizens due to their extensive leadership roles in academia, business, government and the global community. As such, they are influencers of change and national contribution (Bogle et al., 2011; Council of Graduate Schools and Educational Testing Service, 2010; Nerad & Tryzna, 2008).

In summary, doctoral graduates embody a stock of human capital with potential for enhancing productivity. They are high-skilled knowledge workers with abilities to contribute to the knowledge economy and society more broadly (Kearney, 2008; Walker & Yoon, 2016; World Bank, 2002). Doctoral graduates exert influence within their workplaces by

encouraging others to excel, raising productivity and supporting those with whom they work (Casey, 2009; Diamond et al., 2014; Halse & Mowbray, 2011; Mowbray & Halse, 2010).

The literature shows that research capacity is regarded as critical for national development, and increased participation in doctoral education is seen as a strategy for enhancing their human capacity (Molla & Cuthbert, 2016). In South Africa, the PhD is viewed as a central driver for growing the scientific community (Bawa et al., 2014). In the same vein, the Group of Eight (2013) argued that increasing the quantity and quality of PhD graduates can enhance their contribution to society.

The foregoing suggests little is known about PhD graduate contributions. Nevertheless, Smith et al. (2010) argued that postgraduate education plays a "crucial role in driving innovation and growth of the nation states" (p. 4); and Harris (1996), that postgraduate education, including the PhD, makes a major contribution to knowledge and the creation of national wealth. Halse and Mowbray (2011) concluded that postgraduate education is a significant contributor to knowledge generation and research outputs; and Cloete et al. (2015) suggested "the PhD is not just a possible contributor to talent in the knowledge economy – it is also regarded as crucial for improving quality in the university system" (p. 7).

2.5 Stakeholder Engagement and Collaboration in Doctoral Education

Stakeholder engagement and collaboration in doctoral education refer to participation and partnerships. In some countries such as the UK, France and Germany, stakeholder engagement in higher education is well developed due to a long tradition of employer involvement in cooperative education, apprenticeships and teaching culture. Employers play a prominent role in higher education policy (de Weert, 2011). The next section discusses three levels of engagement and collaboration for stakeholders in doctoral education, including university-industry collaboration; university-industry-government collaboration; and university-university partnerships.

2.5.1 University-Industry Collaboration

Growing demand for research partnership between industry and universities is part of the reform of doctoral education. Some studies on the collaboration of stakeholders in doctoral education (Borrell-Damian et al., 2010; Manathunga et al., 2012; Nyquist, 2002) reported on the interdependent system of partnerships among groups of stakeholders and called for greater engagement, particularly between universities and industry.

In the last two decades, the UK government has increased pressure on universities to develop stronger partnerships with industry (Becher & Trowler, 2001). Universities are now strategically positioning themselves to engage with the knowledge economy and contribute to innovation and the social well-being of society by producing doctoral graduates with high-level research skills and problem-solving capabilities (Borrell-Damian, 2009; Etzkowitz & Leydesdorff, 2000; Kehm, 2007). University-industry research collaboration in doctoral programs are encouraged, funded and monitored at a national level (Kehm, 2007). The European University Association identified a range of initiatives and funding to promote and support collaborative programs in Europe (Malfroy, 2011). In Australia, the emphasis on linking university research and industry partnerships has been sponsored by government funded schemes (Malfroy, 2011). This led to the establishment of Cooperative Research Centres (CRCs) in 1990 to forge university-industry links with the goal of producing industry-ready graduates (Pitt, Cox, & Manathunga, 2010). CRCs facilitate research collaboration between private firms and public universities, and are supported by the Australian Department of Innovation, Industry, Science and Research to prepare PhD graduates for non-academic jobs. This is an industry-university partnership in doctoral training rather than post-doctoral collaboration.

Research Councils in the UK actively encourage and facilitate partnerships between researchers, business and industry to develop their ideas beyond academia and put them into practice (Research Council United Kingdom, 2014). This has led to successful innovations, scientific discoveries, spin-off companies, and collaborations. In Europe, much work has been undertaken to promote collaborative doctoral education (Borrell-Damian,

2009; Borrell-Damian, Morais, & Smith, 2015). These researchers identified core components of collaboration as mutual trust, public support, regulatory framework, leadership, time commitment, economic and human resources, drawn from good practice in universities and businesses. These components of collaborative doctoral education are a useful guide for countries wishing to pursue partnerships in doctoral programs.

The work of Perkman and Walsh was adapted by Guimon (2013) to produce a typology of university-industry links ranging from high-to low-intensity relationships. These included inter-organisational research services and partnerships for pursuing collaborative research; shared infrastructure by industry and universities, such as laboratories and equipment; academic entrepreneurship for the commercialisation of research; scientific publications; and the formation of social relationships through conferences and social networks. This typology embraces a wide range of links and connections for universities and industry.

Strategies have been adopted for international collaboration between industry and universities, for example, the establishment of Knowledge Transfer Organisations (KTO) or Technology Transfer Offices (TTO) and Cooperative Research Centres (CRC). KTOs or TTOs have similar objectives, originating in the USA in the 1980s to protect, exchange, commercialise universities' intellectual property and exploit research results. They serve as collaborators for university researchers to produce knowledge, for industry to market products, and for government to develop policies and provide funding. Both KTOs and TTOs also assist job creation and economic growth. CRCs are public-private collaborative research centres charged with promoting effective research effort and collaboration as indicated earlier under university-industry partnerships. These institutions all provide research opportunities for doctoral graduates.

2.5.2 University-Industry-Government Collaboration

Collaboration in doctoral education was advocated across sectors by Etzkowitz and Leydesdorff (2000), who developed an internationally recognised Triple Helix model of engagement among three key partners – university, industry and government. The model takes into account an understanding of entrepreneurship, the changing dynamics of

universities, innovation and socio-economic development. Besides their traditional missions, the three sectors have overlapping roles. These hybrid organisations and networks serve to "institutionalize and reproduce interface as well as stimulate organizational creativity and regional cohesiveness" (Etzkowitz & Leydesdorff, 2000, p. 315). According to the Triple Helix theory, when industry invests in research laboratories, governments take the role of industry in supporting the development of industry-relevant research, and universities take the role of industry by capitalising on knowledge and becoming entrepreneurial (Thune, 2010).

The Triple Helix model promotes engagement and collaboration between the university, industry and government, each in their respective but complementary roles. Universities supply the human capital, researchers and entrepreneurs, while industry makes financial capital available to commercialise and market products and/or services, and governments provide funding, incentives and policies. The Triple Helix model describes how universities, industry and governments interact in national and global knowledge production and innovation, and exposes the complexity of this interdependent relationship (Etzkowitz & Leydesdorff, 2000). The common goal of all stakeholders is to promote innovation, and the Triple Helix model emphasises their connection in the knowledge economy. Furthermore, it provides a way of thinking about engaging in strategic research (Manathunga et al., 2012). National policies have emphasised broader skills and the relevance of careers outside of academe, and this has led to reforms of doctoral education and researcher training reflective of the change (Thune, 2011).

Governments around the world are beginning to recognise the potential of doctoral education and training capacity (Group of Eight, 2013). Some have implemented initiatives, such as the MyBrain15 project of the Malaysian Government to step up production of doctoral holders to 60,000 by 2023; the Brain Korea 21 plan and the Connect Korea Project of South Korea, aimed at promoting research in traditional elite universities and facilitating university-industry partnerships (Jørgensen, 2012b).

2.5.3 University-University Partnerships

Research on university-university collaboration is scant. Bao et al. (2016) and Nerad (2011) reported on joint and dual doctoral programs among universities. In Europe, joint doctoral education is delivered by a consortium of at least three universities and promoted to enhance university collaboration (Jørgensen, 2012a).

The evolution of the doctorate has also brought about the cotutelle (co-tutoring) doctoral program or joint doctorate that originated in France and is offered jointly by agreement between two cooperating universities. These doctorates entail a joint curriculum for taught components, developed by the participating institutions. All participating institutions sign agreements on funding and candidature matters. The award of the degree from the enrolled university is a double degree based on joint supervision and the awarding of a joint degree. Germany, Spain, France, Italy, the UK, and the Netherlands (Bao et al., 2016) have taken the lead in offering these models of doctoral education. Iceland has set up cooperative agreements with universities around the world for student research exchanges and joint programs and degrees (Nerad, 2011).

Joint PhD programs are offered by universities who cooperate in transactional networks. They provide a high degree of internationalisation and mobility, as well as opportunities for national and international collaboration through delivery of joint and dual doctoral programs. Joint programs can be both domestic and international and require commitment and formal agreements. Such collaboration allows universities to become internationally renowned for their work, and promotes internationalisation through the exchange of academics and shared research projects.

One example of a university-university collaboration in SIDS was described by Simeon (2014). Seven universities in Malta, Mauritius, South Pacific, Virgin Islands, West Indies, Las Palmas de Gran Canaria and the Seychelles respectively formed the University Consortium of Small Island States (UCSIS) to collaborate in higher education. The main aim of the consortium is to enhance the national capacity of graduate institutions in SIDS and address specific higher education challenges in a collaborative manner. This assists all SIDS, who have

limited potential to achieve economies of scale on their own. UCSIS has the support of the United Nations Department of Economic and Social Affairs and the government of Spain. Simeon also described a university-university research collaboration between University of Seychelles and a university in Sweden, formed with the objective of strengthening local research expertise and generating co-publications in priority fields of research.

Another example of a collaborative initiative is the Framework for the Internationalisation of Doctoral Education (FRINDOC), a consortium of six partner universities (University of Hong Kong, Stellenbosch University, Imperial College London, University of Bergen, University of Camerino, and Dublin Institute of Technology) managed by the European University Association. Its aims are to promote good practice in the internationalisation of doctoral education and support for mobility in doctoral programs.

The literature review provides insights into the evolution of doctoral education and defines the different modes and models of research production resulting from the reforms. The concept of human capital facilitates an understanding of the perspectives of PhD graduates as human capital and their areas of contribution. The nature of collaboration in university-industry, university-industry-government, and university-university partnerships provides opportunities for PhD graduates and stakeholder groups to work together and engage collaboratively for optimal outcomes from doctoral education. The review also inspired the conceptual framework for this study.

2.6 Conceptual Framework

A conceptual framework serves as a graphic representation of the main concepts and their relationships with one another (Punch, 2014), and is particularly useful in qualitative research studies. The conceptual framework for this study (Figure 5) aligns with three key concepts: doctoral education, PhD graduates and key stakeholder groups.

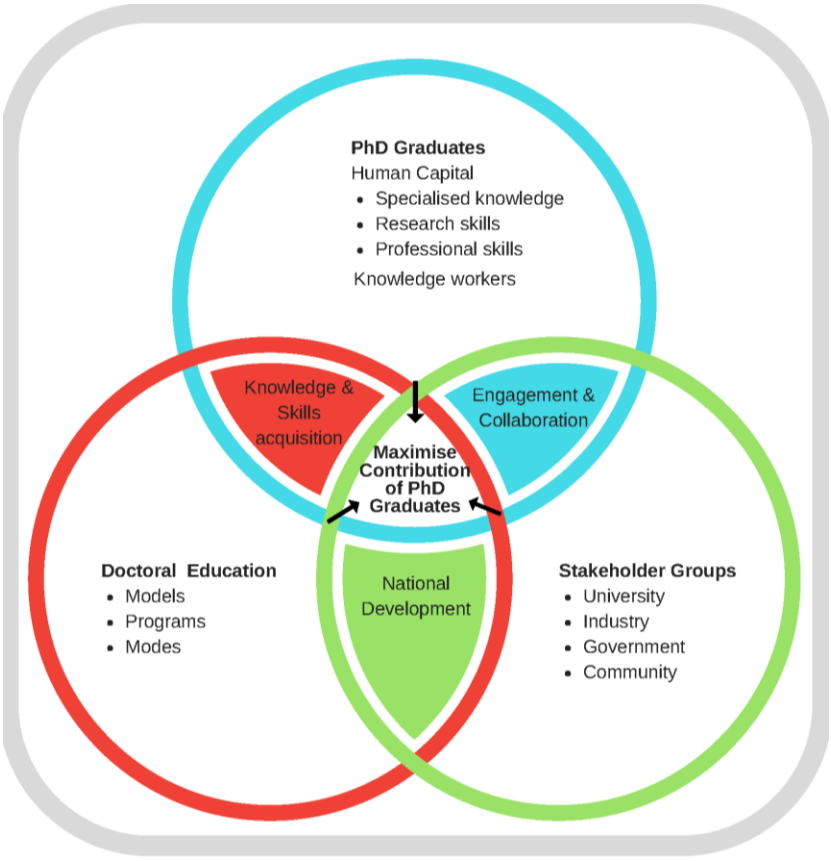

Figure 5: Conceptual Framework

The contribution of PhD graduates to national development is described by the intersection and extent of collaboration. In this framework, the concept of doctoral education (red circle) represents the high-level education obtained through various programs across PhD disciplines. Knowledge production has evolved into three modes: Mode 1 emphasises theoretical knowledge; Mode 2 emphasises transferable knowledge applicable to particular contexts; and Mode 3 focuses on knowledge as an approach to innovation. Interdisciplinary Mode 2 knowledge encourages interaction between governments, universities and industry and caters for changes in the labour market (Thune, 2011).

Through the lens of human capital (blue circle), PhD graduates are viewed as holders of specialised disciplinary knowledge, research and high-level professional skills needed to drive development. It has been argued that individuals with a high level of education can positively affect the productivity of those with whom they work (Perotti, 1993). They

represent a reservoir of doctoral capital, but the extent of their contribution depends on effective utilisation of their knowledge and skills.

The four key stakeholder groups (green circle) include the university, industry, government and community. As partners and potential employers of PhD graduates, their engagement and collaboration are vital for enhancing the contribution of PhD graduates to national development.

The intersection of the four stakeholder groups in doctoral education, i.e. utilisation of PhD graduates' expertise, and engagement and collaboration amongst stakeholders, impact on the contribution of PhD graduates as shown by the arrows. The extent of their contribution is dependent on the quality of their doctoral education, their employability in the labour market, how they utilise their knowledge and skills in employment, and ongoing engagement and collaboration between the four stakeholder groups.

Human Capital Theory asserts that "investment in people through training and education has a direct and indirect impact on organisations, communities and societies at large" (Nafukho et al., 2004, p. 549). Accordingly, this theory was a useful lens through which to view the contribution of Seychellois PhD graduates. While the purpose of the PhD and the relevance of the research topic to the labour market indirectly influence the productivity of PhD graduates, their doctoral capital, capacity, knowledge and skills are important considerations in determining the extent of their contribution to national development.

Another crucial factor is the partnership and engagement of key stakeholder groups to facilitate and optimise utilisation of PhD graduates' knowledge and skills. When all three interact positively, the likelihood of enhanced contribution increases. The principle of Human Capital Theory (Becker, 1993) underpins effective utilisation of knowledge and skills, higher productivity, and maximising contributions to national development.

2.7 Summary

This literature review provides a brief insight into doctoral education, particularly the PhD degree and its historical evolution. It outlines the main doctoral models: research doctorates

(PhD), professional doctorates and practice-led doctorates. The transformation of knowledge production from Mode 1 to Modes 2 and 3 is also described together with financing and trends in doctoral education internationally.

A synthesis of the literature on Human Capital Theory (Becker, 1993) distinguished it as a useful paradigm to inform the current study, due to its focus on the value of knowledge, skills and experiences fundamental to PhD graduates' contribution to national development. Concepts of doctoral capital, doctorateness, employment, knowledge and skills are also covered.

The role of universities, industry, government and community as key stakeholders in doctoral education is outlined, emphasising the importance of engagement and collaboration to influence the extent and impact of PhD graduates' contributions. The typology of university-industry partnerships presents an exemplary structure for guidance in doctoral education. The literature review also presents a model of four essential components to guide universities in effective delivery of doctoral programs. Moreover, the literature review brought to light the value of PhD graduates, their roles and areas of contribution in fostering a competitive edge and advancing national prosperity. The concepts that led to the development of the conceptual framework for this study were identified.

The following chapter, chapter three, describes the methodology and methods adopted to respond to the research questions that drove this study.

Chapter Three: Research Methodology and Methods

3.1 Introduction

Chapter two presented a review of the literature, including the historical evolution of doctoral education, PhD graduates as human capital, engagement and collaboration, and the contributions of PhD graduates to national development. The literature review provided insights into relevant existing literature, guided the theoretical orientation and facilitated development of a conceptual framework for this study. This chapter outlines the methodology and methods used to gather and analyse the data, and respond to the research questions stated in chapter one. The chapter begins with the research process adopted for this study, including the epistemology, theoretical perspective, methodology and methods. This is followed by a description of the data collection and data analysis procedures, ethical considerations and trustworthiness of the research. The chapter concludes with a summary of the salient points.

3.2 Research Process

The research process comprised four elements: epistemology, theoretical perspective, methodology and methods (Crotty, 1998) as outlined in Figure 6. This study used a constructivist epistemology with phenomenology as the theoretical perspective, which guided the methodology and the methods. Each element is described below.

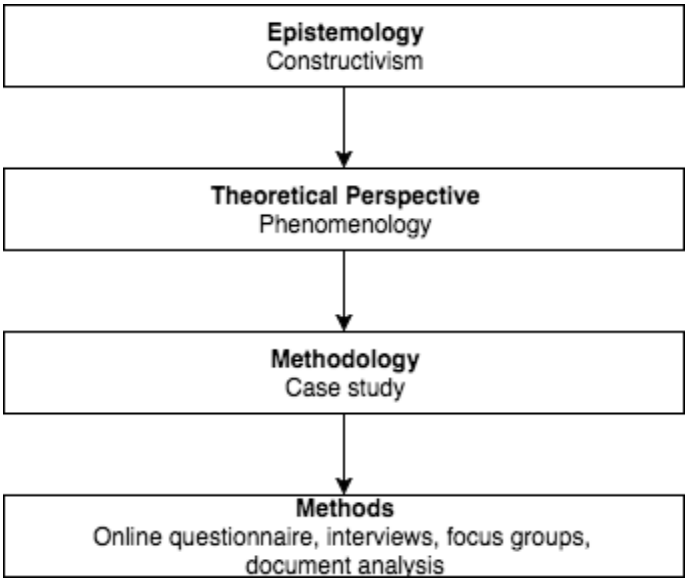

Figure 6: Four Elements of the Research Process
Source: Adapted from Crotty (1998, p. 4)

3.2.1 Epistemology

Research epistemology provides a philosophical grounding about the nature of knowledge and the kind of knowledge that is possible, whether objective or subjective (Babbie, 2010; Crotty, 1998). This study adopted a constructivist paradigm of subjectivity, which means that truth or meaning comes from engagement with the realities of the world, and meaning is interpreted and constructed through understanding the knowledge (Crotty, 1998). Therefore, constructivism is concerned with understanding people's experiences in a particular setting and constructing knowledge from the data. A reliance on the subjective meaning of participants' experiences and construction of their experiences represents a "constructivist worldview" (Creswell, 2014, p. 8), appropriate for this study given its aim to understand the experiences and perspectives of participants.

In this research, the multiple views of various research participants were interpreted to construct themes and gain insights into the contribution of Seychellois PhD graduates. Schwandt (2007) argued: "the world is always interpreted through the mind" (p. 143) implying that there is a subject making sense of the objects.

3.2.2 Theoretical Perspective

In academic research, the theoretical perspective is the use of theory to facilitate an understanding of the research phenomenon, to make the worldview explicit and provide concepts and models for structuring the investigation. The chosen approach underpins the methodology and involves understanding of knowledge, providing the context for the process and guiding its logic (Crotty, 1998). This study used phenomenology as an interpretivist approach, as it is congruent with a constructivist epistemology, to explain the personal construction of the individual's world (Gray, 2009). Phenomenology provided a methodological theory to help describe and deepen the understanding of the experiences and perspectives of Seychellois PhD graduates and the key stakeholder group participants, to clarify ideas and guide data collection and analysis. Phenomenology is a widely used theoretical perspective in qualitative research, used to describe a phenomenon from the point of view of the research participants (Liamputtong, 2013). Phenomenological research investigates the experiences of people closest to the study phenomenon, interprets the personal points of view of participants, and describes and interprets the meaning of their experiences and views (Schram, 2006). Data were collected from research participants, and the interview and focus group transcripts were transcribed and interpreted (data analysis) to identify meaningful information and themes.

3.2.3 Methodology

Methodology is the strategy or design dictated by the choice and use of particular methods, linking them to the desired outcomes (Crotty, 1998). It is also a procedural plan for inquiry into the study phenomenon, including the choice of methods for gathering and analysing the data (Bazeley, 2013; Creswell, 2014). This study adopted a case study design to investigate the contribution of Seychellois PhD graduates to national development through the perspectives of Seychellois PhD graduates and participants from four key stakeholder groups. The approach provided an opportunity for PhD graduates to speak for themselves and for the stakeholder groups to share their experiences regarding doctoral education.

To shed light on the investigation it was deemed appropriate to examine not only the participants' perceptions of the knowledge and skills acquired by Seychellois PhD graduates, but also their roles in the workplace and collaboration between PhD graduates and key stakeholder groups. A case study approach was a suitable choice for exploring the experiences, knowledge and skills of Seychellois PhD graduates, and for understanding their own and key stakeholder groups' perspectives. In addition, the approach was suitable for identifying appropriate initiatives to maximise the contribution of PhD graduates to national development.

Case study is usually employed to seek evidence in a specific setting for collation and abstraction to provide answers to research questions. Gillham (2000) advocated the "use of multiple sources of evidence, each with its strengths and weaknesses, as a key characteristic of a case study research" (p. 2). There is no single definition of a case study and it is understood in various ways. Stake (1995) did not regard case study as a methodology and described it as the study of the "particularity and complexity of a single case, coming to understand its activity within important circumstances" (p. xi). Yin (2009) considered case study a research technique or method and described it as "set within its real-world context" (p. 18). Mertens (2010), and Hamilton and Corbett-Whittier (2013) identified differences of opinion regarding case study as a method or methodology, and Punch (2014) asserted "case study is more of a strategy than a method… a way of organizing social data so as to preserve the unitary characters of the social object being studied" (p. 120). He also identified four characteristics of case studies: a) context and boundaries of the unit of analysis; b) preservation of the wholeness; c) unity of the case; and d) the use of multiple data sources and data collection tools in a naturalistic setting. Like Punch's characteristics, Elliott and Lukes (2008) described a case study as a research genre, implying that a case is examined to provide insights into an issue. Simons (2009) argued case study could be a method, methodology or strategy, and defined it as "a study of a singular, the particular, of the unique" (p. 3). Miles et al. (2014, p. 28) referred to a case as "a phenomenon of some sort occurring in a bounded context", ranging from an individual to a nation. The latter definition fits the current study and supports the approach adopted.

In this study, the Seychelles represents an "instrumental case study" in a natural setting (Stake, 1995, p. 3). In an instrumental case study, an issue is first identified and then the case selected to explore the issue in depth. A case study is extensive and focuses on a single instance, usually qualitative, but can combine qualitative and quantitative methods of analysis. It explores a problem, generates understanding and provides rich insights into a particular issue, is manageable and achievable and may shed light on other similar cases, thus providing transferability (Rule & John, 2011). Case study methodology has been used as espoused by Miles et al. (2014) and as a research strategy as advocated by Punch (2014). Case study is aligned with the nature of this research and was therefore chosen as an appropriate methodology for seeking an in-depth understanding of the contribution of PhD graduates within the bounded context of the Seychelles.

3.2.4 Methods

Methods are the techniques or procedures used to gather and analyse data related to the research questions (Crotty, 1998). Methods are linked to methodology, and the collected data forms the basis of the knowledge generated through the research. This study adopted a qualitative investigative paradigm and included four data collection methods: online questionnaires; interviews; focus groups and document analysis. Initially, an online questionnaire, consisting of a mix of closed- and open-ended questions provided useful data and demographic information about Seychellois PhD graduates. Subsequently, individual face-to-face interviews with PhD graduates and stakeholder group participants were undertaken.

A questionnaire is a commonly used method for collecting data in research. It consists of closed-or open-ended questions or a combination of both. The questionnaire for this study was designed to suit the purpose of the research and the research questions. Questionnaires can be in print or online – both can provide anonymity – and can be self-administered or delivered through different web-based software. In this study, the researcher used Qualtrics as an online format for the questionnaire.

Interviews are an effective way of soliciting and documenting individual perspectives, capturing feelings, opinions, values, attitudes and beliefs about experiences (Saldaña, 2011). Interview is one of the most commonly used qualitative research methods (Gray, 2009; Mason, 2002). Schwandt (2007, p. 162) described the interview as a "verbal exchange" between the interviewer and the interviewee; and Seidman (2013) expanded this description, defining interviews as "recounting narratives of experience" (p. 8). Patton (2015) contended that a good interview is one that arouses thoughts, emotional states, knowledge and experiences for both the interviewer and the interviewee; hence, there might be an element of risk in the encounter. The interviewer therefore needs to be tactful and focused on the purpose of the interview to avoid risks when entering into a person's world where new realities are exposed to the interviewer.

Interview design ranges from structured to semi-structured and unstructured formats (Rubin & Rubin, 2005). In unstructured interviews, the interviewer asks the interviewee open-ended questions regarding the area of interest and interviewees communicate their stories. Structured interviews include closed questions with limited response choices. Semi-structured interviews are widely used in qualitative research and characterised by some questions, pre-determined through an interview protocol, to ensure information is gathered on areas of interest to the researcher. Such interviews are hybrids of structured and unstructured interviews, providing flexibility for prompting and probing, and hence the choice for this study.

In addition to the questionnaire and interviews, three cross-sector focus groups were conducted, comprised of PhD graduates and participants from the four stakeholder groups. Focus groups work well when exploring perceptions, feelings and thoughts about issues, and yield insightful data (Krueger & Casey, 2015). Focus group interviews involve an active discussion of a topic by a small group of about 5 to 10 people in response to questions by a moderator in order to generate data (Glesne, 2011; Krueger & Casey, 2015; Mertens, 2010). The aim is to gather a range of opinions across a group of participants to better understand how people think and feel about an issue (Krueger & Casey, 2015). Stewart, Shamdasani, and Rook (2007) described focus groups as "an inherently social phenomenon" (p. 19).

Participants with similar backgrounds are usually brought together to focus discussion on a specific issue (Patton, 2015; Schwandt, 2007). The process requires mediation by a skilful moderator for effective results. Focus group interviews are a useful technique to facilitate emerging ideas, elicit peoples' experiences and gather a range of multiple perspectives on the topic under discussion. Focus groups produce qualitative data through a process of participants interacting with one another, listening to responses from other group members and making further comments in view of what others have said (Patton, 2015).

The researcher undertook an analysis of relevant documents that could contribute to the study concurrently with the three data collection methods. Document analysis involves the identification and examination of relevant records and documents that can contribute to a particular study (Schwandt, 2007). Documentary data can be used in conjunction with interviews and other data as a means of triangulation (Punch, 2014).

These methods were selected for their relevance and alignment with the research design and for triangulation purposes. The questionnaire provided anonymity and there was no interaction with the researcher. The interviews and focus groups afforded the researcher an opportunity to listen to the individual and collective experiences of participants, thereby gaining a deeper understanding of the issues. The following section outlines the data collection procedures

3.3 Data Collection

Data collection involves gathering data from a variety of relevant sources to obtain an understanding of a phenomenon under examination. It also entails selection of appropriate methods to provide the data (Bell & Waters, 2014), and as such, forms a crucial part of the research with potential for impacting on the quality of the results.

This study examined four research questions anchored by the central question: "how to maximise the contributions of Seychellois PhD graduates to national development". The research methodology accommodated a real-world context and appropriate data collection methods for obtaining both biographic and anonymous data from PhD graduates and

relevant stakeholder groups. The nature of the research questions was exploratory, seeking insights to facilitate understanding of the phenomenon under examination.

The next section describes the four main components of the data collection in this study. It commences with a positionality statement, followed by the sampling strategy, the data gathering process and ethical considerations.

3.3.1 Positionality Statement

In order to understand the world from the participants' point of view, researchers have to "bracket out" their own preconceptions (Gray, 2009, p. 171). To achieve this, the researcher must acknowledge his or her own experiences and perspectives in order to understand the participants' perspectives without influence. The researcher's positionality "reflects the position that the researcher has adopted within a given research study" (Savin-Baden & Howell Major, 2013, p. 71).

The researcher is a mature-age Seychellois with a background in education and training who started her career as a secondary school teacher and progressed as a specialist in training and human resource development. She is an advocate for employee training and development, and subscribes to knowledge translation from theory to practice. She values sharing knowledge and skills, giving a voice to others and empowering them to perform to their full potential. She is a career public servant who has worked in various roles in the Seychelles public service, including as a trainer in adult learning; as associate lecturer for three decades with the Seychelles Institute of Management; in education, employment and human resource development. She has not been active in politics as a career public servant, has held several high-level public service positions during the last two decades, and was Vice-Chancellor of the University of Seychelles for almost two years prior to enrolling in her PhD.

The researcher's previous roles and responsibilities in the public service and the University of Seychelles may be seen as a conflict of interests, given that a few participants had previously worked with her. They may also have been helpful for recruiting research

participants and gaining access to key stakeholders. However, her previous positions afforded her no privileges or special access to participants - any other Seychellois PhD student would have received similar access. In Seychellois culture, a person who vacates a senior position no longer commands authority and influence. This researcher relinquished her employment at the university in December 2013, and therefore did not hold any position of power over the research participants during the data collection phase in 2015. Aware of her background, she made a clear and conscious effort during the research to prevent any preconceptions from influencing the study. She adopted and maintained an open mind and approach to collecting and analysing the data.

The PhD graduates alluded to their superiority as degree holders. Two declined to be involved in the research, indicating their reluctance to participate and that they did not feel obligated.

There were also positive aspects to being an insider researcher, particularly having experience and knowledge of the public service, the university, industry, government and community in the Seychelles. Knowing the local culture and politics brought a fundamental understanding of the formal hierarchy and guided the approach for contacting and establishing relationships with the research participants.

The next section presents the sampling strategy adopted to investigate the contributions of Seychellois PhD graduates to national development.

3.3.2 Sampling Strategy

Sampling is the process of selecting and recruiting appropriate participants for research, typically those who can provide useful information to the enquiry. A sample is a subset of the larger population under study and defines the population on which the research focuses. Qualitative researchers rely heavily on purposive sampling strategies (Bryman, 2016; Neumann & Tan, 2011; Patton, 2015). Qualitative inquiry typically focuses in depth on relatively small non-random samples that include diversity. Patton (2015) contended there are no rules for sample size in qualitative inquiry; it depends on what will be useful, what will

have credibility, and what is viable with the available time and resources. He advised researchers to study a larger number of people when seeking breadth and variation, and a smaller number of people when seeking depth. Cohen, Manion, and Morrison (2011) asserted the purpose and methodological considerations determine the sample size. In this study, purposive sampling was used to access participants who had knowledge and experience of the topic under investigation. This allowed for carefully selected participants based on specific criteria, who could provide responses to the research questions. Consideration was given to the availability of participants, the methods used and the duration of the research. The whole population of Seychellois PhD graduates was targeted, so the total number of PhD graduates and ultimately, the number of those who agreed to participate determined the sample size. Participants were recruited progressively during the study, as substantiated by Sarantakos (2013).

This research used a combination of purposive samples to select and recruit suitable participants. Non-random purposive sampling was better suited to selecting the online questionnaire respondents and interview participants.

Stratified (quota) purposive sampling was employed to recruit stakeholder participants and "capture major variations" in the sample (Patton, 2002, p. 240). These variations included the size, mix and balanced representation of key subsector stakeholder groups and focus group members in relation to the topic. By selecting input from diverse subsectors within the stakeholder groups, a stratum with distinct characteristics could be identified within the clusters.

Quota sampling is a type of purposive sampling that includes the appropriate number of participants with gender, age, occupation and other characteristics needed to respond to the research questions. Quota sampling is more specific with respect to size and proportion of subsamples, and subgroups are chosen to reflect corresponding proportions in the population. Such a sampling technique was useful for selecting representatives from the stakeholder groups.

Snowball sampling (Bryman, 2016) was used to strengthen data collection and recruit Seychellois PhD participants, whereby an identified participant referred other potential participants to the researcher. Participants were selected purposively in relation to the topic and purpose in order to encourage a range of perspectives. Purposive sampling allowed flexibility during the research process and catered for the relatively small population of doctoral graduates in the case study.

3.3.2.1 Research Participants

Out of 60 potential participants invited to take part in the study, 53 participated. All were aged between 25 and 75 years and they were assigned pseudonyms (see Appendix B). Of the 53 participants, 24 were PhD graduates and 29 were representatives from the four stakeholder groups, namely: university, industry, government and community. The aim was to obtain an equal number of the two groups of participants (PhD graduates and stakeholder groups). Slightly more than half of the stakeholder group participants were in positions of authority, and had a grasp of the research topic.

Employers and work supervisors of Seychellois PhD graduates were not relevant due to their potential to skew the data in view of their employers' political status. Other challenges were that self-employed PhD graduates did not have supervisors, and other PhD graduates, under the oversight of a Corporate Board of Governors, received distance supervision. Since the study focused on a national dimension, the perspectives of the participants from the four key stakeholder groups were relevant to the research.

3.3.2.2 Key Stakeholder Groups

Key stakeholders were selected according to two criteria: firstly, the relevant stakeholder group and sector; and secondly, individual participants within the stakeholder groups. Four stakeholder groups were relevant to PhD graduates: university, industry, government and community. Participants were selected by means of purposive sampling and participation was subject to consent and availability.

The university was chosen as a key stakeholder since teaching and research are its core functions. It also attracted doctoral graduates, albeit in small numbers. The perspectives of university participants were gathered through individual interviews designed to seek their views on the need for, and contribution of PhD graduates to the university, the role of the university in doctoral education, and how to more fully harness the knowledge and skills of Seychellois PhD graduates. Purposive sampling was used to select interviewees, taking into consideration their role and knowledge of the topic. A cross-section representation of the university was also selected, ranging from student union representative to governance employees.

The industry sector was an important stakeholder for gaining a deeper understanding of their role, support and collaboration with PhD graduates. At the time of this research, the industry or private sector employed 70% of the workforce in the Seychelles (National Bureau of Statistics, 2013a). The industry sector in the Seychelles comprises largely small organisations; hence, representation reflected the importance of this sector to the economy, their potential interest in doctoral education and size. Purposive sampling was used to select participants from a wide cross section of industry to help enable different perspectives. The chosen industry group organisations represented key economic sectors with the highest number of employees. The Labour Force Survey Report 2011/2012 (National Bureau of Statistics, 2013a) was used to select the participating sectors: commerce and industry, tourism association, hotel resort, construction, fisheries, manufacturing, banking, airline, and telecommunications. During the course of the study, other sectors were included, based on recommendations and leads from participants.

The government sector was the third stakeholder selected to participate in the study. This sector employed 28% of employees, of whom 8% were in the para-state sector, comprised of organisations partly funded by the government but operating commercially (National Bureau of Statistics, 2013a). The majority of government employees was engaged in public administration, education, health and social work, and filled regulatory, funding and policy roles in doctoral education. The perspectives of the Chief Executive Officers of these

government institutions were gathered for their views on the engagement of the government sector.

Interviewees from the government stakeholder group were selected through purposive sampling. They comprised a cross section of government bodies with portfolios relevant to the research topic, including Labour and Human Resource Development; Public Administration; Education; and the Tertiary Education Commission. Three additional organisations were included during the study: a newly formed National Institute of Science, Technology and Innovation; the Fisheries Research Agency; and the Department of Blue Economy. The agency responsible for National Human Resource Development awards scholarships to postgraduate and undergraduate candidates for overseas studies.

The community stakeholder group was the fourth stakeholder group, represented by non-governmental organisations or the "civil society". The term civil society refers to "the wide array of non-governmental and non-profit organizations that have a presence in public life, expressing the interests and values of their members based on ethical, cultural, political, scientific, religious or philanthropic considerations" (World Bank, 2007, p. 1). In the Seychelles, non-government organisations fulfil various functions and include community groups, charitable groups, faith-based groups, professional associations and foundations.

Selection of interviewees was through purposive sampling to identify a cross section of participants from the Citizens Engagement Platform, the oversight body for Community Development; Nature Conservation; and Family and Youth Support. To capture the anti-social dimension of this group an invitation was also extended to an institution working towards the prevention of illicit drugs, but they declined to participate.

In this study, access to participants was through formal and informal contacts. Therefore, access was often dependent on their availability, given that most of the participants could make decisions without permission from their superiors. In a few cases, the approval of supervisors was sought by email - all participants were granted approval to participate in this study.

3.3.2.3 Pilot Tests

In preparation for data collection in November 2014, the researcher trialled the online questionnaire and pilot tested the individual and focus group interviews with PhD graduates at Edith Cowan University, Australia, following ethics approval.

Five PhD holders not included in the data set participated voluntarily to pilot the online questionnaire. They proposed some changes to improve the questionnaire and strengthen its validity. The interview was trialled with two participants, one of whom completed the online questionnaire. Their suggestions were incorporated into the interview protocol. The experience derived from the pilot tests helped to sharpen the researcher's interview skills.

The focus group was also pilot tested with three PhD candidates who made some comments that were subsequently integrated into the guidelines. Owing to the different experiences and cultures of the participants, the pilot tests were limited to the Australian experiences. Nevertheless, the exercise improved the quality of the instrument.

The online questionnaire provided data and background information for the context of the study while ensuring the anonymity of respondents. It also strengthened the results of the study through triangulation of the data sources. The questionnaire preceded the interview and focus groups.

3.3.3 Data-gathering Process

Four methods were used to collect data from five sources for the purpose of triangulation. More detailed information about data collection processes by data source and research questions can be found in Appendix C. Data were collected in the Seychelles from January to May of 2015. One week was dedicated to administrative and logistical preparation for data collection, in addition to using the time to contact Seychellois PhD graduates and identify stakeholder group participants. Recruitment of participants was via invitation in two popular national newspapers, namely "*Nation*" and "*Today*", from 22 to 24 January 2015 (see Appendix D). Only two participants responded. The snowball sampling technique (Bryman,

2016) or word of mouth generated more PhD graduate volunteers. The researcher also invited others who the PhD graduates had mentioned. In total, 24 PhD graduates agreed to participate and responded to an online questionnaire. Of these, 17 volunteered for the interview stage.

The data collection process coincided with the announcement of the re-organisation of the Cabinet of Ministers by the President of the Seychelles on the 26 January 2015 that had a significant impact on the ministries and public servants who had to move into new roles with different responsibilities. These changes in ministerial portfolios meant having to adjust the data collection schedule to accommodate those affected, leading to two, and in some cases three-month delays in gaining access, as well as the unavailability of potential participants.

The data were collected in five interrelated stages. The first sought background information about the Seychellois PhD graduates and their perspectives through an online questionnaire. The second included interviews with a subgroup of 17 respondents from the online questionnaire. In the third stage, interviews were conducted with participants from the four key stakeholder groups – the university, industry, government and community. In the fourth stage, three cross-sector focus groups were held with representatives from both the stakeholder groups and PhD graduates. The fifth stage, undertaken alongside the interviews, involved collection and analysis of documents relevant to the study. Each stage is further discussed below.

3.3.3.1 Stage 1: Online Questionnaire (January to March 2015)

An anonymous online questionnaire was distributed to participants at the outset using Qualtrics, a web-based software (see Appendix E). The questionnaire was developed, customised and distributed to obtain demographic and other relevant information from the participants, specifically the Seychellois PhD graduates; and allowed for anonymous responses to the questions.

The questionnaire comprised 29 questions categorised into four clusters: background information, PhD studies, national contributions of PhD graduates, and other comments.

Less than half the questions were categorical and closed; the rest were open-ended and required written responses. The questionnaire was launched at the end of January 2015 and available online until March 2015, and materialised only two Seychellois PhD graduates. It was forwarded with a covering letter by e-mail to participants who expressed an interest in the research and included a Uniform Resource Locator (URL) link, inviting PhD graduates to complete the online questionnaire (see Appendix F). To encourage participation, the researcher provided an incentive in the form of a 64 GB USB drive to all those who completed the questionnaire within the first two weeks of launch. The incentive encouraged a few PhD graduates to complete and submit the questionnaire faster, but did not have a significant impact. The Human Research Ethics Committee of Edith Cowan University approved inclusion of an incentive.

Most of the PhD graduates completed the online questionnaire, giving a response rate of 86% (24/28). It took between 11 minutes and five hours to answer 29 questions, half of which had multiple-choice answers. The reason why the duration was longer than anticipated for some participants was that they paused to check their answers and ensure accurate responses. Following completion of the questionnaire, participants were invited to attend an interview in order to provide additional information. Seven participants had nothing more to add to the information they had provided in the questionnaire and did not advance to the interview stage.

3.3.3.2 Stage 2: Interviews with PhD Graduates (February to March 2015)

The principal purpose of the interview in qualitative research is to gather data and draw on peoples' perspectives of their lived experiences (Patton, 2015). The interview was a relevant method for this study, which sought the views of Seychellois PhD graduates and four key stakeholder groups, to provide insights into the study phenomenon. PhD graduates who completed the questionnaire were invited to participate in an interview. The 17 PhD graduates who had volunteered for the interview were contacted by email and they were provided with information about the study; and to arrange a date, time and venue (Appendix G).

The researcher used semi-structured interviews for this study. All were held in English, one of the three official languages in the Seychelles, spoken by all participants. Nonetheless, they were given the choice to express themselves in Kreol, the local language of the Seychellois. A few participants used Kreol catchphrases to capture their sentiments and accurately convey their experiences and perspectives.

A semi-structured interview consisting of 17 questions (see Appendix H) was used to enable probing for clarification where necessary. This approach was used to encourage participants to feel at ease in a conversational setting. Most participants comfortably recounted their experiences and openly expressed their emotions. Some willingly discussed their personal thesis topic and findings during the interviews.

Interviews were held on an individual, face-to-face basis, each lasting an average of 45 minutes. As recommended by Seidman (2013), they were kept to under an hour so as not to be too demanding on the participants. There were pauses ranging from five to ten minutes during three interviews to allow participants to respond to urgent telephone calls relating to their work. Interviews ceased after no further candidates showed an interest in participating.

Interviews were conducted at venues chosen by the Seychellois PhD graduates; the majority chose their offices, while others preferred the researcher's office as a neutral zone. To begin with, the researcher provided all interviewees with an information letter (see Appendix I), which stated the objectives of the interview and information about the research. The interviewee then signed a consent form (see Appendix J. All interviews were audio recorded with the interviewees' consent to enable accuracy and allow the researcher to revisit the recordings as required. Body language and disruptions during the interviews were recorded as field notes.

3.3.3.3 Stage 3: Interviews with Key Stakeholder Groups (March to April 2015)

Stakeholder participants did not respond to the invitation in the media advertisement, so to encourage participation, the researcher initiated telephone and email contact with

representatives from each of the four groups. In preparation for the interview, a list of relevant organisations and potential participants was compiled including telephone details of the participants who would be invited to join the study. To confirm agreement, an email was sent to each participant individually, conveying the date and time of the interview. In accord with their preferences, all stakeholder representatives were interviewed in their own offices.

While the university stakeholder group was limited to a sole university, a range of perspectives was encouraged by including different departments. Semi-structured, face-to-face interviews were also conducted with this group of participants, despite the challenge of arranging interviews around their busy work and travel schedules. In total, 21 individual interviews were held with an average of five participants per stakeholder group.

The majority of participants were in decision-making positions. The rationale for purposively selecting them was due to their knowledge of the topic and familiarity with the policies of their organisations. The interview style was similar to that for PhD graduates, guided by predetermined guidelines. All interviews were transcribed verbatim. At the commencement of the interviews, each participant was provided with an information letter and was asked to sign a consent form.

3.3.3.4 Stage 4: Cross-sector Focus Group Interviews (May 2015)

In this research, the purpose of the cross-sector focus groups was to gather data in a setting where participants expressed and debated different views about an issue. Another reason for selecting focus groups was to serve as corroboration. Focus group participants can influence one another with their own and others' responses to ideas and comments, thereby generating individual and collective views.

The researcher selected 13 participants using purposive sampling, that is, participants with familiarity and relevant knowledge of the topic. Eleven participants took part, eight from the four stakeholder groups and three PhD graduates. They were invited by telephone call and subsequently by email to participate in one of three cross-sector focus groups comprised of

two representatives from each stakeholder group and two PhD graduates. Invitations to six participants from the industry stakeholder group elicited only two additional participants. It was difficult to seek replacements because participants had given notice of their apology on the day of the focus group.

Each focus group comprised one participant from each of the four stakeholder groups and a PhD graduate. Selection was based on their experience and knowledge in relation to the research topic; a balanced mix of genders; participants' willingness and availability; and was intended to include only those who had not participated in the interview. However, due to the high participation rate of PhD graduates in the interview phase, two who had been interviewed also offered to participate in the focus groups. The stakeholder participants were all senior officials at middle-management level. Recruitment for the focus groups adhered to similar criteria as for representatives of the stakeholder groups, and all participants complied with the ethics formalities of signing a consent form after reading an information letter.

Some participants were hesitant to participate in the focus groups, and when approached, wanted to know the identity of the other participants. Where available, the information was provided. There were also difficulties associated with specific dates, times, and venues to accommodate the availability of some participants, mainly from the industry and community groups. In the end, 11 participants took part in three focus groups. The first comprised five participants, and the second and third comprised three participants each. Since the target was two groups of five participants and the second group was short of two participants, the decision was made to conduct a third focus group, after which saturation had been reached. Saturation is a term used to describe the point when no more new information is being received (Krueger & Casey, 2015). The cross-sector focus groups provided a fertile opportunity for discussion.

Moderation of the focus groups followed a guided protocol (see Appendix K) and deliberations were audio-recorded with the informed consent of the participants. After agreement in principle, participants were emailed a formal invitation confirming the date,

time and venue where the focus group would be held. Each focus group discussion went on for one and-a-half hour and all three were held at the researcher's office.

3.3.3.5 Concurrent Document Analysis

Document analysis refers to both printed and electronic sources of data (Bowen, 2009), examined and interpreted to elicit meaning, gain an understanding and develop empirical knowledge (Corbin & Strauss, 2008). In this study, the aim of document analysis was to examine relevant information, gain an overview of doctoral education in the Seychelles and generate data for the research. The document sources included published and unpublished official government reports, national strategic plans, policy documents, and abstracts from theses of Seychellois PhD graduates. These documents were available in the public domain; some were mentioned during the interviews and focus groups. Others came to the attention of the researcher during the process of researching available material.

Document analysis was also carried out to learn about policies, training plans and funding of doctoral education. Official policies relating to allocation of scholarships, workforce plans, higher education policy and plan, expenditure on doctoral education, and other relevant material was reviewed concurrently with the interviews and focus groups. A compilation of 14 relevant documents were collected and reviewed; they have been retained as the data corpus (see Appendix L). Twelve of the 24 doctoral theses by Seychellois PhD graduates were accessible online. The results from the document analysis have been incorporated into chapters four and five to supplement the perspectives of PhD graduates and stakeholder groups.

Data collection raises ethical considerations for researchers around the integrity of their work. The ethical considerations taken into account in this study are outlined in the next subsection.

3.3.4 Ethical Considerations

Ethics are guidelines designed to advise and steer researchers in the conduct of good-practice research (Bloor & Wood, 2006). All human-related and qualitatively designed research carry ethical obligations as they involve human interaction and subjectivity, and must be undertaken in accordance with the guidelines in the National Statement on Ethical Conduct in Human Research (Australian Government, 2015). Consequently, the researcher has an obligation to respect the rights, views and desires of the participants. This led to a number of steps taken to ensure compliance. The researcher obtained approval from the Human Research Ethics Committee of Edith Cowan University to conduct this research (see Appendix M).

Ethics compliance was assured at every stage of the research, from design through to the data-collection process, including the participants' signed informed consent, voluntary participation, and respect for confidentiality and anonymity of participants. Pseudonyms were used to conceal their identities.

This research had a very low risk level of intrusion on participants in the form of minor inconvenience for completing an anonymous questionnaire, and a time commitment for the interview and focus group. As a show of appreciation for their efforts, participants went into a lucky draw to win a USB drive. The researcher also adopted a flexible approach with regard to cancellations and postponements of interviews, until agreement was reached in favour of the participant who could also choose the location for the interview.

Participants were provided with the objectives of the research and their role in the study through an information letter. Following this, their consent was obtained in the form of signed consent forms, which gave permission to audio record the interviews and focus groups.

Deception or misrepresentation of the research findings (Gray, 2009) was avoided by audio recording the interviews to ensure accuracy; and interpreting and presenting the results as closely as possible to the spoken words, using quotations from the interviews.

In research, privacy refers to the non-disclosure of private knowledge and information obtained from research participants. Respondents have the right to withdraw from an interview at any time or refuse to answer any questions they find intrusive (Gray, 2009). Therefore, researchers must be sensitive, anticipate how participants will feel and respect their privacy (Gray, 2009). In this study, no participants withdrew after being advised that their participation was voluntary and that they had the right to withdraw at any time. They were honest about expressing their views and opinions and at ease with explicit assurances that their privacy would be protected. For example, despite complaints that they were earning low salaries, participants were not asked to disclose their personal salaries.

Confidentiality is a promise by the researcher that the research participants will not be identified: "it is also about data and refers to agreements with persons about what may be done with their data" (Sieber & Tolich, 2013, p. 155). Confidentiality refers to an agreement between the researcher and the participant in the informed consent that assures the anonymity of the participants who were de-identified in this thesis. Confidentiality was maintained throughout the research, in accordance with informed consent, and only the researcher and her three supervisors had access to the data. Participants' voices have been reported as themes, and quotes have been de-identified and assigned pseudonyms. The thesis has been carefully and thoughtfully written, using selective words and descriptions to conceal the identities of the participants.

Confidentiality also involves data management. In general, the researcher as data custodian, owns the work generated from the research (Lichtman, 2013). This implies that the researcher holds the copyright and intellectual property rights. ECU has a data management policy and plan, both of which were adhered to in this study. The collected data were kept securely in accordance with Edith Cowan University's ethics policy (2015) and data management policy (2016). This study complied with the 2007 Australian National Statement on Ethical Conduct in Human Research, and Edith Cowan University's 2010 policy on the Conduct of Ethical Human Research.

The digital and audio data collected for this study were safely stored in durable digital and non-digital files on a USB drive, dated, labelled and protected by a password known only to the researcher. Printed data were locked in the office of the researcher and precautions taken to safeguard against loss, deterioration and corruption. In accordance with Australian data management regulatory requirements, Edith Cowan University retains all the data upon completion and award of the PhD degree and transfers it to purpose-built storage from where they are destroyed in accordance with the National Statement on Ethical Conduct.

Assuring anonymity means the researcher does not disclose participants' names and/or unique identifiers (Sieber & Tolich, 2013). Using pseudonyms and anonymous online questionnaires helped to conceal the identity of the participants. Sieber and Tolich (2013) argued for ethics in research involving human participants because they may be "vulnerable" and need "special protections" (p. 11).

In this study, precautions were taken to protect the identity of participants by following well-planned ethical procedures. The results were aggregated into themes to prevent identification and every effort was made to ensure the feedback could not be linked to individuals or institutions.

3.4 Data Analysis

Qualitative data analysis is an interpretive art (Corbin & Strauss, 2008). Analysis of data is a complex phase in qualitative research, involving active engagement and a demanding analytical process. The process involves transforming raw data into research results to create new knowledge, and procedures include listening, reading, understanding the language and meaning, and interpreting textual data. The following section describes the method and process of data analysis and concludes with the trustworthiness of the research.

3.4.1 Method of Data Analysis

There is no standard method of data analysis in qualitative research, but there are recommended techniques for constructing meaning, both manually and with technological

assistance (Saldaña, 2011). Thematic analysis is a widely used technique in qualitative research to facilitate interpretation (Glesne, 2011). It can be used in phenomenological studies, since interpretive phenomenological analysis is also based on searching for and clustering themes (Smith & Osborn, 2007). It initially involves coding, searching for patterns and grouping codes in the data to form concepts, then focused categories, and eventually themes. The process helps to capture the complexities of meaning within a transcribed textual data set, and allows the researcher to interpret the text and identify themes. This study adopted thematic analysis; a qualitative method for identifying, analysing and reporting patterns or themes within data (Braun & Clarke, 2006). Thematic analysis refers to the concepts and categories developed, and ultimately, the themes that emerge from data.

Informed by Bazeley and Jackson (2013) and Edhlund and McDougall (2012), QSR NVivo version 11 qualitative software was used for analysis. QSR NVivo International is widely used in social science disciplines and qualitative projects (Bazeley & Jackson, 2013). The software allows users to organise and code data for deeper analysis of transcriptions derived from interviews and focus groups (Edhlund & McDougall, 2012). When coding in NVivo the actual words of the research participants are used rather than the words of the analyst (Corbin & Strauss, 2008).

Given the qualitative data sets collected in this study, thematic analysis was appropriate to analyse the large volumes of rich textual data generated from 24 online questionnaires, 38 interviews, 3 focus groups and several documents. Being a pattern-type technique, thematic analysis is ideally aligned with a constructivist epistemology, a phenomenological paradigm, and the case study design of this research.

3.4.2 Process of Data Analysis

Data analysis is a systematic process of working with data to provide a holistic understanding of research participants' views and experiences. The process involves generating, developing and verifying concepts at different levels of data analysis, is emergent, and drives the research project (Macklin & Higgs, 2010). In this study, data analysis was undertaken sequentially with data collection. Figure 7 illustrates the 4-step

approach to data analysis including transcribing, coding, forming concepts and creating themes.

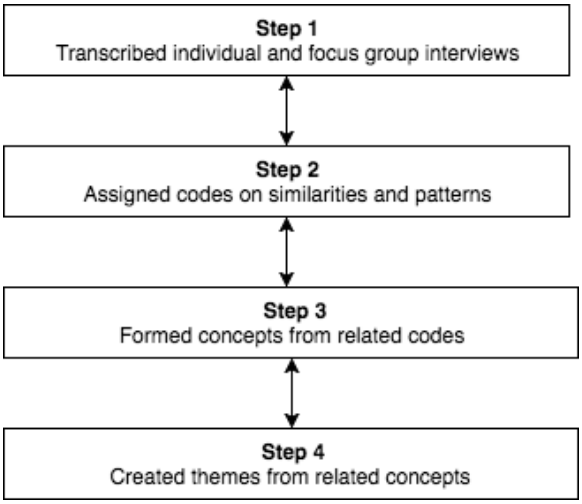

Figure 7: Data Analysis Procedures

3.4.2.1 Transcribing Individual and Focus Group interviews

The first step in the data analysis was transcribing the audio-recordings from the individual interviews and focus groups. The researcher used "Express Scribe NCH software", professional software designed to translate transcriptions of audio recordings into written text. Transcription took place immediately after the interviews, assisted by familiarity with the data and responses to the questions, and the researcher signalled appropriate prompts and probes for future interviews. During transcription, the voice recordings were played and replayed to ensure accuracy. The 24 questionnaires, 38 interviews, 3 focus groups and the reviewed documents generated a large volume of rich data.

The researcher thoroughly read each interview and focus group transcription to familiarise with the texts that were coded line by line into NVivo 11 software. The process initially involved reading and re-reading the transcripts, and reviewing the tapes and notes where necessary to identify relationships for coding.

The transcriptions facilitated analysis and insights into the data by allowing the researcher to revisit the texts in order to identify concepts. The transcribed responses from the interviews and focus groups were printed to facilitate reading and ensure accuracy.

3.4.2.2 Assigning Codes to Patterns and Similarities

The second step in the data analysis process was the construction of nodes in NVivo 11. A node represents a code or theme from the data. Free nodes are open nodes in which the transcripts are coded. Case nodes are classification nodes for a group or each participant (Bazeley & Jackson, 2013). The purpose of free and case nodes is to code and store the data from interviews and focus groups. Codes were created by the concepts, which emerged from the texts.

A code is a "word or short phrase" that captures the meaning of a section of the interview (Saldaña, 2013, p. 3). Coding is a process of "deriving and developing concepts from data" (Corbin & Strauss, 2008, p. 65) by "categorising segments of data with a short name that simultaneously summarises and accounts for each piece of data" (Charmaz, 2006, p. 43) . Miles and Huberman (1994) described coding as "analysis" (p. 56). Through a process of organising the text and uncovering patterns within it, collected data were coded, categorised, and themes established (see Appendix N). The researcher identified and interpreted similar and different concepts from the questionnaires, interviews and focus groups, reviewing the transcripts a second and third time to ensure that all themes had been captured. This led to data reduction (Miles & Huberman, 1994). The repetitive process provided the researcher with an initial understanding of the participants' perspectives.

3.4.2.3 Formed Concepts from Related Codes

Concepts are general, higher-level and more abstract themes (Richards & Morse, 2013) made of words that communicate ideas. For example, age is a concept because it represents an abstract idea of the number of cumulative years of an individual (Berg, 2007). Several codes were generated during the coding process; they were reviewed, collapsed and expanded into gradually emerging concepts or categories. The concepts or explanatory ideas

were identified from the participants' own words in NVivo. Codes that were closely related in meaning were merged into concepts.

Conceptualising related codes into concepts involves clustering ideas and codes to form categories. In this way, concepts were formed into categories, which emerged from the dataset and provided further understanding of the participants' perspectives. Throughout the creation of codes, the researcher made notes to describe relationships between the sets of data. These notes formed part of the data analysis process. From the large number of codes only a few concepts were extracted to provide deeper understanding of the participants' perspectives.

3.4.2.4 Themes Created from Related Concepts

Themes are the outcome of coding, categorising and analytical reflection. "A theme captures something important about the data in relation to the research question and represents some level of patterned response or meaning within the data set" (Braun & Clarke, 2006, p. 82). Themes draw together categories for presentation of research results. During the data analysis for this study, the concepts and categories that emerged from the data were further conceptualised to form themes. Three major themes emerged, providing further insights into the perceived contributions of Seychellois PhD graduates. Although the process is reported sequentially, the procedure did not develop in a linear fashion because the categories were continually revised to reflect the researcher's interpretation of the text. The four steps described above were carried out in a back-and-forth manner in order to verify the results and relationships between the data sets.

3.4.3 Research Trustworthiness

It is incumbent on researchers to undertake research in ways that will ensure the findings are rigorous and trustworthy. The literature reports on different approaches for evaluating research trustworthiness. The seminal work of Lincoln and Guba (1985), which established criteria of credibility, transferability, dependability and confirmability of data, were adopted to maintain the trustworthiness of this study. These four criteria address the validity of

qualitative research and are considered the equivalent of validity, reliability and objectivity in the positivist paradigm. More details are provided on each of these criteria and how they were used in this study in later sections.

Research credibility mandates study results that are truthful and believable from the perspectives of the research participants (Trochim, 2001). It refers to how the research results represent the true reality. In this study, participants who were close to the phenomenon were selected purposively in recognition of their knowledge and experience to provide informed feedback. The credibility of the study was enhanced by the use of multiple (four) data-collection methods: online questionnaires, interviews, focus groups and document analysis.

Transferability is the degree to which the results of qualitative research are relevant and applicable to other similar situations (Lincoln & Guba, 1985). Lincoln and Guba acknowledged that transferability can be difficult in qualitative research, but concluded accurate contextual information makes it possible for comparisons to be applied to other settings. Although this study was a unique case, other small island developing states share similar characteristics, making transferability possible.

Dependability is concerned with the rigour of the research approach, and in terms of consistency, whether similar findings can be replicated (Lincoln & Guba, 1985) in repeated studies. An audit trail of data collection and analysis procedures provide evidence of the research process to ensure that data collection and interpretation have not been fabricated. An audit trail necessitates inclusion of information relating to every step of the research process as a means of assessing its trustworthiness. The research audit trail enables one to trace the logic of the research and determine whether the findings are reliable as a platform for further enquiry.

Confirmability is a term advocated by Lincoln and Guba (1985) to demonstrate the neutrality of research, that is, the extent to which the results are reflective of the participants' views rather than the bias of the researcher. Each researcher brings a unique perspective to a qualitative study (Trochim, 2001) and it is for this reason that strategies to establish

confirmability are built into qualitative inquiry. Confirmability is achieved through a record of the process of inquiry that led to the interpretation of the data, to demonstrate that the data were properly analysed and presented and the interpretations are supported by evidence and balanced perspectives. In this study, confirmability is attested to by interview excerpts that provide evidence of the perspectives of the interviewees, focus-group participants and questionnaire respondents as reported in the results.

The study also used triangulation of data collection sources and methods. Triangulation is corroboration of methods that supports the findings of a study by showing agreement between at least three independent sources. Its purpose is to enhance the trustworthiness of the study and make it believable (Flick, 2009; Maxwell, 2013; Miles et al., 2014; Patton, 2015). This study used four data collection methods: online questionnaires, interviews, focus groups and document analysis. Each method has different strengths and weaknesses, and the combined outcomes help to achieve rigour and deepen understanding.

Atkins and Wallace (2012) advocated data triangulation using two or more methods. Several data sources enhance the credibility of the study and diminish the risk of bias associated with a single method. More than one data source were used in this study by interviewing the various participants, including PhD graduates and representatives from the four different stakeholder groups. This was supplemented by an integrated audit trail. The findings of this research are grounded in data that were further developed into concepts and emerging themes.

As described above, this study is aligned with the required elements of research trustworthiness and integrates criteria of credibility, transferability, dependability and confirmability of the data.

3.5 Summary

This chapter positioned the researcher, outlined the research process adopted, and described the data collection methods used to gather relevant data for the study. The choice of data collection methods was aligned with the research design. The ethical considerations

adhered to throughout this research were explained. The chapter also outlined the thematic data analysis procedures in four steps to ensure trustworthiness of the results by meeting the qualitative research criteria of credibility, transferability, dependability, and confirmability. In addition, the study used four methods of data collection and different sources of data – PhD graduates and four stakeholder groups – for triangulation.

The next two chapters, chapters four and five, present the findings from an analysis of multiple perspectives of Seychellois PhD graduates and the four key stakeholder groups.

Chapter Four: PhD Graduates' Perspectives

4.1 Introduction

Chapter three described the case study methodology used in this research, the research process, the four data collection methods and the thematic data analysis procedures. Ethical considerations and research trustworthiness were also outlined. Chapter four presents the research findings derived from an analysis of data collected from an anonymous online questionnaire, individual face-to-face interviews and focus groups. The findings are supported by evidence from the document analysis. The views and experiences of the participants were interpreted for meaning in order to construct the perspectives of the Seychellois PhD graduates (hereafter referred to as PhD graduates). This chapter is divided into two broad sections. The first presents a profile of the 24 PhD graduates to provide a contextual overview of their perspectives. The profile was constructed primarily from responses to an online questionnaire, supplemented by data from interviews with PhD graduates. The second broad section presents the perspectives of the PhD graduates in three inter-connected themes.

4.2 Profile of Seychellois PhD Graduates

The profile of PhD graduates in the study sample gives context and background information to their reported perspectives. It includes number, gender and study areas; award of PhD degrees; PhD fields and theses; perceived skills developed; career trajectories; and the funding sources for PhD studies.

4.2.1 Number, Gender and Study Sample

The data show a population of 28 Seychellois PhD graduates, comprising 15 females and 13 males, living and working in the Seychelles. In May 2015, there were approximately six Seychellois per 10,000 working adults in possession of a PhD qualification out of a working population of about 50,000 (National Bureau of Statistics, 2013a). Of the 28 PhD graduates, 20 were native citizens of the Seychelles; the rest were naturalised citizens. Three of the

eight naturalised graduates obtained their PhDs before becoming Seychellois. All PhD graduates were awarded their degrees by universities outside the Seychelles.

During the study, participants made mention of 12 Seychellois PhD graduates known to them who had emigrated overseas, suggesting an estimated total cohort of 40 Seychellois PhD graduates, including those living in the Seychelles and abroad. A further 12 Seychellois PhD candidates were at various stages of candidature.

A participation rate of 86% or 24 out of 28 Seychellois PhD graduates voluntarily participated in the study: 14 females and 10 males. Of the four PhD graduates who did not participate, two declined due to heavy workloads and the other two were unreachable. The high rate of participation was due to a keen interest on the part of participants, stemming from the perceived potential benefits from the study. All PhD graduates who participated in the study were allocated pseudonyms to protect their identity (see Appendix B).

As shown in Table 11, the gender composition of Seychellois PhD graduates was almost balanced, with a slightly higher proportion of women. More females (14) than males (10) agreed to be part of the study.

Table 11: Seychellois PhD Graduates by Number, Gender and Study Sample

	Population of Seychellois PhD graduates in the Seychelles (05/2015)		Study sample of Seychellois PhD graduates (05/2015)	
Gender	Number	%	Number	%
Male	13	46	10	42
Female	15	54	14	58
Total	28	100	24	100

Note: Percentages have been rounded

Among the graduates who attained their PhD degree between 1981 and 1997 there was a gender mix of five males and one female, but in the five years from 2009 to 2014, more females (10) completed than males (3).

Data from the Population and Housing Census 2010 (National Bureau of Statistics, 2012) showed aggregated numbers (Master degrees combined with doctoral degrees) of

educational attainment for Seychellois postgraduates. The data from the Labour Force Survey Report 2011/2012 (National Bureau of Statistics, 2013a) indicated a discrepancy between the number of Seychellois PhD graduates surveyed in this study (28) and the statistics presented in the Report (109). Clarification was sought from the author of the report regarding the source of its statistics. In response, the author advised readers to interpret the figures with caution (see Appendix O).

4.2.2 Award of PhD Degrees

All Seychellois PhD graduates were enrolled in a range of universities, with the exception of four graduates who attended the same British university due to a bilateral training agreement with the government. Five PhD graduates pursued their PhD in distance-learning mode. The graduates experienced varied and diverse PhD programs and acquired numerous skill sets. Seychellois PhD graduates who studied in the USA undertook a compulsory coursework year, whereas those who studied in European universities voluntarily registered in coursework components.

As shown in Table 12, most of the 24 Seychellois PhD graduates studied in English – only three in French – and were enrolled collectively in 20 universities in seven countries. Almost half studied in England, partly due to the availability of scholarships and partly due to the UK having been approved by the government of Seychelles as a location for overseas study (Agency for National Human Resource Development, 2014). The Seychelles is a former British colony and still has strong links with its colonial parent.

Table 12: Country and University of Study of PhD Graduates (n=24)

Countries	Number of PhD graduates	% Graduates by Country (Figures rounded)	Number of Universities
England	11	46	7
France	3	12	3
USA	3	12	3
India	3	12	3
New Zealand	2	8	2
Canada	1	4	1
Switzerland	1	4	1
Total	24	98	20

The data from the questionnaire revealed that the first Seychellois achieved a PhD in 1981 – 3 decades ago. Table 13 shows that 75% of PhD graduates qualified between 2000 and 2014, indicating the majority had less than 10 years post-graduation experience. Table 13 also shows a significant increase of PhD graduates during the period 2010 to 2014, when the Seychelles was attracting approximately two PhD graduates a year.

Table 13: Graduation Year of PhD Graduates (n=24)

Year - Decade	No. of Graduates	% (Figures rounded)
1980-1989	5	21
1990-1999	2	8
2000-2009	4	17
2010-2014	13	54
Total	24	100

4.2.3 PhD Research Fields and Topics

Almost all the PhD graduates (22) undertook a traditional PhD research thesis; two were required to produce at least two publications as part of their PhD degree. More than half the graduates (16) studied full-time and took an average of three to four years to complete. The others (8) studied part-time in distance-learning mode while based in the Seychelles and mentored by supervisors overseas.

Almost half (11) the PhD graduates had selected their own thesis topics, while five had considered the interests of the Seychelles in deciding. Very few participants reported supervisor influence on their choice of topic. There was wide agreement among them that the knowledge they derived from their chosen fields of research had equipped them as specialists and experts in their respective disciplines.

Table 14 shows social science the most common research category (14), followed by natural sciences (10). The two most popular fields of study were education (10) and biological sciences (7). The data revealed that nearly three quarters (73%) of these adopted case study as a research method to investigate problem areas in the Seychelles.

Table 14: Discipline and Gender of PhD Graduates (n=24)

Broad discipline area	Number of males	Number of females	Number of PhD graduates	% (Figures rounded)
Education	2	8	10	42
Biological sciences	3	4	7	29
Languages	1	1	2	8
Finance	1	0	1	4
Economics	1	0	1	4
Physical sciences	1	0	1	4
Chemical sciences	0	1	1	4
Engineering	1	0	1	4
Total	10	14	24	99

Only 12 of the 24 PhD theses produced by Seychellois were accessible through their respective university websites, mostly those in Education and Biological Sciences. Only one PhD thesis was lodged with the Seychelles National Library despite mandatory legislation for libraries to receive copies of all PhD theses. One PhD graduate stated that a copy of her thesis had been placed in the Documentation Centre at her workplace. All PhD graduates retained their theses, sharing it only on request with students seeking information and conducting research. In such cases, the students would contact the relevant PhD graduate who would grant access.

An analysis of 12 theses abstracts indicated a predominant use of case study methodology. All focused on issues affecting the Seychelles and made recommendations for improvements. However, the unavailability of half the total number of theses has limited the Seychellois public's access to this useful information.

Table 15 was compiled by the researcher to show the specific fields of expertise of each PhD graduate. As can be seen, the chosen research areas were concentrated in Education and Biological Sciences, with fewer PhD graduates in Natural Sciences and Engineering.

Table 15: Fields of Expertise of PhD Graduates

Broad Field	Specific Areas of Expertise
Education	Teacher induction
	School improvement program
	School leadership
	School accountability
	School language learning strategies
	Mathematics education
	Inductive thinking model of teaching
	Environmental education
	Commitment of secondary teachers
	Socialisation in the National Youth Service
Languages	French literature
	Language use in the Seychelles
Biological Sciences	Conservation of endangered flycatcher
	Conservation & restoration of endangered species
	White-eye zosterops modustus
	Conservation of marine turtles
	Ecology of whale shark
	Management of Coco-de-mer
	Plant ecology
	Californian checker spot butterfly
Natural sciences	Physics
	Chemistry
Economics	Econometrics
Finance	Islamic banking
Engineering	Theory of Organic Light Emitting Diodes and electronic engineering (Nano metric metal grids)

4.2.4 Career Trajectories of PhD Graduates

Table 16 shows the majority (18) of the 24 PhD graduates who participated in the study had work experience prior to pursuing their PhD studies; the other six did not. Slightly more than half had more than a decade's work experience before enrolling in their PhD degree.

According to the participants, their decision to enrol in the PhD program was motivated by opportunities after completing their Master degree or offers received during employment. The biographic data from the questionnaire showed that three quarters (18) of the PhD graduates were mature-age students at middle to late-career stage, with an average of 10 years work experience at the time of enrolment. Six PhD graduates progressed from an undergraduate to a Master degree, before going on to complete a PhD degree.

Table 16: Years of Work Experience of PhD Graduates (n=24)

Years of work experience	No. of PhD graduates	% (Figures rounded)
None	6	25
1-5	1	4
6-10	3	12
11-15	5	21
16-20	5	21
21+	4	17
Total	24	100

After returning to the Seychelles post-graduation, nearly half the 24 PhD graduates held leadership positions as Chief Executive Officers or Directors (Heads of Department or Section) in public, private and non-governmental organisations; the others were mostly consultants, advisors, researchers and technicians (Table 17). One PhD graduate was actively seeking employment and another had retired, hence only 22 were in employment. There was an almost equal gender distribution at senior official level.

As shown in Table 17, females were predominant in Director and Consultant positions, while males were slightly predominant at chief executive level. PhD graduates in leadership positions attributed their appointments to holding a PhD degree, which they claimed had accelerated their promotion.

Table 17: PhD Graduates by Roles and Gender (n=22)

Occupation	Number of PhD Graduates	Number of males	Number of females	% (Figures rounded)
Chief executive officer	5	3	2	23
Director	5	1	4	23
Consultant	3	0	3	14
Advisor	2	1	1	9
Researcher	2	1	1	9
Project officer	2	1	1	9
Academic	2	1	1	9
Senior policy analyst	1	0	1	4
Total	22	8	14	100

A review of the Population and Housing Census 2010 indicated the majority (80%) of postgraduates, including PhDs, were full-time employees and 10.8% owned a business (National Bureau of Statistics, 2012). Five PhD graduates commented on their employment

being unrelated to their subject-specific knowledge and more relevant to the professional skills they had developed during their PhD candidature. They expressed a sense of frustration at not being able to utilise their disciplinary knowledge as they had expected to.

Most of the PhD graduates (19) found jobs outside academia; only three worked in academia. Responses to the questionnaire revealed that half of the 22 employed PhD graduates were in government organisations, while the others worked in industry, academia, the non-profit sector or were self-employed. The high number of PhD graduates employed by the Seychelles Government can be attributed to graduates returning to government positions after their studies, or being obligated to work for the government by funding arrangements. A few graduates undertook their studies part-time while employed by the government (Table 18).

Table 18: PhD Graduates by Employment Sector and Field of Study (n=22)

Employment Sector	Education	Biological sciences	Finance	Economics	Languages	Physical sciences	Chemical sciences	Total
Government	5	3	1	0	1	0	1	11
Industry	0	0	0	0	0	1	0	1
University	3	0	0	0	0	0	0	3
Community	1	2	0	0	0	0	0	3
Self-employment	1	2	0	1	0	0	0	4
Total	10	7	1	1	1	1	1	22

Out of the 24 PhD graduates, two were inactive, one (language discipline) had retired, and one (engineering discipline) was seeking employment. The unemployed PhD graduate had no employment history prior to pursuing his PhD. He had been actively seeking employment that matched his PhD discipline for three months' post-graduation without success.

4.2.5 Funding Sources of PhD graduates

The interview data indicated that the Seychelles government either fully or partly sponsored almost half (11) the 24 PhD graduates. The rest (13) were sponsored through bilateral

agreements between the Government of Seychelles and other countries, such as New Zealand and France or through university and project funds. Very few self-financed their studies. Sponsorship was a significant factor in the employment of PhD graduates: those who were funded by the government were required to work either for the public sector or the country after graduating (Agency for National Human Resource Development, 2014). In this way, the bonding arrangement guaranteed employment for government-funded PhD graduates when they returned to the country, while those who obtained funding elsewhere had to seek and find employment. Of the four stakeholder groups, only the government group funded PhD studies.

In summary, this profile of the Seychellois PhD graduates depicts a small cohort of almost equal numbers of males and females, almost half studied in the UK, and the majority in social sciences. This background presents a setting against which to understand the experiences and perspectives of the PhD graduates in the second part of this chapter.

4.3 Seychellois PhD Graduates' Perspectives

The second part of this chapter describes the Seychellois PhD graduates' perspectives through the lens of three themes that emerged from a data analysis of the online questionnaires, interviews and focus groups. A constructivist epistemology helped to interpret and represent their perspectives. Perspectives refer to the participant's "point of view", made up of "words" and "value judgements" regarding a phenomenon, as described by Charon (as cited in O'Donoghue, 2007, p. 27). The thematically analysed perspectives of the PhD graduates can be traced back to quotations, and where available, further evidence provided by extracts from the document analysis.

A thematic analysis of the PhD graduates' perspectives generated three key themes: a) country context and lack of readiness for doctoral education; b) limited support and collaboration; and c) underutilisation of PhD graduates. These themes are interrelated and reflect the historical, economic, cultural and political context of a country under study. For example, culture or attitude of Seychellois towards doctoral education influenced all three

themes in this research. The three themes are discussed in the subsections below for a better understanding of their impact on the contribution of PhD graduates.

4.3.1 Theme 1: Context and Lack of Readiness for Doctoral Education

This theme emerged from four concepts derived from the online questionnaire and interview data: a) limitations of SIDS; b) limited understanding of doctoral education; c) lack of national policy on doctoral education; and d) lack of a national doctoral training plan.

4.3.1.1 Limitations of SIDS

PhD graduates described specific contextual and cultural issues that affected the readiness of the Seychelles for doctoral education. 'Readiness' refers to the preparedness and availability of critical enabling factors and appropriate systems and resources to promote doctoral education and support PhD graduates.

These issues adversely affected PhD graduates and hampered their contribution to national development. They spoke of constraints in the context of the Seychelles as a Small Island Developing State (SIDS), with its inherent limitations in terms of opportunities, systems and resources. The PhD graduates also discussed the influence of the country's culture and attitudes towards doctoral education that was not well understood and perceived as a new concept. In this study, 'culture' refers to the norms, attitudes and behaviour of the Seychellois towards doctoral education and PhD graduates. Participants also commented on the influence of politics on employment opportunities.

The interview data identified concerns and challenges encountered by the majority of these PhD graduates to excel and contribute to their country's development. They believed its limitations as a SIDS impinged on their ability to contribute fully. Some of the limitations they mentioned were: the small group (28) of local PhD graduates in a population of just under 100,000; the limited scope for career prospects; limited opportunities; scarce financial and other resources – all of which prevented PhD graduates from realising their potential. This is further illustrated by the comments of two PhD graduates: Emma expressed the view

that “there are more challenges to operate in the Seychelles as a small island developing state” (Interview: 6.3.2015), and Olga claimed: “the smallness of the Seychelles limits career prospects and opportunities” (Interview: 16.2.2015).

More than half (14) of the 24 PhD graduates thought there was a lack of preparedness and limited resources for PhD graduates to maximise their performance. The questionnaire and interview responses cited the following contextual constraints: insufficient academic resources to facilitate the conduct of research; limited human resource capacity to engage in high-level national academic conferences; shortage of funds and grants for research; and unavailability of national peer-reviewed journals for academic publications. The graduates viewed these issues as hindrances to their contribution, as illustrated by: “the scope for opportunities for PhD graduates in the Seychelles is limited… it costs a lot of money to keep abreast with developments in the field, due to lack of resources” (Interview-Sammy: 26.2.2015).

Additionally, the data highlighted the lack of networking forums for researchers, no induction and no provision for sabbatical leave for PhD graduates’ professional development. Six of the 24 PhD graduates raised these factors in the questionnaire and interview responses. Emma said: “We need a structure where PhD graduates can connect with others and do research collectively” (Interview: 6.3.2015). PhD graduates perceived these resources vital to facilitate enhanced performance and greater contribution to national development. Sammy explained: “Government can facilitate PhD graduates to conduct research by providing a conducive environment for the graduates to put their research skills into practice and bring about a contribution” (Interview: 26.2.2015).

PhD graduates reported that Seychellois culture did not seem to value the high-level knowledge and qualifications of a PhD. They believed there was a lack of interest in using local graduates’ skills; preferring instead to recruit expatriate PhD graduates for tasks that could be performed adequately by Seychellois PhD graduates.

Political allegiance was another cultural influence that PhD graduates believed affected their full participation. Their views on the role of politics in the Seychelles brought forth emotions

of apprehension and fear. According to the PhD graduates, patronage politics impacted negatively on their roles, and consequently, on the extent of their contribution. Five of the 17 PhD graduates interviewed claimed that political influence mitigated their involvement and performance. The prevailing culture meant few Seychellois were prepared to discuss political issues. Employees, particularly public servants, refrain from talking about politically sensitive matters because they are expected to remain politically neutral, and out of fear of possible recrimination. Those who did express their views about politics were determined to expose the issue, and prefaced their comments with 'I will be honest with you' and 'to be frank'. They believed the country's political landscape instilled fear in those with differing views and ideologies, and could have repercussions. One PhD graduate was forthright in conveying her experience: "appointments of people in positions of authority were made on political patronage, rather than on the competency to do things" (Interview-Mary: 25.2.2015). This view matched the observations of two PhD graduates who noted that senior positions in the public service were not advertised publicly. They had also not seen an employment advertisement that specified the requirement for a PhD degree.

One PhD graduate acknowledged feeling restricted to give thoughtful comments and make sound recommendations for fear of retribution or termination of employment. Garry recounted being a victim of political power, claiming: "PhD graduates are judged on political affiliation and this has affected our employment opportunities, including my own… to this day, I don't know why they refused to recruit me upon return with my PhD" (Interview: 10.2.2015). The few participants who raised political influences described their candid experiences and observations in the hope for change.

4.3.1.2 Limited Understanding of Doctoral Education

Interview data also indicated that the country's contextual factors, such as beliefs, values, behaviour and poor understanding of doctoral education influenced the contribution of PhD graduates. One of the cultural issues perceived by six PhD graduates was that most Seychellois had a superficial understanding of doctoral education, perhaps because the PhD degree was not conferred in the Seychelles. These graduates considered the poor

understanding to have an adverse impact on their performance and contribution. James illustrated this by saying: "There is a lack of awareness within the general community, even in the community of employers; many people do not seem to understand what PhD training entails" (Interview: 12.2.2015). Their opinions were that Seychellois were not aware of the knowledge and skills of PhD graduates, leading to a tendency to undervalue a PhD qualification. Suzy agreed: "There is a lack of awareness and lack of acceptance that there are Seychellois who hold the PhD degree … some people ignores your PhD" (Interview: 23.2.2015).

Slightly more than one third of the 24 PhD graduates expressed the view that the knowledge and skills of PhD graduates were not fully understood by the Seychellois public. Their observations, interactions and experiences with the public had informed this perception. Slightly more than half (13) of the 24 PhD graduates thought the misunderstanding about doctoral education in the Seychelles was associated with its newness, and little available public knowledge coupled with an attitude of indifference towards high-level education. For instance, Dina said: "They don't understand what a PhD graduate is" (Interview: 3.3.2015). These participants perceived employers of PhD graduates, who were not themselves PhD qualified, felt threatened by their more highly qualified subordinates and considered them overqualified. As a result, PhD graduates believed that working within a culture of limited understanding of the degree hindered their input in the workplace. One focus group discussed the myths associated with doctoral education and PhD graduates in the Seychelles arising from poor understanding of the concept (Focus Group 3: 26.5.2015).

Nevertheless, in certain areas such as academia and biological sciences, PhD graduates ably demonstrated their knowledge and skills and helped spread awareness. The widespread misunderstanding was summarised by one PhD graduate who worked in a biological science-related occupation: "In the Seychelles the PhD is not fully understood… but in the environment [biological sciences] sector, particularly in nature conservation, there is complete understanding of the difference that a PhD holder can make" (Interview-Flory: 16.2.2015).

4.3.1.3 Lack of a National Framework for Doctoral Education

The data also revealed the lack of a national framework for doctoral education in terms of a national policy and a national doctoral training plan.

PhD graduates viewed a national policy for doctoral education as imperative for guiding and facilitating their productivity and professional development. This is illustrated by the words of one PhD graduate: "A doctoral education policy could provide guidance and rules to govern doctoral education and would be beneficial for PhD graduates" (Interview - Alex: 7.4.2015). They realised that doctoral education was not a national priority, yet despite the absence of a national policy, the Seychelles Government granted full and partial scholarships in response to ad hoc requests for doctoral study, as was the case for some of the participants. The document analysis revealed that national training policies had been developed for undergraduate and Master degrees, but not for doctoral degrees.

Almost one third of the PhD graduates were dissatisfied with their earnings, which they considered out of step with the investment of attaining a PhD degree. A lack of career guidance, indicative salaries and incentives to cater for PhD qualifications were reported by most PhD graduates. Comments from a focus group discussion included: "Seychellois PhD graduates were not remunerated appropriately for their contributions to national development… in some cases PhD graduates were subordinate staff and earning much less, despite being better qualified than their superiors" (Focus Group 2: 20.5.2015B). For these PhD graduates, their salaries did not meet their expectations, although there was no indication of what the expectation was. Two participants raised the issue of inequity between the salaries of Seychellois PhD graduates and expatriate PhD graduates. Judy's assessment of a decent salary for PhD graduates was: "A good salary package would encourage Seychellois PhD graduates to remain and contribute to the country" (Interview: 13.2.2015).

One PhD graduate shared his experience to obtain a better salary: "In order to secure a decent salary I had to move to a management position, hence, my current duties have no relevance to my PhD discipline" (Interview-James: 12.2.2015). He explained his motivation

for moving was driven by the offer of a higher salary and superseded working in his discipline.

Another participant spoke about the lack of incentives and initiatives for PhD graduates to promote innovation, including incubator projects to develop entrepreneurial skills, and start-up projects. He wanted to participate in such initiatives and thought they would be helpful for PhD graduates' transition into employment.

Sabbatical leave was also an issue for a small group (5) of graduates who spoke of their disappointment when trying to access leave in order to pursue a PhD or undertake research. Sabbatical leave is a flexible arrangement of up to one year in duration, whereby an employee takes paid or unpaid leave for study but remains employed with the organisation. This category of leave is available in universities in many countries, for example Australia, New Zealand and Finland, for professional renewal. Seychellois PhD graduates complained that they could not access such leave arrangements in the Seychelles. One gave voice to her experience: "I applied for sabbatical leave from my former employer and was told to resign from my job, which I did to pursue the PhD" (Interview-Mina: 20.2.2015). Another participant who wanted to use sabbatical leave for professional development and undertaking research also raised its importance. The PhD graduates were of the view that an allocation of educational leave would be useful for undertaking research or post-doctoral work and could potentially encourage more PhD candidates, and recommended it be introduced into the public service. Two participants proposed the introduction of sabbatical leave in the workplace to provide opportunities for further study, professional development, publishing, post-doctoral work and research.

A national training plan for doctoral education is a government-approved document that identifies the quantity, fields, and education level of human resources required by a country. A national training plan can guide a country in the alignment of graduates with national priorities and is useful for budget allocation. Such a plan was not available in the Seychelles.

The data showed no consideration for matching supply and demand in terms of national training needs and PhD graduates. Nearly all participants indicated they were not aware of

the existence of a training plan to guide them in selecting a PhD research topic. In the absence of knowledge about labour market needs in the form of a national training plan, PhD research topics were chosen on an arbitrary basis. Most PhD graduates chose topics of personal interest to pursue a career in research, or for professional development reasons. Access to PhD was subject to opportunities, as stated by one PhD graduate: "I was offered the PhD because of my very good performance in the Master degree" (Interview- Suzy: 23.2.2015). Another participant said: "It [the PhD] just generated from my Master degree, as I was a gold medalist, the University wanted me to do my PhD" (Interview-Dina: 3.3.15A).

Three PhD graduates who identified training needs in the Seychelles recommended the government invest in providing two to three scholarships a year. The following fields of research were proposed: tuna stock, as it is vital for the fisheries industry (Interview-Sony: 3.3.2015B); traffic modeling, to address traffic congestion in the country's capital (Interview-Sammy: 26.2.2015); finance, to produce models of the economy of the Seychelles (Interview-Sony: 3.3.2015B); and zoology and botany, to serve the environment sector (Interview-Emma: 6.3.2015). These PhD graduates believed that investment in these strategic areas would benefit the country.

Three participants proposed formulation and implementation of a generic induction program by government or industry to welcome Seychellois PhD graduates back from overseas training and provide access to potential networks, offer professional development and facilitate integration into employment. They believed such a program would provide useful information for graduates and ease their entry into the workplace upon return from overseas PhD studies. Four PhD graduates raised the absence of an induction program to familiarise doctoral graduates with their new responsibilities and introduce them to other PhD graduates, professionals and potential collaborators. They emphasised the value of an induction program for enabling smooth entry into employment. Emma explained: "We need to look at better ways to induct PhD graduates to familiarise with their roles and prospects" (Interview: 6.3.2015). These participants also felt that an induction program might help promote recognition of a PhD qualification, stimulate interest in the utilisation of PhD graduates, and could potentially serve as a means of retaining PhD graduates in the country.

The interview and questionnaire responses highlighted the absence of a platform, in the form of an association for researchers and run by PhD graduates, to collaborate, network and share research findings in the Seychelles. The concept of a forum refers to a group of scholarly researchers who come together to form an association that serves as a program for networking, working collectively in teams and assisting one another. Ten PhD graduates mentioned this issue, summarised by one questionnaire respondent as follows:

> There is no support network for PhD holders to consult with each other, carry out research [post-PhD], obtain funding for projects, share research outcomes … as a result, research as a practice and its outcomes are not highly valued. (QR 10: 7.2.2015B)

The lack of networking opportunities was reiterated by Neil who said: "What is hampering us [PhD graduates] is that everybody is doing their own things, nobody wants to cooperate, and we don't have enough Seychellois PhD graduates in one sector to move to the next level" (Interview: 23.4.2015).

Almost all the 24 PhD graduates (20) wanted to network and form a community of like-minded intellectuals. They proposed the creation of a non-government organisation, such as an association or consortium of PhD graduates, to promote their interests.

One PhD graduate proposed a virtual forum using social media, which is simple to establish, low cost, and easily accessible by all PhD graduates, including Seychellois PhD holders living abroad. She suggested: "Formation of an association of PhD holders, which could be virtual, likened to "LinkedIn", for networking, information sharing, online publishing, as well as for organising national academic conferences" (Interview-Emma: 6.3.2015). These PhD graduates recognised the need for an advocate to lead the proposed initiative.

The questionnaire and interview data indicated a preference for an institution allocated by the Seychelles Government to house the Seychellois PhD graduates. Eight of the 24 PhD graduates suggested the university as an obvious choice for PhD graduates to congregate and discuss research issues. However, one participant had a different view and thought that

responsibility for a supportive structure, including a forum, resided with the government. All PhD graduates supported the view that government assistance was necessary for developing a forum that will enable a community of researchers to network and collaborate.

In response to the constraints identified in this study, most PhD graduates expressed a need for the Seychelles government to improve the country's readiness for doctoral education and support of its PhD graduates in order to enhance their contribution to national development. The initiative was visualised as a national framework to include a national policy for guiding doctoral education and career progression; a national doctoral training plan to specify national priority training needs; an induction program and sabbatical leave; a remuneration scale; funding of doctoral education by the Seychelles government; and other support systems to facilitate the contribution of PhD graduates.

About half the PhD graduates also proposed the Seychelles government establish a repository of research work, including theses, academic publications and resources, and the creation of an updated register of graduates to include their expertise and contact details. They recommended a government institution, such as the agency responsible for coordination of national human resource development, take on the role. In addition, participants suggested disseminating information to demystify the concept of doctoral education and publishing its usefulness and value to the Seychelles, spearheaded by the government in partnership with PhD graduates and other relevant stakeholder groups.

In summary, the study revealed inherent limitations in the Seychelles. Poor understanding of doctoral education, lack of a national framework in terms of a policy, training plan, remuneration scale, induction program and sabbatical leave were perceived as the main barriers to the contribution of PhD graduates. These issues also reflected the cultural environment of the country.

The second theme to emerge from the data was limited support and collaboration. This is discussed in the next section.

4.3.2 Theme 2: Limited Support and Collaboration

Due to the complexity of the topic, themes are intertwined in that the context has implications for support and collaboration and are also linked to the utilisation of PhD graduates. The questionnaire and interview data revealed that PhD graduates believed three main factors contributed to the low level of support for doctoral education and collaboration between stakeholder groups and PhD graduates. These were a) limited support for research from stakeholder groups; b) limited collaboration between PhD graduates and stakeholder groups; and c) a lack of recognition by stakeholder groups. The issues are reviewed in more detail in the following subsections.

4.3.2.1 Limited Support for Research from Stakeholder Groups

Five PhD graduates believed the Seychelles government provided limited support for research due to a lack of funds and time constraints with administrative responsibilities. The difficulty of conducting research was summarised by Alex: "the environment is not conducive for research… many PhD graduates are in administrative positions… people believe that research is costly and decisions can be made without it"(Interview: 7.4.2015).

Three participants cited other difficulties, including access to academic conferences, research grants and funding, and a lack of national peer-reviewed academic journals. The majority of the PhD graduates felt that access to these resources entailed complex procedures and they were deterred from pursuing them. Most were of the view that the limited support they received adversely affected their contribution to national development.

The questionnaire and interview data revealed poor dissemination of the research undertaken by PhD graduates. Nine PhD graduates disseminated their research through local media: daily newspapers, television and radio. A smaller group indicated they published their research findings in international journals, which few Seychellois were aware of.

Four PhD graduates experienced very little support from stakeholder groups and felt isolated in their workplaces. One participant proposed: "stakeholder groups could engage from the beginning of PhD training… keeping in contact with PhD candidates during their training…

seeking the research findings on PhD completion… helping to put recommendations in practice" (Interview-Olga: 16.2.2015).

Most of the PhD graduates (15) complained that employers preferred to recruit expatriate PhD holders for consultancy work, when Seychellois PhD graduates, who were familiar with the country's culture and context, could provide a better service. A second PhD graduate reiterated this sentiment: "the solution [to a problem] has to be specific to the particular country. You cannot take a model that is used in the UK to solve a particular economic problem and impose it on a small island state" (Interview-Gary: 10.2.2015). Suzy referred to this situation as "post-colonisation trauma" (Interview: 23.2.2015), implying that international consultants, particularly Europeans, were still viewed as superior to national consultants due to the country's British colonial history. Participants also spoke of the human resource management system that seemed to favour and reward non-Seychellois.

Three PhD graduates reported a lack of support structures to enable PhD graduates to disseminate and share their research findings. This was illustrated by the experience of one PhD graduate who stated: "I came back with a PhD degree years ago… it was like what are we going to do with this guy?" (Interview-Alex: 7.4.2015). He explained there was no support for PhD degree holders, believing that the Seychelles postgraduate system of education had not progressed in this regard.

4.3.2.2 Limited Collaboration between PhD Graduates and Stakeholder Groups

The majority of PhD graduates complained about limited collaboration with key stakeholder groups, particularly the university, government, community and industry. In the case of the university, less than a quarter of the Seychellois PhD graduates had been given the opportunity to teach at the university.

It was clear that some interaction had taken place between Seychellois PhD graduates and the government group with regard to financing PhDs through government scholarships and employing nearly half the cohort. PhD graduates in biological sciences were more relevant to non-government organisations for whom the research topics were relevant, leading to

limited collaboration with the community group. Almost all participants felt there was almost no collaboration with the industry group post-graduation.

Limited collaboration between PhD graduates and stakeholder groups was traced back to when students enrolled in doctoral education. A few PhD graduates had no dialogue with their employers when they enrolled in the PhD or during the training period (Interview-Olga: 16.2.2015).

The majority of participants called for more collaboration with the industry group in key areas. They proposed increased pre-study collaboration in the form of financial assistance and scholarships for doctoral education aligned with areas of national priority. Utilisation of Seychellois rather than international PhD graduates for consultancy work post-graduation was recommended to enhance post-study collaboration. Other suggestions included the engagement of stakeholder groups with PhD graduates in research and joint projects; the provision of internships and post-doctoral work; and more opportunities for innovation in research.

4.3.2.3 Lack of Recognition and Value of PhD Graduates

Almost one-third (7) of PhD graduates witnessed or experienced negative comments about doctoral education and PhD graduates from other Seychellois. They viewed this as a typical attitude in the Seychelles and SIDS in general. Some of the negative comments came from employers who challenged the need for a PhD qualification.

Four PhD graduates encountered jealousy from others who did not hold a PhD degree. This was implicit in resentful comments from work colleagues. One PhD graduate stated: "*La ki inn ganny en PhD, Ki i kwar"* [Now that s/he has a PhD who does s/he think s/he is?] (Interview-James: 12.2.2015). There were reports of similar comments by government officials who questioned the need for a PhD degree: "*akfer tou sa bann PhD*" [why all these PhDs] (Interview-Mary: 25.2.2015). Another remarked: "What could they do with their PhD degrees?" (Interview-Mona: 5.2.2015).

Three participants believed that non-PhD holders in high-level positions felt threatened by PhD graduates; hence, non-PhD holders hindered opportunities for PhD graduates to progress in the workplace and within the hierarchy. One PhD graduate was of the opinion that employers believed their skills are impractical: "they live in a bubble … they are impractical, un-pragmatic, and there was cynicism" (Interview-Sammy: 26.2.2015). Another participant believed the lack of recognition and value was not caused by misconceptions of PhD education, but rather the attitude of people in authority. She articulated her experience: "I've been left out in many things in which I could have contributed. It's the attitude of the people… the Government is not really monitoring its investment in its own people" (Interview-Judy: 13.2.2015).

One PhD graduate felt she could contribute more to sectors related to her PhD, such as tourism, environment and community development. However, she was unable to find employment in these fields because some employers in the Seychelles viewed her PhD degree as an over-qualification. She recounted her experience: "I have been told repeatedly that I am overqualified and I feel discouraged since my return with a PhD degree" (Interview-Dina: 3.3.2015). Sammy stated: "stakeholders should start seeing research as very important for economic development" (Interview: 26.2.2015).

The majority of the PhD graduates (14) believed they were underpaid and that their salaries were not commensurate with their PhD qualifications. No indicative national pay scale exists for doctoral qualifications, so doctoral graduates were remunerated based on employment role, competency and experience. One participant claimed: "When I joined, I was the only one with a PhD degree. There was no recognition, no special salary or treatment. Even now PhD graduates do not get any allowances, or increase in one's salary" (QR 19: 27.2.2015). Three participants expressed their dissatisfaction with expatriate PhD graduates earning more than Seychellois PhD graduates for the same work.

There were mixed responses from the participants regarding recognition of their expertise. Four PhD graduates believed their knowledge, skills and performance were recognised, valued and respected. Eight believed their work was not valued or recognised. Those

participants who felt valued in the workplace believed it was due to the relevance of their discipline, which was aligned with the needs of the Seychelles. PhD graduates in biological sciences appear to have received greater acknowledgement than those in the social sciences. For instance, one PhD graduate complained he had done work of international repute for his country, but "I did not get an acknowledgement nor a 'thank you' or a word of encouragement from the authorities nationally… but was appreciated internationally" (Interview-Garry: 10.2.2015).

Three PhD graduates believed they were doing significant work as a result of their PhD qualification. Others felt that PhD graduates were not given due attention and attributed this to the disinterest of higher authorities. To mitigate these issues Mona suggested: "PhD graduates should have national recognition and this could be facilitated through a support forum" (Interview: 12.2.2015).

Six participants reported not feeling valued; and certainly less valued than expatriate PhD graduates. This was supported by a quarter (6) of the PhD graduates who indicated that little value was attributed to doctoral education and Seychellois PhD graduates, and described by one participant as: "the stakeholders do not value PhD graduates, for whatever reasons… in countries that I have worked, PhD graduates are valued. They occupy key positions and their qualifications are recognised, but not in the Seychelles" (Interview-Garry: 10.2.2015). One participant reported overhearing Seychellois asking: "Why do these people get PhD degrees as we don't need that level of education" (Interview-Mary: 25.2.2015). Another claimed: "Seychellois have a tendency to value what somebody from outside [abroad] tells us, instead of valuing what Seychellois are doing for our own country" (Interview-Olga: 16.2.2015).

A quarter of the PhD graduates believed that stakeholder groups should attribute more value to Seychellois PhD graduates by better utilising their knowledge and skills and offering them opportunities to contribute to national development. Mina commented that stakeholders seemed unaware of local PhD graduates: "they [employers] don't seem to be aware that we have competent human resources in country… they bring consultants from Europe. I ask why they have to bring in those foreign consultants when we have local PhD graduates"

(Interview: 20.2.2015). Mary also felt that the key stakeholder groups should draw on the expertise of local PhD graduates; and Olga suggested:

> They [stakeholder groups] should be on board from the beginning. As you come back they should make it their business to find out what your findings are, what are your recommendations for the organisation and how we can put those recommendations into practice… I think the stakeholders should not take thesis findings personally (Interview: 16.2.2015).

It was proposed that stakeholder groups view research as an asset for economic development, and for managers in authority to encourage and assist PhD graduates in contributing to Seychellois society. Garry believed stakeholder groups were apprehensive about employing PhD graduates: "If I allow him/her [PhD graduates] to join my organisation... maybe s/he will rise above me" (Interview: 10.2.2015).

Almost all participants recognised the value of the knowledge and skills acquired from their PhD to career advancement. Even an unemployed PhD graduate spoke favourably about the PhD degree in terms of disciplinary knowledge and skills. Another participant believed the PhD degree was important for the economy, as he perceived research and development pivotal to economic development.

Three PhD graduates spoke about the usefulness of their PhD degrees derived from utilising their knowledge and skills. For example, they learned to produce films and videos, which were useful for their work. Another participant considered PhD graduates a valuable resource with high-level competencies; able to analyse situations and recommend solutions. The benefits of accrued expertise and professional development acquired from a PhD degree were also mentioned. Three participants articulated the value of their PhD on a personal level. Emma stated: "The PhD has been helpful for consultancies… you've got more chances of being hired… it is also helpful at personal level" (Interview: 6.3.2015). One participant spoke of being equipped with "the ability to do research, to help others through supervision of Master degree students" (Interview-Mary: 25.2.2015). However, one participant did not find his PhD discipline knowledge useful in employment because the topic was too narrow

and scientific, but found the process of the PhD helpful for career progression. He explained: "although the PhD field was not relevant… from a career point of view it accelerated my career progress" (Interview-Sonny: 3.3.2015).

These comments indicate that the professional development acquired from a PhD degree can enhance job opportunities and career prospects for the benefit of the workplace and the country as a whole. The next subsection explores the applicability of PhD graduates' knowledge and skills.

The data showed a mismatch between the perceived usefulness of the PhD and utilisation of the expertise gained from the degree. One PhD graduate noticed that: "superiors without a PhD qualification ignored specialist advice from PhD graduates, therefore PhD graduates often got discouraged and left the job, and eventually also left the country" (Interview-Emma: 6.3.2015). She spoke of the importance of retaining PhD graduates in the Seychelles and avoiding a "brain drain" through emigration. Between them, the PhD graduates knew around a dozen Seychellois PhD graduates who had emigrated.

Three PhD graduates proposed providing more assistance to the community stakeholder group through assisting non-governmental organisations with more voluntary work; research project development; access to research funds; assisting with other aspects of research and responding to areas of need. These participants also recommended the creation of a non-governmental organisation to promote the interests of all PhD graduates.

In summary, the PhD graduates unanimously advocated the need for collaboration with key stakeholder groups, and for industry to finance PhD studies and facilitate internships. Participants recommended a number of strategies to promote contribution to national development. First, for stakeholder groups to offer more opportunities for consultancy work to Seychellois PhD graduates. Second, inclusion of more Seychellois PhD graduates on corporate boards, high-level committees and in an advisory capacity to value, recognise, remunerate, and effectively utilise their knowledge and skills.

The third and final theme to emerge from the data was the underutilisation of Seychellois PhD graduates' expertise. This is described in the next section.

4.3.3 Theme 3: Underutilisation of the Expertise of PhD Graduates

The third theme to emerge from the data was the underutilisation of PhD graduate expertise. Four subthemes evolved: a) PhD graduate expectations; b) employment and expertise of PhD graduates; c) barriers to contributions; and d) potential areas of contribution for PhD graduates. This section concludes with recommendations for strategies to enhance the contribution of PhD graduates.

4.3.3.1 PhD Graduates' Expectations

Having achieved a doctorate, PhD graduates spoke of their expectations for career prospects in their respective fields, namely, to perform their jobs better; to conduct research independently; and to contribute to the development of the Seychelles. Overall, all PhD graduates had high hopes and positive expectations of opportunities to make a greater contribution.

The data revealed a mix of both fulfilled and unfulfilled expectations. Slightly more than a quarter (7) expressed positive views about their experiences as PhD graduates. These graduates were employed in their fields of specialisation, mainly in the biological sciences and the environment sector. The remainder had mixed feelings of satisfaction in some areas and dissatisfaction in others. Six articulated mixed feelings, and of these, five participants expressed disappointment with their employment positions. One PhD graduate was frustrated at not being able to find a job. Almost all the Seychellois PhD graduates expected to be valued and remunerated equally to expatriate PhD graduates. Despite frustrations over employment conditions and salary issues, most PhD graduates were hopeful for change.

Three PhD graduates reflected on their experiences and identified some shortcomings in their own practice since returning from their PhD studies. They acknowledged that in order

to succeed they had to improve their performance and demonstrate their capability. One PhD graduate stated: "we need to be self-motivated, proactive, prove oneself and be visible" (Interview-Judy: 23.2.2015). Another said: "make known our knowledge and skills… show positive attitude and personality to earn respect and be valued as PhD graduates" (Interview-Emma: 6.3.2015).

Participants were of the view that the relevant authorities and Seychellois public were inclined to ignore their work and competencies, and claimed this adversely affected their contribution to national development.

4.3.3.2 Employment and Expertise of PhD Graduates

The data revealed that almost all the PhD graduates (22) were employed gainfully. The Seychelles Government guarantees employment to all sponsored PhD graduates prior to their studies, particularly those employed in the public service. Notwithstanding this arrangement, the employment roles did not always meet the graduates' expectations and job preferences, and as a result, some sought alternative employment opportunities. Two participants who did not benefit from funding criticised the practice of guaranteed employment to government-sponsored students. Participants in a focus group discussion agreed:

> If Government has advised you to study for the PhD degree, afterwards Government will use your services, and there is a job for you, but if you have taken up the PhD yourself, Government does not help you to find a job. (Focus group 3: 26.5.2015)

Many participants complained that this practice prevented unsponsored PhD graduates from maximising their contribution, and caused dissatisfaction among those who struggled to find suitable employment in the challenging Seychelles employment market.

PhD graduates without prior work experience encountered difficulties securing employment following graduation, whereas those with work experience found employment more easily,

although not always relevant to their qualifications or job of choice. Three PhD graduates without work experience prior to their studies talked about the difficulties of securing a relevant job post-PhD. One was actively job seeking, while another described how he had been unemployed for several months until he eventually started his own business. The third PhD graduate encountered difficulties securing a position that aligned with his qualifications. He spoke of the benefits of accumulating work experience prior to pursuing PhD studies, recognising that work experience counted and could improve choices of PhD research topics, thus facilitating employment post-graduation. The unemployed participant put his inability to find a suitable job down to low demand for PhD graduates in the Seychelles (Focus Group 1: 25.5.2015A).

The PhD graduates in the Seychelles had pursued their degrees for reasons of supply rather than demand, so their decisions were not made in response to a policy or national plan that promoted and provided training. They chose research topics that they perceived to be relevant. Participants were of the opinion that they had acquired specialist knowledge across numerous disciplinary fields such as education, environment, languages, natural sciences, economics, banking and engineering, and considered themselves specialists in their specific fields of research.

The majority of PhD graduates (17) indicated their topic had been chosen in mindfulness of its relevance to the Seychelles and career development. One participant stated the reason for choosing his topic was to contribute in an area where there was no existing expertise. Another participant believed her topic "would be a contribution to the economic development of the Seychelles" (Interview-Judy: 13.2.2015). However, nine PhD graduates experienced a lack of appreciation for their knowledge and expertise from the stakeholder groups.

The questionnaire and interview data showed that almost half the PhD graduates (10) were satisfied with the manner in which their expertise was being utilised and acknowledged. The data also revealed that the most satisfied PhD graduates were in biological sciences and education disciplines. All seven PhD graduates in biological sciences were content in the

environmental sector, where they were making effective use of their knowledge and skills. They commented on the shortage of biological scientists as they struggled to cope with high volumes of work and demand for their services.

The data showed that the four PhD graduates who had positive experiences and job satisfaction were using their expertise effectively. One participant stated: "I have a voice in a group, I am listened to, and have a contribution to make" (Interview-James: 3.2.2015). Another said: "I am respected for holding a PhD degree in a scientific subject… I am appointed on several high-level Corporate Boards" (Interview-Sonny: 26.2.2015). Another satisfied participant reported: "I feel valued" (Interview-Mina: 20.2.2015), while a fourth expressed contentment at the helm of an institution where she was using the expertise gained from her PhD research. The majority of the PhD graduates (14) considered their specialist knowledge was partly utilised through their appointment to and membership of high-level committees.

Slightly over half (14) of the PhD graduates were dissatisfied with the utilisation of their skills and expertise, mainly due to their employment positions and conditions. The majority believed the stakeholder groups were not fully utilising their expertise, as illustrated by one PhD graduate:

> These people [stakeholder groups] should recognise that PhD graduates have potential and are qualified researchers, let's make good use of them… the Seychelles has reached a point in its development where it has a good body of PhD holders and the stakeholder groups should make use of the PhD graduate's expertise… Believe in our professionals… Seychellois PhD graduates have the capacity, they know our context and they know our mentality (Interview-Suzy: 23.2.2015).

Slightly more than half the PhD graduates expressed negative feelings and frustration at the underutilisation of their expertise. One was applying for employment overseas because he was unable to secure employment in the Seychelles. Five PhD graduates were disappointed with the use of their expertise, which did not match their employment positions. One

participant claimed her inability to find relevant employment and use her expertise had subsequently led to making use of her research skills, but she was unhappy with the low remuneration in her research position. She was frustrated at the way she had been treated. Another participant believed those who could make use of her expertise ignored her knowledge and skills. She claimed: "Seychellois PhD graduates are shunned" (Interview-Suzy: 3.3.2015B). Yet another faced sarcasm from individuals who regarded PhD graduates as having knowledge of theories that are impractical in the workplace.

One participant identified a cultural issue in observing a sense of distrust and suspicion on the part of non-PhD holders concerning recruitment. Another recalled a bad experience when trying to secure suitable employment, reporting that other Seychellois PhD graduates were isolated and guarded. A third participant expressed his disappointment at being denied the opportunity to utilise his expertise, which he perceived to be relevant. As a result, he had to be re-trained in a new field to secure employment and was compelled to undertake consultancy work overseas.

In the online questionnaire, PhD graduates were asked to rate the extent of the skills they had developed during their candidature. Entrepreneurship was rated lowest (Table 19), indicating that this skill was not well developed during their PhD candidature.

Participants were asked to identify other skills they had acquired during the course of their doctoral studies and included writing, interpersonal relationships, presenting academic papers, and awareness of ethical conduct of research.

All respondents affirmed that the knowledge and skills acquired from their PhD studies and the research experience had prepared them for positions as researchers, university lecturers, leaders, high-skilled workers in non-academic sectors, entrepreneurs and writers.

Table 19 depicts the skills PhD graduates perceived they had developed during the PhD journey. The top five skills are research, communication, planning, problem-solving and project management.

Table 19: Perceived Skills Developed by PhD Graduates

	Extent of Skills Developed			
Skills	None	Some	Great Extent	No. of PhD graduates
Research	0	1	23	24
Communication	1	7	16	24
Planning	1	8	15	24
Problem solving	1	7	15	23
Project management	3	7	12	22
Teaching	2	11	11	24
Leadership	3	8	11	22
Team-work	1	12	10	23
High level employment	4	9	8	21
Entrepreneurship	10	9	2	21

Participants reported professional skills were important and equipped them to operate at senior level. One PhD graduate articulated this: "the knowledge and skills acquired from the PhD help me to understand technical issues, to lead teams, to achieve goals, and contribute to different committees" (QR 24: 22.5.15). Another was of the view that "Seychellois PhD graduates can guide the country towards sustainable development based on research" (Interview-Mina: 20.2.2015).

In addition to professional skills, three participants also acquired particular modelling, mapping and organisational skills. For example, Dina acquired mapping skills, which she was using to develop models in education (Interview: 3.3.2015). One PhD graduate talked about mastery in econometrics modeling (QR 11: 9.2.2015), and another referred to experiences gained in geospatial mapping (QR 21: 1.4.2015). Those PhD graduates who had opportunities to do so were therefore using the skills they had acquired to improve processes and services within their workplaces, and by extension, contributing to the national good.

Six participants gained newfound confidence, acquired new and improved skills, and were able to utilise theories in problem solving because of their PhD studies. Two participants spoke of being confident and more organised in the performance of their duties. One talked about the confidence required to design rigorous scientific research for answering specific questions (QR 16: 22.2.2015). Flory recalled her confidence in making decisions based on scientific information (Interview: 16.2.2015); and Sammy spoke of being able to apply

appropriate theories to solving problems in the workplace (Interview: 26.2.2015). Another participant mentioned being able to apply various research methods learned from the PhD process (QR 9: 7.2.2015).

Data from the questionnaires and interviews revealed that PhD graduates viewed translation of their knowledge and skills in two ways: a) as key roles within the workplace; and b) as national accomplishments. The data also put a spotlight on potential opportunities for contribution currently blocked by barriers. Almost all participants believed they had contributed to national development through five key occupational roles (Table 20). The majority said they used their research skills at work although they were not in research-based roles, and many had transferred their competencies to new domains.

Table 20: Key Roles of Seychellois PhD Graduates (n=22)

Key role	No. of PhD graduates	% (Figures rounded)
Leader	11	50
Consultant	5	23
Researcher	2	9
Teacher	2	9
Advisor	2	9
Total	22	100

Participants were asked about their post-PhD accomplishments as a result of the expertise derived from their PhDs. Their responses are itemised in Table 21. Accomplishments were defined as being of national significance. Examples included the electricity tariff that assists the government with collection of revenue; the National Bureau of Standards that provides useful guidelines related to services for the benefit of users; and conservation of endangered species that contributes to management of the ecology in the Seychelles. These projects all promote the Seychelles in various ways. As noted, the greatest accomplishments were in the area of sustainable management of natural resources, where PhD graduates reported being able to more fully utilise their expertise.

Table 21: Accomplishments of Seychellois PhD Graduates

List of PhD Graduates' Accomplishments
Sustainable Management of Natural Resources
Undertaken over 100 national and international research consultancies
Publication of several articles in peer-reviewed journals
Conservation of endangered species – White-eye Zosterops Modustus
Conservation of Seychelles flycatcher
Conservation of marine turtles
Sustainable management of the coco-de-mer trees
Monitoring of sharks in Seychelles waters
Conservation of coral reefs in the Seychelles
Communication and Publishing
Published books and documentary films about shark monitoring
Over 100 publications in the last three decades
Dissemination of information through monthly newsletter
Accessed a 3-year funding project to train 6 Seychellois conservation practitioners
Improvements in Education
Environmental education activities including documentary film
Establishment (work in progress) of a new school governance model
Development of the BSc environmental science course curriculum
Mentoring students
Education awareness programs
Development of National Organisational Structures
Establishment of a tariff structure for electricity consumption in use in the Seychelles
Creation of a National Bureau of Standards currently in use
Introduction of new and renewable technologies in the Seychelles
Ongoing creation of a National Language Observatory to monitor languages in contact (Kreol, English and French) in the Seychelles

The concept of contribution to national development is complex and multidimensional. Contribution refers to inputs, effects and gains, and manifest in roles and accomplishments, some of which are tangible and others are intangible. PhD graduates discussed how their doctoral experiences had increased their confidence and abilities to deliver presentations to different audiences; it had sharpened and clarified their thinking and developed their organisational and project management skills.

Two participants described their contributions as PhD graduates. Judy said: "I have been instrumental in fostering a research culture and publishing at the university" (Interview: 13.2.2015); and Dina: "my contribution was in strategic planning projects" (Interview:

3.3.2015). Importantly, the data indicated that PhD graduates were mainly contributing in the workplace and less so at national level.

The contribution of PhD graduates can be organised into three main categories: a) organisational development; b) increased research and publications; and c) building local workforce capacity.

All 22 employed PhD graduates claimed they contributed in some way to organisational development in their workplaces; although there was variation in the extent to which they applied their knowledge and skills. Out of 22, only two felt they had contributed very little due to a mismatch between their expertise and their jobs. Slightly more than half felt they were making a partial contribution given the underutilisation of their competencies and lack of support; and a further seven PhD graduates believed they were fully contributing in their areas of specialisation, as evidenced by the high demand for their services. It is clear from the data that the overall contribution of PhD graduates to national development was limited, and there was significant scope for improvements.

Almost half of the 24 participants were members of corporate boards and high-level committees, and able to use their knowledge and skills to improve the performance of their respective organisations. A similar number of participants believed they were contributing their expertise by leading and advancing their workplaces. Three PhD graduates were managing their own businesses and nine were engaged in teaching, training and mentoring undergraduate and postgraduate students in and outside academia. The university benefits from PhD graduates who mentor and teach undergraduate and Master degree students. Other institutions were also beneficiaries of the training services provided by PhD graduates.

Thirteen PhD graduates, who had collectively focused on enhancing research and increasing publications, boasted a publishing record of over 100 articles in peer-reviewed journals in the last three decades. Many of these papers related to the Seychelles, and since they were published mainly internationally, served to promote the country to the international community. Eleven PhD graduates did not conduct any research or publish due to time

constraints and a lack of resources. These participants indicated they would undertake research and publish if the opportunities presented themselves.

Twenty-two of the 24 PhD graduates contributed by strengthening the local workforce capacity in the form of a stock of local, highly trained human capital spread across eight sectors. Five PhD graduates were doing consultancy work nationally and internationally, and called for greater participation of local expertise to reduce the country's reliance on expatriate graduates. In these ways, the local capacity has the potential to bring about both direct and indirect economic benefits to the Seychelles.

4.3.3.3 Barriers to Contribution

Participants indicated they had encountered difficulties with contributing to national development. The data revealed several barriers, including four principal ones: a) mismatch of knowledge and skills to employment; b) underutilisation of skills; c) misalignment of PhD topics with national priority training needs; and d) inability to undertake research and publish due to high administrative workloads and the lack of a national support structure.

Almost all the PhD graduates complained that the stakeholder groups were not fully utilising their expertise for consultancy work, and instead, employed expatriate PhD holders. Given that slightly more than half the graduates were conferred in the last decade, they could still be considered early career researchers who are developing in confidence and experience and trying to gain a foothold in their careers. There was a commonly held view amongst all participants that their intellectual capability had remained relatively untapped, and there was potential to capitalise further on their knowledge and expertise. Nevertheless, the data showed varied contributions and achievements by PhD graduates.

From the perspective of the PhD graduates, it seemed that the Seychelles was not benefitting fully from their expertise. The strategies they proposed to help maximise their contribution to national development are discussed below.

4.3.3.4 Potential Areas of Contribution for PhD Graduates

Some PhD graduates acknowledged that they sometimes felt invisible and had not been able to demonstrate fully their knowledge and skills, stating they wished to do more to improve their contributions to the Seychelles. They proposed taking on more significant roles in five ways. First, marketing their expertise and publicly celebrating their achievements in order to gain the confidence of employers. Second, being proactive and establishing a national profile while exhibiting positive attitudes to earn respect and recognition. Third, adapting and transferring their knowledge and skills to a SIDS context and the culture of the Seychelles. Fourth, promoting collaboration between PhD graduates and key stakeholder groups, namely, university, industry, government and community to encourage engagement; and fifth, creating a virtual forum for networking, sharing resources and participating in intellectual debates.

All participants unanimously agreed that if the opportunities were forthcoming they would be more involved in solving the problems facing the country, thereby increasing their contribution to national development. Five graduates expressed their intention to publish books, teach part-time, and inspire students to pursue doctoral research. One PhD graduate stated: "I would like to write and publish books for students" (Interview-Dina: 3.3.2015). A few confided that they would like to educate the youth by delivering presentations to schools, teaching part-time at university, leading curriculum change, and seeking opportunities for post-doctoral research, which were not currently available. Most voiced a desire to conduct more research and publish in a supportive environment.

Despite sometimes feeling disappointed, participants strongly encouraged aspiring Seychellois students to pursue a PhD degree. They also advised aspiring PhDs to be well prepared and select their topics wisely, balancing personal passion with national priority areas and employment prospects.

4.4 Summary

This chapter presented the profile of a small cohort of 28 Seychellois PhD graduates, mostly mature age and with a small majority of females. Participants had expertise in eight fields of study (education, biological sciences, languages, finance, economics, physics, chemistry and engineering), and were awarded their PhDs by 20 different universities. Half of the graduates were employed in the public service and the other half held various high-level positions in other sectors. Almost half the PhD graduates received financial assistance from the Seychelles Government.

The Seychellois PhD graduates identified three themes to describe the barriers preventing them from making a greater contribution. They were: a) the country's lack of readiness for doctoral education; b) limited support for and collaboration with other PhD graduates; and c) underutilisation of PhD graduates' expertise. Seychellois PhD graduates faced particular challenges due to the country's context and lack of support from stakeholder groups that affected utilisation of their knowledge and skills. As a result of these hindrances, PhD graduates contributed to varying extents: some made significant contributions to their workplaces and communities, while others had fewer opportunities to do so. The contribution of the majority of Seychellois PhD graduates was not only limited by barriers such as underutilisation of their expertise, but also by low job satisfaction arising from unfulfilled expectations, lack of policy and poor remuneration.

The study found PhD graduates in the biological sciences were performing in ways that fully utilised their knowledge and skills. These participants were generally satisfied, since their employment was relevant to their studies and they worked in high-demand areas. However, the data also showed a high proportion of PhD graduates, particularly in the social sciences, were dissatisfied because they were not making full use of their knowledge and skills. They were unhappy with their working conditions, particularly their remuneration packages.

A quarter of the PhD graduates expressed their personal appreciation for this research, which had given them an opportunity to express their views on subjects of national importance and benefit for Seychellois PhD graduates. Moreover, they anticipated the

findings of this study would create potential for change and encourage enhanced contributions for the greater good.

The issues addressed have identified areas that will benefit from future PhD studies, in addition to initiatives recommended for maximising the contribution of PhD graduates to national development. These initiatives include the formulation of a national policy, plan and remuneration scheme. Participants urged greater support from key stakeholder groups, particularly government, the university and industry. They also proposed better utilisation of their knowledge and skills through consultancies and relevant employment positions that matched their skills set. Finally, the multiple perspectives of these PhD graduates and the accounts of their experiences provided rich, deep insight into the contributions of Seychellois PhD graduates to national development.

This chapter presented the perspectives of PhD graduates. Chapter five expands on the perspectives of the four key stakeholder groups to provide a balanced overview of the attitudes and beliefs that impact the contributions of Seychellois PhD graduates to national development.

Chapter Five: Stakeholder Groups' Perspectives

5.1 Introduction

Chapter four reported on the profile and Seychellois PhD graduates' perspectives on three themes: the country context and lack of readiness for doctoral education; limited support and collaboration; and underutilisation of the PhD graduates' expertise. These were identified as the major influences on the contributions of PhD graduates to national development. This chapter presents the background and perspectives of the four key stakeholder groups in two sections. The first section provides the background of the key stakeholder groups, and the second describes their perspectives regarding the contributions of Seychellois PhD graduates to national development. The stakeholder groups represented the university, industry, government and community sectors.

5.2 Background of Stakeholder Groups

The background of the stakeholder groups provides a context for the composition of the participants and their perspectives. Specifically, this information includes: number of participant representatives; gender distribution; and number of employed PhD graduates.

5.2.1 Stakeholder Groups Representation

In total, 29 elite participants across 21 subsectors were recruited from the four key stakeholder groups. The term 'elite participant' refers to senior officials and includes heads of organisations, heads of Department of Ministries, directors of sections, senior specialists and technicians. Of the 29 participants representing the four stakeholder groups, 21 were interviewed individually and eight participated in cross-sector focus group interviews.

The Seychelles has only one small teaching university with a student population of approximately 950 students (National Bureau of Statistics, 2016b), offering mainly undergraduate courses and a few coursework Master degree programs. Eight participants represented the university group with portfolios ranging from academic to professional and

student union responsibilities. The industry stakeholder group included eight participants drawn from subsectors with the largest number of employees and key economic roles in the Seychelles. The government stakeholder group comprised seven participants from various departments and public sector corporate bodies – each had one representative. Two participants from the Ministry of Education did not participate in the study due to ministerial restructuring in tertiary education. Lastly, the community stakeholder group (including non-governmental organisations) comprised five subsectors with one representative from each, except for Community Development, which had two, as shown in Figure 8.

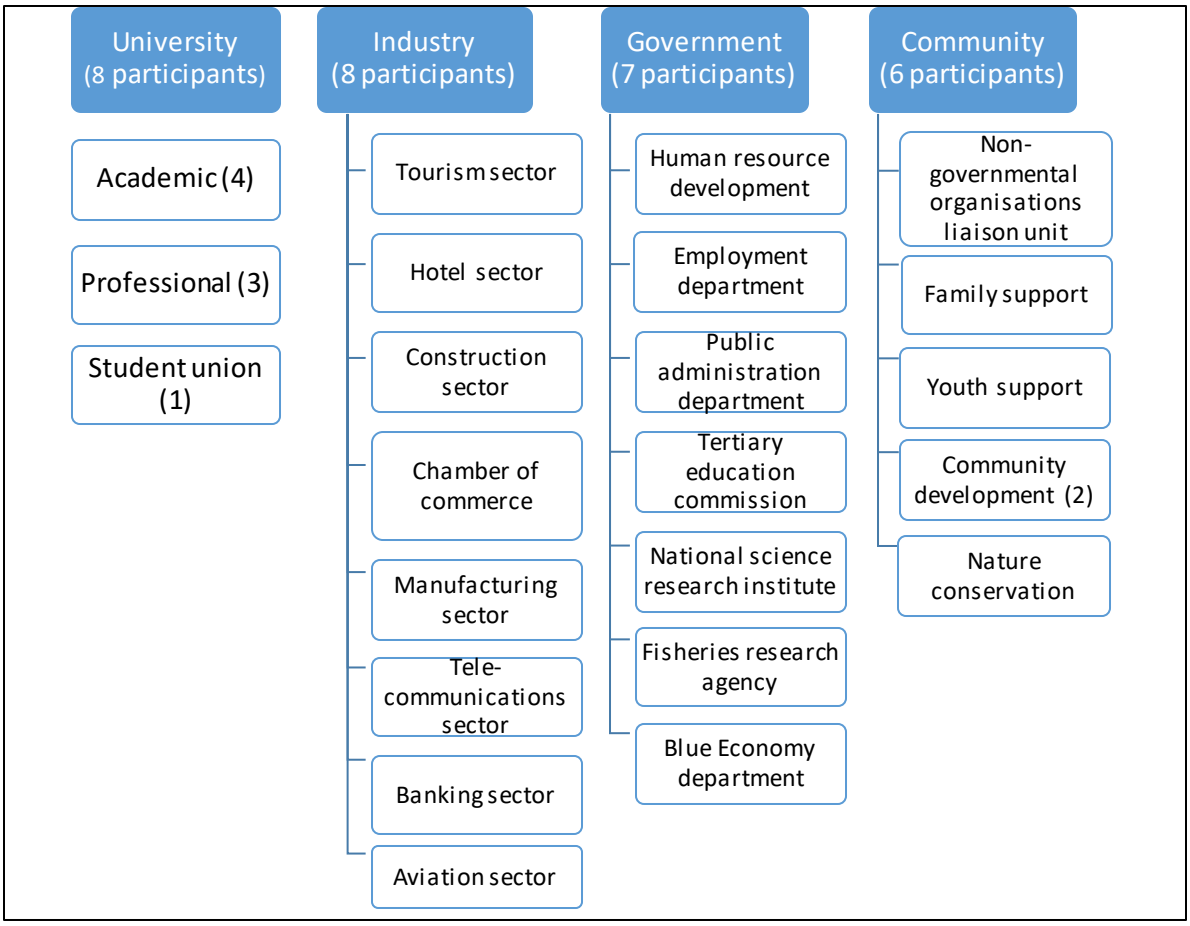

Figure 8: Stakeholder Group Representation

5.2.2 Gender

The gender distribution of the 29 stakeholder group participants was almost equal (Table 22), however, males were more dominant in the industry group and females were more dominant in government group. In total, 32 participants were invited to take part in the study and 29 accepted.

Table 22: Stakeholder Group Participants by Gender (n=29)

Gender	University	Industry	Government	Community	Total	%
Male	5	6	2	3	16	55
Female	3	2	5	3	13	45
Total	8	8	7	6	29	100

5.2.3 Stakeholder Group Employment of PhD graduates

The stakeholder groups employed 19 of the 24 PhD graduates. Government was the largest employer of 63% of the graduates, the university employed almost 16%, and industry lagged behind with only one PhD graduate (Table 23). Collectively, the stakeholders employed 86% of the PhD graduates. The remainder was self-employed.

Table 23: Stakeholder Group Employment of PhD Graduates (n=19)

Gender	University	Industry	Government	Community	Total	%
Male	1	1	2	2	6	31
Female	2	0	10	1	13	69
Total	3	1	12	3	19	100

The following section describes the individual and collective perspectives of the four stakeholder group participants.

5.3 Stakeholder Perspectives

This section presents the perspectives of the stakeholder groups on three themes: a) lack of readiness for doctoral education in the Seychelles; b) limited support for PhD graduates; and

c) limited contributions of PhD graduates to national development. Each theme concludes with proposed strategies for addressing the issues identified. The chapter concludes with a summary of the key findings.

5.3.1 Theme 1: Lack of Readiness for Doctoral Education in the Seychelles

The first theme to emerge from the interviews and focus groups with the four stakeholder groups was the lack of readiness for doctoral education in the Seychelles. This was derived from four subthemes: a) limited understanding of doctoral education; b) the need and relevance of doctoral education; c) lack of a national policy on doctoral education; and d) lack of appetite for research. The strategies proposed for improvements are also discussed.

Almost all the participants of the stakeholder groups alluded to the Seychelles' lack of readiness for doctoral education and little or no acknowledgement of their intrinsic value. In view of the country's context, stage of development and the absence of prerequisite policies and structures for doctoral education, they believed the country was not yet ready for doctoral education. Most participants from the government group claimed that doctoral education was being undertaken without appropriate support and the country was not harnessing the benefits of its PhD graduates. One government group participant illustrated this by saying: "we are putting the cart before the horse, we want to do something but we don't have the resources" (Interview-Josie: 14.4.2015). Another participant from the community group said: "Seychelles do not have the structure to support people having PhD qualifications" (Interview-Danny: 29.4.2015A).

About two thirds of the stakeholder participants expressed concerns about the absence of necessary conditions for mobilising Seychellois PhD graduates to greater productivity. The interview and focus group data revealed a lack of readiness, interest and focus on doctoral education, as evidenced by the absence of a national policy, national training plan and support structures for PhD graduates. The relatively small size of the Seychelles and its lack of financial resources and infrastructure were identified as barriers by participants.

Participants from the stakeholder groups had different perspectives on the country's readiness for awarding national PhD degrees. Four participants estimated it would take four to ten years to change the situation, because the university needed to develop its capacity and resources. Three participants from the government group were of the view that it would take much longer, over a decade, based on first establishing the primary functions of teaching undergraduates followed by postgraduates (Master degrees) before pursuing doctoral education. All stakeholder participants were in favour of conferring the PhD degree in the Seychelles as a step towards advancement.

Interviews and focus groups with the four stakeholder groups indicated that Seychelles was not yet ready to grant doctoral degrees and lacked support structures for doctoral graduates. Facilities and initiatives for enabling PhD graduates to optimise their contribution to national development were virtually nonexistent.

Two thirds of the community group participants were of the view that the Seychelles government and political climate in the country were not conducive to reaping the benefits of PhD graduates. One participant articulated this as follows:

> It is not clear to me if the society itself is ready for that value… I don't think as a nation we have reached that stage where we value data, science-based or evidence-based approaches rather than opinions and politics… we don't see, for example, knowledge fora or knowledge fairs or people talking about published papers or people outside of the university talking about lectures (Interview-Nigel: 23.4.2015).

Political influence also negatively impacted the contribution of Seychellois PhD graduates and exacerbated the unpreparedness of the country to benefit from their expertise. Three of the 28 stakeholder participants talked about the adverse influence of politics. One participant from the government group argued that politics influenced the views of PhD graduates especially in advising government: "sometimes, individuals are scared to speak out" (Interview-Josie: 14.4.2015). An industry group participant observed: "high-level positions were usually filled by appointment by higher authorities in government, rather

than through advertisements and on merit… politics has discouraged professionals, and vacancies are not geared towards professionals holding PhDs" (Interview-Mark: 13.3.2015). He believed this practice denied PhD graduates opportunities to demonstrate their capabilities and establish a profile. Another participant from the community group also shared the view that politics played a detrimental role in the employment of Seychellois PhD graduates.

5.3.1.1 Limited Understanding of Doctoral Education

Doctoral education is a relatively new concept in the Seychelles. One participant from the government group captured the stakeholders' perceptions of doctoral education: "doctoral education is a new concept to many Seychellois, and only a few have acquired that level of qualification" (Interview-Josie: 14.4.2015). Doctoral degrees are not yet conferred in the Seychelles, and as such, doctoral education is mainly undertaken internationally, full-time or in distance-learning mode.

The Seychelles national education and training policy prioritises undergraduate study with the aim of meeting the government's target of one graduate per household; the target being 24,770 households according to the latest census (National Bureau of Statistics, 2012). Students who wished to pursue Master degrees had recently been allocated scholarships by the Seychelles Government after two years of work experience as undergraduates (Agency for National Human Resource Development, 2014). Undergraduate and Master degree candidates were encouraged to undertake training aligned with national needs identified by the Government. However, the national policy is silent on scholarships and national training needs for doctoral education. Consequently, doctoral education is pursued in an ad hoc manner, as reflected in the words of one government group participant: "undertaking a PhD is a personal initiative, and in fields chosen by doctoral candidates, rather than as a national strategy" (Interview-Viola: 5.5.2015).

Stakeholder group participants believed there was limited understanding of the knowledge, skills and outcomes that doctoral education provides. The majority of participants from the four stakeholder groups shared this perception. Five participants suggested members of the

public associated the title 'doctor' with the medical profession and were unable to distinguish between the two. About half the stakeholder participants felt the Seychellois public did not understand the level of knowledge and skills acquired by PhD graduates. In one focus group discussion, participants reported: "some Seychellois seem to think that PhD graduates 'know it all'" (Focus Group 1: 20.5.2015A). Another participant from the university group was of the opinion that many undergraduate students in the Seychelles had a vague and unclear impression of doctoral education. One community group participant stated:

> The Seychellois public does not appear to understand the concept of doctoral education or the competencies of a PhD graduate …The title of doctor is still associated with medical doctor. They think that an academic is not rooted in reality … there is a need for more awareness in the community and in the private sector of what is a PhD and what is the value of it (Interview-Nigel: 23.4.2015).

The comments and interview responses of the stakeholder groups reflected a divergent understanding of doctoral education, ranging from acquiring research experience, pursuing a narrow field of study, undertaking specialised courses, in-depth investigation of a discipline, and training in philosophy. A few viewed doctoral education as training to help candidates work independently and become change agents.

Other perceptions of doctoral education were evident from stakeholder participants' descriptions of the outcomes for those who pursued the program. Some of the words used to describe PhD graduates were: courageous, studious, disciplined, intelligent, knowledgeable, hard-working, authoritative and powerful persons. However, none of the stakeholder participants demonstrated an understanding of the knowledge, range of professional skills and attributes developed during doctoral education. The majority believed there were several reasons associated with this lack of understanding in the Seychelles, including a lack of information about the benefits of doctoral education; the absence of a register of PhD graduates and repository of their theses; and a lack of public exposure regarding the expertise and achievements of Seychellois PhD graduates. This was articulated

by Basil: “There is not enough exposure of people who hold PhDs in the Seychelles… the public do not know what the PhD is all about… exposure is a way to encourage the youths to also aim for a PhD” (Interview: 11.3.2015).

Limited understanding of doctoral education led stakeholder participants to challenge the need for doctoral education in the Seychelles, given its underdeveloped postgraduate education system. The relevance and need for doctoral education and its resultant outcomes emerged as a subtheme, as reported in the next section.

5.3.1.2 The Demand for Doctoral Graduates

Some participants from three of the four stakeholder groups were more positive about doctoral education in the Seychelles. They supported the need for doctoral qualifications, whereas others (8) regarded the PhD degree as an over-qualification and irrelevant in a SIDS.

Five of the eight participants from the government group were generally in favour of doctoral education. One participant stated: “the Seychelles lacks qualified human resources in scientific research” (Interview-Tony: 1.4.2015). Viola said: “the Seychelles is aiming towards creating a knowledge based society, therefore would need more PhD graduates” (Interview: 5.5.2015). Another participant believed the onus was on public sector officials to engage government in promoting doctoral degrees in certain areas, as well as considering supply. The government group was apprehensive about the limited capacity and likely inability of the Seychelles to accommodate large numbers of PhD graduates. They believed it would be difficult to satisfy the expectations of PhD graduates and potentially lead to emigration to other countries. Josie expressed this concern as follows:

> Do we need many people with doctoral education? If yes, there is a need to develop a policy for people to train at that level. In a small society like the Seychelles, if we train many people at doctorate level, will we be able to compensate them? (Interview: 20.4.2015).

The majority of participants from the government group spoke about the requirement for PhD-qualified academic staff at the university, and the need to enlarge the current stock of human capital in national priority areas. This view was voiced by one participant: "A doctoral degree is necessary especially since now we have a university… where doctoral education is required to teach on master programs and to be professors" (Interview-Josie: 20.4.2015). The university group was also in favour of employing more Seychellois PhD graduates: "we want to improve the ratio of Seychellois and expatriate PhD holders at the university…. to improve the reputation of the university to the students… a high proportion of Seychellois PhD graduates are important to us" (Interview-Dave: 4.3.2015). Another government group participant said:

> Government now has an agenda for innovative development and is aspiring for a knowledge-based society. This necessitates that we have higher level thinking personnel that the country has the ability to conduct research and analyse what is happening and to come up with innovative solutions (Interview-Myra: 30.3.2015).

All but one participant from the industry group believed the industry sector in the Seychelles was highly practical and service oriented with a focus on applied skills for service delivery, and therefore did not need PhD graduates. They perceived doctoral education and the research expertise of PhD graduates irrelevant to industry. These participants associated doctoral education with academic institutions, such as the university, but also believed it was appropriate for Government to formulate policy. Nonetheless, from administrative and planning perspectives, a few (3) participants anticipated a future need for PhD graduates to provide consultancy services in relevant areas.

Three of the four stakeholder group participants claimed that more PhD graduates would be needed to drive socio-economic development in the Seychelles, including: expansion of the university to incorporate research; strengthening of research nationally; promoting and taking a leading role in the "blue economy" nationally and internationally; and transition of

the country towards a knowledge society. These developments would benefit from the contribution of PhD graduates, as expressed by Vicky:

> Seychelles is attempting to transition into a knowledge-based society, so we need to look at the level of training we are offering to our people. We need to see whether training in doctoral education will help us to get to that level for a knowledge-based society (Interview: 1.4.2015).

The majority of stakeholders believed the current cohort of 28 Seychellois PhD graduates was too small and their research fields too narrow and misaligned with national priorities to make any significant impact. They felt more PhD graduates were needed in various areas of national importance. From a capacity-building perspective, they were of the view that increased numbers of Seychellois PhD graduates were needed to serve development of the country. They stressed the importance of research topics tailored to areas of national priority. One participant from the university group clarified this sentiment: "more PhD graduates are needed for the country's advancement, for staffing and for the development of the university" (Interview-Joan: 19.3.2015). Another participant from the community group supported the need for more Seychellois PhD graduates in scientific fields (Interview-Nigel 23.4.2015).

It was apparent to the stakeholder groups that national demand for PhD graduates had not been assessed and supply was on an ad hoc basis. Research topics were chosen for personal interest reasons rather than aligning with national priorities for the benefit of the Seychelles. Representatives of industry and government groups proposed training in areas of national priorities to benefit their sectors. Some of those aligned with the pillars of the economy, that is, blue economy and fisheries, tourism and hospitality.

As previously stated, the "blue economy" is about the use of marine resources for public good. An analysis of relevant documents indicated that the blue economy was being actively promoted by the Seychelles Government in national and international forums (Ministry of Foreign Affairs, 2014). The hope was that doctoral education would help advance the concept of the "blue economy" as a national strategy. One participant explained: "building a

future for the Seychelles based on sustainability, resilience, responsibility and dependency on the oceans requires PhD graduates. Youth can pursue studies in fields such as biotechnology, aquaculture and maritime law… we will need specialists" (Interview-Rhonda: 28.4.2015).

Participants from the stakeholder groups almost unanimously raised the need for a national plan to specify priority areas that would assist PhD candidates in choosing research topics relevant to the country's needs.

5.3.1.3 Lack of a National Policy for Doctoral Education

All participants from the government group expressed concern over the lack of a national policy to guide and promote doctoral education in the Seychelles. Government-funded scholarships for doctoral education were reviewed and approved on a case-by-case basis, without access to a national strategy or the policies that are aligned with national priorities. Two participants from the government stakeholder group supported this view. Josie said: "Doctoral education occurs on an ad hoc basis as there is no national policy and plan. If someone wants to pursue a PhD, the person applies and the application is considered on merit" (Interview: 14.4.2015). This view was shared by another participant who stated: "The policy is at undergraduate level and there is no focus on doctoral education… at PhD level there is not much information available. We do not have a policy that focuses on the PhD" (Interview- Viola: 5.5.2015).

One participant from the government group commented on the frequency of reforms and restructure within the public service, considered a cause for instability and a deterrent for PhD graduates to remain in the country post-graduation. She commented: "Doctoral graduates can easily find employment with international organisations hence, these reforms can push them towards other opportunities" (Interview-Josie: 14.4.15).

Approximately half the stakeholder participants believed those individuals who sought personal and professional development drove doctoral education in the absence of a national policy. They expressed concerns over Seychellois PhD graduates earning PhD

degrees for 'prestigious titles and personal benefits' rather than to contribute to national development. Two participants echoed this sentiment. Sarah said: "The PhD degree seemed to be additional prestigious qualification for the graduate rather than to contribute to national development" (Interview: 9.3.2015); and Nigel stated: "In the last 10 years there has been a spur in Seychellois getting PhDs for professional development to undertake research consultancies because there is money in it" (Interview: 23.4.2015).

The absence of a national policy on doctoral education has also led to a lack of support structures for Seychellois PhD graduates. The following subsection illustrates stakeholders' perspectives concerning this issue.

In the absence of a national training plan for doctoral training, one government participant commented: "Currently, the government of Seychelles is funding areas such as human resource management, agriculture and soil science". She indicated: "there were other national priority fields, such as renewable energy, the blue economy and aquaculture where a PhD degree would be needed" (Interview-Myra: 30.3.2015). Focus group participants identified aquaculture as a priority training area with no specialist graduates working in the area (Focus Group 2: 20.3.2015B). The researcher compiled a list of training needs for doctoral education as perceived by the participants (see Appendix P).

5.3.1.4 Lack of Research Interest in the Seychelles

Stakeholder group participants held the view that research was at an early stage of development in the Seychelles. A few recognised that research was not valued and this is exemplified by Mark who said: "knowledge is not valued in the Seychellois society, and nobody is interested in research" (Interview: 13.3.2015). This perception was associated with the recent establishment of the university, its teaching focus and low research capacity, typical of a SIDS context. Stakeholder participants also commented on the lack of resources and incentives to undertake research in the Seychelles.

These views were supported by focus group participants who stated there was "no appetite for research in the Seychelles and the unavailability of mechanisms and opportunities to

encourage PhD graduates to contribute to national development" (Focus Group 1: 20.5.2015A).

Four industry group participants and one focus group participant believed there was no need for research, given the small market and lack of research capacity in the Seychelles. Several participants from the industry group concurred with this view. One reported that the market was too small for local scientific research. In his experience: "it was better to access, adopt and adapt research findings undertaken internationally, rather than undertake research locally" (Interview-Vince: 2.4.2015). Jason, who shared this perspective, stated: "research in the industry was being undertaken abroad due to the small market and lack of research capacity locally in that domain and scarce resources" (Interview: 26.3.2015). Another participant from the telecommunications sector agreed: "there was no need to conduct research in the Seychelles given the lack of capability in terms of laboratories and other research facilities and economy of scale to undertake scientific research" (Interview-Carl: 25.1.2015).

These sentiments were shared by the hotel sector, where participants identified the size of the Seychelles and its lack of economies of scale as deterrents for local scientific research (Focus Group: 26.5.2015). They talked about the preference and cost effectiveness of adopting and adapting international research findings rather than conducting their own research.

One university participant described the university as: "still in the process of being firmly established, and PhD graduates are mainly for teaching rather than conducting research" (Interview-Dave: 4.3.2015). This participant argued that regulatory provisions for professorships, i.e. procedures and criteria, had not yet been developed, hence they were unprepared for the appointment and promotion of professors. As a result, PhD graduates lacked professorial pathways and career prospects within the university.

In summary, the stakeholders suggested that PhD graduates increase awareness of doctoral education through programs designed to disseminate the outcomes to the Seychellois public. The university group acknowledged the need for structures, such as establishment of

criteria for professorship; a review of conditions for recruitment of Seychellois PhD graduates; providing opportunities for academic research; facilitating dissemination of research findings; and encouraging publications. Industry participants recommended the government train PhD graduates in two key industries – tourism and fisheries – and proposed research topics based on national needs. The government stakeholder group also recommended formulation of a policy and remuneration scheme for doctorates, and assistance for PhD graduates to facilitate networking.

University stakeholders particularly, acknowledged the need for opportunities to engage and collaborate with Seychellois PhD graduates. The government group suggested inter-organisational use of PhD graduates in a collaborative manner, rather than limiting their services to one workplace, as a strategy for initiating collaboration (Interview-Josie: 14.4.15). They also proposed establishment of a repository of knowledge for PhD theses.

University group participants admitted they had not engaged with PhD graduates and that their interactions at the university had been restricted to a small number of colleagues. Participants from the government group recommended more support and engagement from both sides, that is, stakeholder groups and PhD graduates. Another government group participant reported on a newly established research institution – National Institute of Science, Technology and Innovation – that would require the services of doctoral graduates, and advised that such an institution could serve as a forum for PhD graduates to remain actively engaged.

Participants reported on the Seychelles government's agenda for innovative development and the aspirations of the country to move to a knowledge-based society, which could provide opportunities for partnerships between PhD graduates and the public service. Such partnerships will require the participation of PhD graduates in nationally identified research areas and offer opportunities to work on specific research projects. One participant suggested a possible avenue for research and innovation as: "the gradual set up of a Blue Economy Research Centre would require working in partnership with the PhD researchers" (Interview-Rhonda: 28.4.2015). At the time of this research, the government group was

promoting a new national innovation system and seeking involvement from Seychellois PhD graduates.

Participants from most of the stakeholder groups believed there was a lack of government policy and that Seychellois PhD graduates were not recognised or valued, their knowledge and skills not effectively utilised, and they were poorly remunerated. The focus group data suggested a lack of attention to Seychellois PhD graduates.

5.3.2 Theme 2: Limited Support for PhD Graduates

The second theme to emerge from the data was the limited support offered to PhD graduates in the Seychelles. This was derived from four subthemes: a) limited support structures and resources; b) no remuneration scheme; c) poor perception of PhD graduates; and c) limited collaboration between PhD graduates and stakeholder groups. Each of these is discussed in further detail below.

5.3.2.1 Limited Support Structures and Resources

More than half the participants from the four stakeholder groups spoke about a lack of support structures, including a remuneration scheme for PhDs and a guide for job prospects. They lamented the absence of a national training plan to identify priorities for doctoral level research that had resulted in ad hoc requests for scholarships.

All stakeholder groups acknowledged a lack of transparency and clarity on the part of the government with regard to doctoral training. They called for an "institution"' where PhD graduates could congregate, undertake collaborative research, and stakeholder groups could make contact and get to know the PhDs in their respective disciplines.

Besides the lack of a government framework, one university group participant made reference to the university being in the process of developing structures, and PhD graduates predominantly teaching rather than conducting research. This participant went on to say: "although there are regulatory provisions for the professorial cadre, the procedures and criteria have not yet been developed and were not ready for appointment and promotion of

professors" (Interview-Dave: 4.3.2015). Consequently, there was a shortage of career pathways and prospects for PhD graduates within the university.

A document search and analysis revealed that the salary scheme in the Seychelles public service catered for qualifications up to Master degree, and did not include doctoral degrees. Participants reported that non-PhD holders were earning more than PhD graduates. The absence of an indicative salary scale for remunerating PhD graduates is one example of a support structure in dire need in the Seychelles.

Half of the university group participants were disconcerted that Seychellois PhD graduates were paid less than expatriate PhD holders for similar work. They were cognisant of the issue and determined to take action to address the situation. Government and community group participants claimed they could not afford to pay PhD-qualified employees; one government participant suggested "PhD graduates should work for themselves because Government is not able to remunerate them for their qualifications. They could undertake consultancies besides their permanent employment position to supplement their income" (Interview-Josie: 14.4.2015). Industry group participants also indicated that private sector employers were unable to offer high salaries to PhD holders, yet were willing to consider short-term research consultancies on a needs basis. Three quarters of the participants from the government group cited budgetary constraints as the cause for low salaries, which discouraged rather than rewarded PhD graduates. Focus group participants agreed that PhD graduates were on low salaries (Focus Group 1: 20.5.15A). They claimed that most senior staff members in their institutions did not hold PhD degrees and viewed subordinate staff members with a PhD degree as "overqualified". They also believed that Seychellois PhD graduates migrated overseas because they were more valued outside the country (Focus Group 3: 26.5.2015).

One university group participant considered the human resource management of PhD graduates challenging, with no clear guidelines for recruitment, prospects, salary, opportunities and employment in relevant professions. Another participant from the

university stakeholder group believed the non-recognition, underutilisation and low remuneration was due to a lack of focus on human resource management of PhD graduates.

5.3.2.2 Poor Perception of PhD Graduates

Fewer than a quarter of the stakeholder participants held PhD graduates in high esteem. In the same vein, focus group participants felt there was little recognition of the work of Seychellois PhD graduates and that they were not valued in their home country. This was evident from the fact that they were less favoured than expatriates for consultancy work and paid less.

The university group believed PhD graduates received appropriate academic respect from students and staff. However, one participant acknowledged: "we avoid putting PhD graduates on a pedestal to avoid creating an elite club" (Interview-Dave: 4.3.2015). Other participants from the university group felt this view had adverse implications and was a contributing factor to low recognition of Seychellois PhD graduates.

About half the stakeholder group participants held the view that Seychellois PhD graduates were not valued or recognised for their work. One industry group participant said: "I know and respect one PhD graduate who has shown high level performance, but I think that another PhD graduate wasted his time investigating a topic that is irrelevant to and cannot be implemented in the Seychelles" (Interview-Mark: 13.3.2015). Most stakeholder participants were of the view that some PhD graduates had not earned recognition or respect: "PhD graduates have to demonstrate their expertise to get recognition" (Focus Group 1: 20.5.2015A). Another focus group participant shared this view:

> Seychelles do not recognise nor value local PhD graduates… a master's degree is regarded as sufficient… there is a feeling of threat and fear of PhD graduates from non-PhD holders, because upon obtaining a PhD degree, the graduate is expected to lead" (Focus Group 3: 26.5.2015).

The foregoing limitations, arising out of a lack of support structures for Seychellois PhD graduates were perceived by participants from the four stakeholder groups to be responsible for PhD graduates not being valued. There was also an implicit lack of synergy between Seychellois PhD graduates and key stakeholder groups, which is further detailed below.

5.3.2.3 Limited Collaboration with PhD Graduates

In chapter four, the interview and focus group data revealed limited engagement and collaboration between PhD graduates and the university, industry, government and community stakeholder groups. In this chapter, participants of the four stakeholder groups also believed there was limited engagement and collaboration with PhD graduates, and felt PhD graduates were working in isolation.

About half the participants from the four key stakeholder groups were aware of only one, and a maximum of three other Seychellois PhD graduates. University participants were of the opinion that Seychellois PhD graduates were unknown and secluded. One community group participant explained: "PhD graduates work in isolation rather than sharing their research skills with non-governmental organisations" (Interview-Nigel: 23.4.2015). Government and community group participants believed that Seychellois gained PhD qualifications for self-fulfillment rather than to contribute to national development.

All participants from the four stakeholder groups were unanimous in urging Seychellois PhD graduates to broaden their areas of work, be conspicuous, promote themselves and collaborate with other stakeholders. A few industry group participants, particularly from telecommunications and manufacturing, offered to consider proposals from PhD graduates with the aim of developing joint projects for mutual benefit. Some stakeholder groups announced their intention to provide opportunities for internships to PhD graduates during their doctoral studies. However, the offer was conditional upon favourable consideration of a tax rebate incentive by the Seychelles government.

During this study, about half of the participants commended the research and claimed the interview had helped them to reflect on collaborative strategies with PhD graduates to bring about greater contribution to national development. One university group participant who was committed to greater engagement and collaboration stated: "The university should be making it easy for them to contribute to national development and you inspired me to do something about it" (Interview-Dave: 4.3.2015). Two participants from the government stakeholder group undertook to improve the utilisation of Seychellois PhD graduates' expertise in the future, through advice, research and consultancy work.

In summary, stakeholders acknowledged the need for appropriate recognition, value and remuneration for PhD graduates, making use of local competencies in preference to expatriates, supporting innovation and working towards research outcomes.

The government group referred to the positive effects of collaboration between stakeholders and PhD graduates, including enhanced opportunities, job satisfaction, professional growth and higher incomes.

Participants from the university group proposed two strategies to stimulate contributions from PhD graduates: a) incentivise PhD graduate staff members to remain research-active through contractual arrangements, with targets for publishing and disseminating findings; and b) encourage PhD graduates to participate in think tanks and national debates on topical issues.

The industry stakeholder group recommended several key research areas for PhD graduates to benefit the Seychelles and suggested that the government provide funding in national priority areas. Participants from the community stakeholder group proposed launching a campaign to facilitate networking with PhD graduates. They encouraged PhD graduates to voluntarily provide research and project management services to community and non-governmental organisations.

5.3.3 Theme 3: Limited Contributions of PhD Graduates

The third and final theme to emerge from the perspectives of stakeholder participants was the extent of the contribution made by Seychellois PhD graduates to national development, in other words the benefits derived from the input of PhD graduates through the performance of their work. Three subthemes were grouped to examine this perspective: a) stakeholders' perceptions of PhD graduates; b) utilisation of PhD graduates' expertise; and c) their limited contribution to national development. Each subtheme is discussed sequentially below.

5.3.3.1 Stakeholders' Perceptions of PhD Graduates

All participants from the university group expected PhD graduates to be more proactive and participate more actively in research opportunities. Participants from the government group believed some Seychellois PhD graduates were not meeting expectations. This statement from one participant explains: "Even if they are PhD holders, they do not deliver to expectations… I would expect PhD graduates to be more visible, and come out more in the areas of their expertise, like in academia and research" (Interview-Josie: 14.4.2015). These stakeholders were of the opinion that PhD graduates' expertise could be harnessed more effectively in the public sector to conduct research and provide a consultancy service in addition to supplementing their incomes. They held the view that PhD graduates had been trained as independent researchers and should be able to initiate change.

Almost all industry group participants believed that PhD graduates were not required at this stage in the country's development. Participants from the community group acknowledged that non-governmental organisations could not afford PhD graduates and relied on free and voluntary services. About half the participants from the community group expressed their appreciation of PhD graduates who voluntarily shared their knowledge and skills through training and workshops. They sensed reluctance on the part of other PhD graduates to assist non-profit organisations in the same way.

According to the participants from the four stakeholder groups, PhD graduates had not publicly demonstrated the full extent of their expertise, and there was a lack of awareness about the knowledge and skills they offered. They encouraged PhD graduates to take the lead in being proactive, taking calculated risks, seizing opportunities, thinking laterally and inviting stakeholders to collaborate with them.

5.3.3.2 Opportunities for Utilising PhD Graduates' Expertise

All participants from the government stakeholder group indicated there were numerous employment opportunities for PhD graduates to use their knowledge and skills. The university employed three Seychellois PhD graduates compared with twice the number of equally qualified expatriate PhD graduates. Recruitment was based allegedly on the best match between PhD graduates' knowledge and skills and those required by the university. Some participants expressed dismay that Seychellois PhD graduates were not research-active, as this affected their job prospects in academia. They also expressed an interest in recruiting more PhD graduates with the required expertise – this was captured by one participant who explained: "It is good to have a wider network and we want to improve the ratio of Seychellois PhD holders to expatriate PhD holders, provided they are research-active, and they qualify for the position" (Interview-Dave: 4.3.2015). In reference to the utilisation of PhD graduates' expertise, one industry participant said:

> I would like to see high-level performance from Seychellois PhD graduates… If they feel that they are not succeeding, it is not because of society but because of themselves. They have not gone out there to demonstrate their capability. (Interview-Mark: 13.3.2015)

Almost half the participants from the university stakeholder group believed that employing more Seychellois PhD graduates would attract local and international students, potentially enhancing the university's reputation and contributing to its research objectives and development.

Sarah disclosed that the research findings, from Master and PhD-degree theses were not disseminated and described the Seychellois culture and the university as "not research-friendly": "It's cultural! People are afraid to give information. Sometimes they think they are revealing the secrets of their workplace and they are exposing themselves" (Interview: 9.3.2015).

Most participants from the industry group regarded PhD graduates as 'academics', and as such, "not practical" employees and unsuitable for the applied nature of jobs in the industry sector. One industry group participant explained: "in the private sector we don't write many policy papers. We are practical… we do not have many PhD graduates… these people are overqualified" (Interview-Mark: 13.3.2015). Another participant expressed similar views: "a PhD in the construction sector is not really relevant. PhD as I have known and observed is someone that is highly specialised in a certain chosen subject" (Interview-Vince: 2.4.2015).

One university participant made known that PhD graduates were not effectively utilising their expertise in academia or being research active: "Graduates return to the country with a PhD degree and they consider themselves holding the qualification, but it is also the lack of necessary structure to support them to remain active in research" (Interview-Sarah: 9.3.2015).

The university stakeholder group was of the view that the expertise of Seychellois PhD graduates were not being maximised. The following four participants exemplify this. Two participants felt the knowledge and skills of Seychellois PhD graduates were not being maximised in the Seychelles. Mario clarified: "I don't think that the university has really maximised the use of its lecturers with PhD degrees for research… There is a mismatch of skills of PhD graduates who work in administrative and managerial jobs" (Interview-Mario: 3.3.2015). Two participants commented on low levels of interest among local PhD graduates to join the university. One participant claimed: "of the 10 PhD graduates employed by the University, only three were natives, the majority was expatriates" (Interview-Sarah: 9.3.2015). Another said: "local PhD graduates were deliberately being kept out of the university by offering them lower salary than expatriates" (Interview-Mario: 3.3.2015).

Industry participants had varying perspectives on the abilities of PhD graduates to translate their knowledge and skills. Most believed that holding a PhD degree was not a recruitment criterion; instead, the priority was finding the best candidate with a positive attitude. Participants also believed the reluctance of businesses to recruit PhD graduates was due to the misconception that they prefer research.

Some stakeholder participants commented on the cultural inclinations of Seychellois as being risk averse, in drawing comparison with PhD graduates. These participants were privy to the dissatisfaction of some firms with the performance of PhD graduates, and now preferred to recruit non-PhD graduates. One participant elaborated: "We have lost graduates, so we have changed our approach, we no longer fund university graduates… we do not employ them" (Interview-Jules: 31.3.2015).

Focus group participants were displeased with the arrangement whereby only government-funded PhD graduates received employment opportunities. There was consensus of support from one participant who explained: "If a PhD graduate is not funded by Government, the graduate encounters difficulties to obtain employment and eventually they migrate to the country of study and Seychelles lose its professionals" (Focus Group 3: 26.5.2015).

The above commentaries attest to a relatively poor perception of some of the Seychellois PhD graduates on the part of the four stakeholder groups, and a prevailing sense of dissatisfaction with their performance.

The following section covers the stakeholders' perceptions of the contribution of PhD graduates to national development.

5.3.3.3 Limited Contribution to National Development

Interview and focus group data revealed that most of the four stakeholder group participants perceived to be limited contribution of Seychellois PhD graduates to national development. They believed their contribution came mainly from utilising their specialist knowledge and skills in their places of employment. This included teaching at the university, membership of high-level committees, conducting research, publishing (by some),

consultancy work, and national presentations. One participant said: "I think PhD holders are used mostly for lectures, but they can be used much more, for example, to advertise the university" (Interview-Basil: 11.3.2015).

The interview and focus group data showed the contribution of PhD graduates was well below potential. This was raised in one focus group: "It seems that PhD holders in the Seychelles are not contributing enough" (Focus Group 3: 26.5.2015). Most participants had the impression that the work of Seychellois PhD graduates was 'not visible' and their accomplishments were hidden. One participant, with support from others in the group, stated: "I don't see Seychellois PhD graduates making a big contribution. They are just like any other graduates… there is no distinction" (Focus Group 2: 20.5.2015B). A participant from the community group identified a new area for PhDs to contribute:

> As a country, we are unable to provide data for international country reports, for which we have been criticised. If you look at an international report, you find chunks of data missing for the Seychelles. We need people who can analyse and provide data. That is where PhD graduates could contribute (Interview-Nigel: 23.4.2015).

There was a strong belief that PhD graduates seldom shared or displayed their work publicly and were rarely involved in projects that brought them into contact with the stakeholder groups. A community group participant summarised: "Some research has been undertaken but the findings have not been shared" (Interview-Viola: 5.5.2015). One focus group participant echoed this view: "We see that our locals, even if they have a PhD, they are a bit behind in terms of sharing their knowledge critically" (Focus Group 2: 20.5.2015B). All focus group participants agreed with the words of one community group participant: "Somebody has a PhD; it is as if his or her work is hidden somewhere. You don't see it … you don't feel the contribution" (Interview-Danny: 29.4.2015). These comments indicate that PhD graduates are not promoting their research in the public domain or publicising their knowledge and skills nationally.

Most of the stakeholder participants did not know much about Seychellois PhD graduates but were keen to know more, particularly about their PhD disciplines. One community participant said: "I am sure employers would go to them, if they knew what they studied" (Interview-Diana: 24.3.2015). An industry participant agreed: "These people get PhD qualifications but I don't see nor hear about them here" (Interview-Jason: 26.3.2015). A university participant gave his view of the barrier to contribution: "the main barrier is that we do not have enough research-active PhD holders" (Interview-Dave: 4.3.2015).

One university participant stated the contribution of PhD graduates was necessary for the university where they could take an active role in teaching, research, consultancies and participating in national debates. Others observed a lack of tangible contribution from PhD graduates and believed they could contribute more to national development, if they were employed in jobs relevant to their expertise, both in and outside academia. The perception that Seychellois PhD graduates were reluctant to conduct research, yet complained when expatriate PhD holders seized those opportunities was raised. One participant summarised this as follows: "At times you give Seychellois PhD graduates the opportunity, but sometimes they are a bit reluctant to seize the opportunity hence, restricts the possibility to contribute to national development" (Interview-Mario: 3.3.2015). The following excerpt from an interview represents other views from the university group regarding the contribution of PhD graduates:

> We are still a teaching institution but there will be research opportunities... my preference is to increase the knowledge capacity in the Seychelles, and therefore we look favourably on the local PhD candidates… research-active PhD holders… as we build a reputation for research. We want to encourage that [PhD] person to write... to attend conferences and build a reputation because it will help the university (Interview-Dave: 4.3.2015).

Dave talked about some of the impediments to national contribution, such as resources, salary and recognition. He stated: "The main barriers were that we don't have enough research-active PhD holders. We don't have our own refereed journals… it is hard in a small

country like the Seychelles to engage in national debates" (Interview-Dave: 4.3.2015). Another participant from the university group voiced the challenges he perceived Seychellois PhD graduates faced:

> All PhD graduates are currently teaching at first-degree level… the PhD graduates should not be lecturing only, but also undertake research. We have a lot more expatriate PhD holders working in academia… our salaries are not encouraging local PhD holders to take up teaching at the university (Interview-Mario: 3.3.2015).

Despite the views of three industry group participants who alleged that PhD graduates contribute through their roles as consultants, researchers and advisors, the majority felt the contributions of PhD graduates were not seen, not visible, and not felt.

Participants from the industry group agreed unanimously that Seychellois PhD graduates needed to demonstrate their capacity and could contribute more. One participant explained: "I do not see the PhD graduates or their contribution because they keep a low profile" (Interview-Jason: 26.3.2015). This view was echoed by another participant who stated that, "we don't know who the PhD graduates were and their fields of expertise… they keep separate, seemingly on a different stratosphere" (Interview-Diana: 24.3.2015).

The seven government group participants perceived some PhD graduates contributed to national development through their leadership positions in organisations. One attributed the cause of PhD graduates' disengagement from research to high volumes of onerous administrative work. Another expressed this view: "the extent of the contribution of PhD graduates is dependent on the relevancy of their study field to the employment position, therefore they should be in relevant jobs" (Interview-Josie: 14.4.2015).

Half the community group participants' perceptions of the contribution of PhD graduates mirrored those of the industry group. One participant identified the contributions of PhD graduates through their roles as consultants and advisors on committees. Another expressed

the view that PhD graduates were not contributing much and their contributions were not obvious. A further participant agreed: "their value was not seen, they don't want to get into the limelight outside of their field and to jump outside the box… PhDs are too embedded in their own work to be able to look to the community" (Interview-Nigel: 23.4.2015). Another participant raised the issue of visibility: "PhD graduates are not visible and their work was hidden; they leave their research in the cupboard, hence their contribution was not obvious… frankly for the time being I don't see much contribution" (Interview-Danny: 29.4.2015). Danny also claimed there were too few local PhD graduates to notice the effects of their contribution towards national development.

Participants from the three focus groups agreed unanimously that the number of research projects undertaken by PhD graduates in the Seychelles was negligible. They had not noticed any significant contributions from PhD graduates. Half the industry participants perceived PhD graduates were not performing according to industry expectations, nor performing at a particularly high level. One participant explained: "PhD graduates wanted to transpose what they have learnt in large countries in a small economy and it does not work" (Interview-Mark: 13.3.2015). Mark also believed PhD graduates were not demonstrating their full potential. Another participant contested the practical outcomes of doctoral education and their applicability in the workplace. There was a feeling among the industry group in the Seychelles that there existed a general lack of awareness of Seychellois PhD graduates, as illustrated by this participant:

> I am surprised to hear that we have so many PhDs in the Seychelles… many people will strive to get that title, but then I don't want it to be left as a title only on paper. It needs to be contributing to the economy and country (Interview-Jason: 26.3.2015).

The perceptions of two of the seven government group participants illustrate that insufficient attention was paid to PhD qualifications, PhD graduates and their contribution to national development. Two others proposed that PhD graduates do consultancy work in certain research areas that would be of benefit. According to one of these participants there

were many opportunities for consultancy work in the public service: "Some 2000 jobs will become available from fish vets to data assessment and analysis, so there will be a lot of opportunities" (Interview-Rhonda: 28.4.2015). Another participant suggested PhD graduates engage in consultancies side by side with their permanent roles to generate an income over and above their salaries. She said: "employers of PhD graduates should not keep these graduates only in their organisations, but should allow them to do work outside their permanent jobs" (Interview-Josie: 14.4.2017). Another participant stated: "the Seychelles needs to harness the graduates' tacit knowledge and to be more aware of the nation's research capacity" (Interview-Tony: 1.4.2015B).

The perspectives of the community group participants with regard to the transferability of knowledge and skills revealed an unwillingness of some PhD graduates to assist the community group, particularly with training and accessing project funds from non-governmental organisations. They viewed these graduates as merely being after financial rewards. One participant declared: "where there is money, you will find PhD graduates" (Interview-Mifa: 29.4.2015B). Another recommended PhD graduates consider giving voluntarily of their spare time to help the community and non-government organisations in areas that needed their knowledge and skills. One participant distinguished two kinds of PhD graduates: "those who willingly work in the community with the grassroots, and those who only conduct scientific research and ignore the community" (Interview-Vicky: 1.4.2015). She acknowledged that working in the community could open doors for interested PhD graduates and encouraged them to assist non-governmental organisations for their mutual benefit. One university participant stated: "Seychellois PhD graduates have reached a high intellectual level and are well placed to make a contribution in an area of expertise" (Interview-Dave: 4.3.2015).

More than half the focus group participants observed little transfer of knowledge and skills by PhD graduates. One university group participant clarified: "It's like having a PhD, no one hears of the research findings, which are not disseminated. PhD graduates come back and it is business as usual" (Interview-Sarah: 9.3.15). Focus group participants believed that about half the PhD graduates were employed as administrators and leaders in government, were

overwhelmed with administrative functions, and had little time left for research and publishing. They also perceived the competencies of PhD graduates were not being used effectively; that is, there was a mismatch between their knowledge and skills and the positions they occupied.

Participants from two focus groups felt PhD graduates would be better utilised in academia, employed at the university. In focus group three, participants spoke about the lack of demand for PhD graduates in industry. One participant shared the following comment: "I have overheard senior officials who have voiced their views that a Master degree is adequate for employment in the Seychelles" (Focus group 2: 20.5.2015B), the message being that a PhD qualification was considered unnecessary and an over-qualification. Participants from the industry group indicated they would use Seychellois PhD graduates in the future for consultancy work, to prepare position papers and for specific research work in useful areas on short-term contracts.

This section illustrated the stakeholder groups' perceptions of Seychellois PhD graduates and their limited contribution to national development, mainly in the form of lecturing, research consultancies, membership of high-level committees and leading organisations.

5.4 Summary

This chapter offers background on the stakeholder groups and presents the perspectives of participants from the university, industry, government and community. It outlined three key themes: the country's unpreparedness for doctoral education; limited support for PhD graduates; and PhD graduates' limited contribution to national development. Strategies proposed by participants to help maximise their contribution to national development were provided.

More than half the stakeholder participants were of the view that doctoral education was a new concept and poorly understood by Seychellois, contributing to low appreciation of the qualification and PhD holders in general. They confirmed there was limited engagement and collaboration between themselves and the Seychellois PhD graduates.

Generally, industry participants believed it was not worthwhile undertaking certain research projects in the Seychelles because it was more cost effective to adopt and adapt international research findings. Three of the four stakeholder groups expressed the requirement for more PhD graduates to align their research to the country's development needs, as determined by national priorities. The stakeholder groups also identified the need for training in their respective sectors that could define PhD research topics for future students.

Three quarters of the participants recognised a lack of support for PhD graduates with regard to remuneration, relevant employment opportunities, low levels of interest in research, and particularly, the absence of a national policy to guide doctoral education. These were all impediments to PhD graduates' contribution to national development and influenced the readiness of Seychelles for doctoral education.

The evidence indicated a mix of positive and negative perceptions about Seychellois PhD graduates. Positive views included the potential of Seychellois PhD graduates whereas negative views encapsulated their underutilisation.

The stakeholder groups endorsed the view that Seychellois PhD graduates were overqualified, invisible, had gained a prestigious qualification and academic title mainly for personal and professional development. As far as they were concerned, the performance of Seychellois PhD graduates did not meet expectations and their achievements were unknown to the majority of the participants and the public at large. Furthermore, there was a perception that PhD graduates were not needed in the industry and they made limited contribution to national development. These perceptions emanated from a lack of visibility of Seychellois PhD graduates, who were seemingly working in isolation and reluctant to promote themselves and their work in public. Their contributions were noted in three main areas: predominantly teaching, consultancy work, and at the helm of organisations. The extent of their contribution to national development was deemed negligible.

All the stakeholder groups acknowledged they were not effectively using PhD graduates. They suggested consultancy work as one avenue for effective use of their knowledge and

skills, and as far as possible avoiding expatriate PhD graduates, with recruitment undertaken on a needs basis and subject to competencies and requirements. In general, most of the four stakeholder participants believed that Seychellois PhD graduates could do more to demonstrate and promote their areas of expertise.

This chapter supplements the findings from the perspectives of the Seychellois PhD graduates presented in chapter four. The next chapter discusses the three key findings of this study, which emerged in chapters four and five, and in light of related international studies.

Chapter Six: Discussion of Findings

6.1 Introduction

This chapter discusses the key findings that emerged from analysing and interpreting the multiple perspectives of Seychellois PhD graduates and the four key stakeholder groups as reported in chapters four and five. Findings from the document analysis are also incorporated where relevant, to complement and triangulate the data provided by the participants. The chapter comprises a discussion of three key factors: a) Seychelles' lack of readiness for doctoral education; b) limited support and opportunities for Seychellois PhD graduates; and c) underutilisation of the expertise of Seychellois PhD graduates. These factors limited the contribution of Seychellois PhD graduates to national development. A summary of salient points concludes the chapter.

6.2 Key Finding 1: Seychelles' Lack of Readiness for Doctoral Education

The first key finding in this study was the Seychelles' lack of readiness for doctoral education. This phenomenon mitigated the contribution of Seychellois PhD graduates as perceived by participants in the four key stakeholder groups and some of the Seychellois PhD graduates. Two contextual factors contributed to the lack of readiness: a) the limitations of SIDS; and b) the current state of doctoral education in the Seychelles. Each of these is discussed in further detail below.

6.2.1 Limitations of SIDS

SIDS has unique characteristics, challenges, and social, economic and environmental vulnerabilities (United Nations-Office of the High Representative for the Least Developed Countries Landlocked Developing Countries and Small Island Developing States, 2011). The Seychelles also has its limitations, as perceived almost unanimously by Seychellois PhD graduates and key stakeholder participants, who believed Seychelles was not yet ready to utilise fully the potential of its PhD graduates. This belief was derived from their experiences of the culture and the challenges of living and working in a SIDS. Seychellois PhD graduates

encountered the following limitations: a small PhD labour market and limited career opportunities; unfavourable political environment; and early stage of research development. Each of these limitations is elaborated below.

6.2.1.1 Limited Scope for Employment and Careers of PhD Graduates

SIDS have small populations, limited stocks of human resources (Bray & Martin, 2011) and lack economies of scale (Bray, 2011). They also have inherent challenges and vulnerabilities based on size and lack of critical mass (Crossley, 2010; Everest-Phillips, 2014). Due to these attributes, some Seychellois PhD graduates faced difficulties associated with a restricted labour market and limited career prospects to implement their doctoral expertise.

Seychelles has a limited labour market with a small working population of almost 50,000 (National Bureau of Statistics, 2016b) and restricted employment opportunities for PhD graduates. The existence of only one small, young teaching university, inhabited by 205 students in 2014 (National Bureau of Statistics, 2016b), few undergraduate programs and even fewer Master degree programs, further limits employment opportunities in academia. Similarly, the research institute offered few employment opportunities for PhD graduates due to its recent establishment, mainly a coordinating role in research that presents few prospects for researchers. A small number of occupations require PhD qualifications in Seychelles. During this study, the stakeholder groups, particularly the government sector identified potential opportunities for Seychellois PhD graduates.

Given the dearth of human resources and the high cost of doctoral training in a SIDS context, those Seychellois PhD graduates who were financed by the Seychelles Government or were previously employed in the public service benefitted from guaranteed employment after graduation. However, because of the limited availability of appropriate positions for PhD degree holders and a lack of understanding of their expertise, employment offers were not always aligned with their skills sets, and were ultimately unsatisfactory in some cases. Seychellois PhD graduates who sourced non-government funding to pay for their studies were not assured of the same employment opportunities after graduation. Four Seychellois PhD graduates who were not government funded encountered difficulties securing

employment aligned with their PhD discipline and skills – one was unemployed at the time of the study. These PhD graduates were not afforded the same employment opportunities as government-funded graduates and hence, the country was not capitalising on their knowledge and skills.

In view of the small industry sector in the Seychelles, very few Seychellois PhD graduates were able to access employment in industry. To make matters worse, industry stakeholders considered a PhD qualification unnecessary. From the participants' perspectives, industry stakeholders regarded Seychellois PhD graduates as over-qualified, and their overseas-acquired knowledge not applicable in the Seychelles. Contrary to this perception, the literature indicates that a PhD degree is a global qualification, regardless of where it is conferred. Nerad (2012), who studied trends in doctoral education, maintained that the knowledge and skills of PhD graduates are transferable to different contexts, no doubt requiring adaptation, flexibility and pro-activity on the part of the graduates themselves.

Career progression presented difficulties for almost half the Seychellois PhD graduates. Career opportunities were restricted due to the small labour market in the Seychelles, which had a total population of 93,400 people in 2015 (National Bureau of Statistics, 2016b). Seychellois PhD graduates believed their expertise was well suited to careers in policy analysis yet, less qualified candidates were being recruited for those posts, flagging a lack of understanding of PhD knowledge and skills.

Approximately half the 24 Seychellois PhD graduates had progressed to leadership positions and felt they were contributing to their workplaces and various sectors of Seychelles. However, this was not the case at the university, where none of the Seychellois PhD graduates had attained associate- or full professorship. Only one participant held a research position at the university, which had been in existence for less than a decade. PhD graduates were employed mainly in management, and a professoriate scheme had not yet been established to give shape to their career prospects and aspirations. Given the higher education landscape, the career prospects of Seychellois PhD graduates were more promising in the government sector, where most had risen to leadership positions.

In countries with research-intensive universities and well-established research institutes most PhD graduates aspire to a career in academia, but few realise their goals (Golde & Dore, 2001). A study in the UK showed that more than 50% are employed in sectors outside academia (The Royal Society, 2010). While statistics for PhD graduates in academic careers differ in the Seychelles and internationally, there is a common trend of larger numbers employed in non-academic sectors. The political environment inherent in small islands like Seychelles was another factor that influenced the employability of Seychellois PhD graduates.

6.2.1.2 SIDS Political Environment

Both PhD graduates and key stakeholder groups believed the political environment affected the recruitment and performance of Seychellois PhD graduates and inhibited their contribution to national development. About a quarter of the PhD graduates believed that appointments to senior positions in the public service were motivated by political allegiance to the ruling government party. This pointed to a non-transparent process for high-level appointments that restricted recruitment and career opportunities for Seychellois PhD graduates. Many of these positions were not advertised along the lines of normal recruitment procedures (newspapers, media) and were therefore unavailable to Seychellois PhD graduates. In this political climate, some Seychellois PhD graduates experienced fear and victimisation; they felt deprived of attractive employment opportunities due to political affiliations and a lack of understanding and appreciation of doctoral education. Some graduates were also apprehensive about their employment for fear of misinterpretation that could potentially lead to termination of their employment. This situation influenced the recommendations of Seychellois PhD graduates when addressing challenges in the public service, and had a negative effect on their capacity to contribute to national development.

A study by Philpot et al. (2015, p. 40) described political decision-making in the Seychelles as a "top-down structure" with little opportunity for participation. This type of political environment is inherent in SIDS and affects employment opportunities (Everest-Phillips, 2014; Philpot et al., 2015; Veenendaal, 2015).

There is a need to mitigate political impact on the employment of Seychellois PhD graduates and implement transparent recruitment procedures to optimise their contribution. Another factor identified as a limitation of SIDS was the early stage of research development and activity in the Seychelles.

6.2.1.3 Early Stage of Research Development

Study participants held the view that research was in the early stages of development in the Seychelles. They commented on a lack of interest, inadequate facilities and apparent disengagement of key stakeholder groups. Only half the Seychellois PhD graduates had been research active over the last three decades; the rest cited lack of time, limited support and unavailability of research grants as some deterrents they had encountered. Participants also claimed they were not aware of procedures for accessing research funds and their high workloads did not permit time for research. While these issues were of genuine concern they are surmountable with targeted strategies, and suggest that Seychellois PhD graduates were not always proactive about finding ways to engage in research and enhance their contribution.

Industry stakeholders in the Seychelles believed research was unimportant in small organisations, and rather than investing in local research, it was more cost-effective to adapt international research findings. As such, little research was undertaken in the industry sector. At the time of this study, teaching was the core function of the university. It was in the process of establishing a research department, developing its research ethics policy, and launching its first academic journal to promote and encourage research and publishing, both still in very early stages.

This study brought to light management's encouragement of PhD-qualified staff to engage in research. Participants from the university group acknowledged that more need to be done to reduce the teaching workload and support PhD graduates to remain research active and publish. The university stakeholder group was committed to developing a research culture. The community group was the most interested in adopting and conducting research, particularly in life sciences. Seychellois PhD graduates involved in life sciences were actively

using their skills and expertise. The Seychelles government, in recognition of the importance of research, created a National Institute of Science, Technology and Innovation in 2014, with responsibility for coordinating and promoting research. It is evident that research is growing in the Seychelles, but there is still a way to go to increase and sustain interest.

The research landscape in the Seychelles is relatively consistent with other developing countries such as Mauritius, South Africa, Egypt and Nigeria, where there is a low capacity for research and little recognition of the importance of building capacity. These countries are strengthening their research and doctoral capacity through increased national funding (Kotecha, Walwyn, & Pinto, 2011). Similarly, a focus on national priorities and increased investment by the Government will help to foster a research culture in the Seychelles.

In the last decade, approximately half the Seychellois PhD graduates working in the community had published a range of between one and five articles in overseas peer-reviewed journals during and post-graduation. A few PhD graduates at the university had just started to publish. The other half had not published post-graduation for several reasons, particularly the time constraints of heavy administrative and management responsibilities, lack of motivation and encouragement, and the absence of local academic journals.

Most SIDS face challenges associated with limited resources, technical capabilities and limited opportunities for research (Everest-Phillips, 2014). In the Seychelles, facilities for research and publishing are limited due to the resource capacity and constraints of the university, the research institute, and unsurprisingly, at a national level. As with conducting research, opportunities exist for Seychellois PhD graduates to develop strategies that would enable them to publish despite their work responsibilities.

A lack of access to equipment and infrastructure, and insufficient time for research are issues that constitute the early stages of research development and add to the limitations of SIDS. These areas need strengthening in order to support increased research outputs, innovation and publishing.

It is evident that the constraints of Seychelles as a SIDS and limited research facilities impacted on the number of research projects and publications Seychellois PhD graduates were able to generate. It also highlights a need for Seychellois PhD graduates to engage more in research and develop a research culture in the Seychelles that will foster an appreciation for doctoral education. This is discussed further in the following section.

6.2.2 State of Doctoral Education in the Seychelles

There are currently no doctoral programs delivered in the Seychelles, so PhD candidates go offshore or use online and distance modes of learning to gain a doctoral qualification. The following sections outline the issues perceived to influence doctoral education in the Seychelles, including: lack of a national policy and priority plan, absence of a doctoral graduate register and induction program, limited understanding of doctoral education, and availability of doctoral expertise in the country.

6.2.2.1 Lack of National Priority, Policy and Plan

The four key stakeholder groups did not consider doctoral education a national priority in the Seychelles, where the focus was on schools, undergraduate and Master degree programs. The aim of the Government was to increase the overall number of Seychellois graduates, which stood at less than 4% of the working population (National Bureau of Statistics, 2012) at the time of this study. The availability of scholarships for doctoral education was minimal and awarded on a case-by-case basis, signifying personal motivations rather than national priorities.

The Government of Seychelles funded approximately half of the PhD candidates. Those who were unable to obtain a government-funded scholarship sourced financial assistance from other foreign governments, or accessed scholarships from overseas universities and international project funds. Seychellois industry, university and community stakeholder groups did not fund any Seychellois PhD candidates and were of the view that doctoral training was the responsibility of the government.

In other countries, such as the USA, the UK and Australia, a wide range of funding sources are available for doctoral education in the form of federal and national governments grants, and funding from industry, philanthropic and non-profit organisations (Elmgren et al., 2016). Participants proposed that the Seychelles Government introduce a budget for doctoral education and encourage other stakeholder groups to jointly fund doctoral education. At the time of this study, there was no indication that doctoral education would be budgeted. Such an initiative could help transform the Seychelles into a knowledge-based economy as outlined in its National Development Plan (Ministry of Finance Trade and Blue Economy, 2015).

The study also revealed no formal alignment of doctoral education to national priority areas. Nonetheless, when selecting their research topics, approximately two thirds of the Seychellois PhD graduates chose to investigate "authentic problems" (Herrington, Reeves, & Oliver, 2010, p. 69), leading to recommendations and learning relevant to the Seychelles. One constraint felt by Seychellois PhD graduates was implementing their research findings in the workplace, due to limited support from the key stakeholder groups.

Governments in many developing countries are making significant investments in research and highly skilled employees for academia and other sectors (Halse & Mowbray, 2011; Smith et al., 2010). For example, South Africa has made PhD education a national priority in its strategic plan to replenish its ageing PhD population, boost research and generate high-level skills (Cloete et al., 2015). In Brazil, the government has made provision in its National Plan for Post-Graduate Studies 2005 to 2010, to increase the number of doctorates in areas relevant to economic development (Ribeiro, 2007). These options can be considered by the Seychelles Government, when considering its policies and plans on doctoral education.

This research uncovered a low number (3) of Seychellois PhD graduates in Science, Technology, Engineering and Mathematics (STEM). There was a paucity of PhD graduates in technology and mathematics, and very few in engineering. This is in stark contrast to international statistics, where STEM disciplines attract larger numbers of doctoral students than undergraduate degrees (Australian Council of Learned Academies, 2013). Traditionally,

research-intensive universities and developed countries invest heavily in STEM for innovation and competitiveness. This trend is also evident in developing countries like India and China, where there is high investment in STEM doctorates due to their potential impact on national development (Cyranoski et al., 2011). Training for Seychellois PhD graduates could focus on STEM and also align to the country's needs to increase the local stock of doctoral expertise and reduce the country's dependency on expatriates. Strengthening investment in STEM will also facilitate the contribution of Seychellois PhD graduates to national development.

Identifying appropriate national priorities for doctoral education is typically the focus of national policies, formulated by governments to declare and communicate their focus on national development goals. In the Seychelles, there is no national policy to guide doctoral education in the achievement of national development goals, and this has implications for the value, priority, scholarship and budget allocations for doctoral education.

In many countries, policies for doctoral education are incorporated into national development or education plans. In Japan, research is an explicit priority in its national policy agenda (Jørgensen, 2012a). The South African government announced targets and policies for the growth of PhD graduates, particularly STEM, in its National Development Plan: Vision 2030 (Cloete et al., 2015). The universities and governments of three other African countries, Kenya, Nigeria and Zimbabwe, have formulated respective policies and plans, set higher qualification thresholds for the appointment of university lecturers, and are urging their university lecturers to earn PhD degrees within a specific timeframe (Mashininga, 2013; Nganga, 2014; Tunde, 2008). China and India have also articulated policies, plans and targets for doctoral education, having estimated the future demand for PhD graduates (Cyranoski et al., 2011). These examples clearly demonstrate the position and targets of certain countries with regard to PhD qualifications, from which Seychelles could draw understanding and insights for development of its own policies.

In addition to the lack of national priorities and a national policy for doctoral education, there is also no doctoral plan to outline demand, supply and key national research areas. A

review of the Seychelles' national strategic plan included the National Development Strategy 2016-2020; the Seychelles Sustainable Development Plan 2012-2020; and the Seychelles Education Sector Medium-Term Strategic Plan 2013-2017. None of these refers to doctoral education or any kind of systematic planning for demand, supply and prioritising areas that require PhD degrees. Consequently, PhD graduates pursue research topics aligned with personal interests rather than national priorities, resulting in a misalignment of their expertise with national priorities and employment opportunities.

Almost all participants from the industry group indicated there was no need for more Seychellois PhD graduates. However, participants from the government, university and community stakeholder groups believed more Seychellois PhD graduates were needed to up-skill the labour force and provide the university with expertise. However, the alignment of PhD research topics to national priorities and an appropriate supply of Seychellois PhD graduates for industry, government and community call for a coordinated national development plan.

Several countries have set goals to increase their stock of PhD graduates. China is targeting a 40% increase in doctorates, and Mexico, an increase of 17.1%, while India's goal is to significantly increase its doctorates by 2020 (Cyranoski et al., 2011). South Africa is aiming for 5 000 PhD graduates a year and has included this target in its National Development Plan (Cloete et al., 2015). The supply of PhD graduates internationally has grown exponentially, whereas the job market in academia has declined, leading to an imbalance in supply and demand (Cyranoski et al., 2011). This signals a need for policy makers in the Seychelles to encourage future development of the graduate labour market and plan for the required numbers and research expertise in relevant disciplines. The right mix of doctoral expertise aligned with national priorities will enhance the contribution of PhD graduates to national development.

The next section discusses the limited understanding of the concept of doctoral education, another factor contributing to the state of doctoral education in the Seychelles, as identified by participants.

6.2.2.2 Limited Understanding of Doctoral Education

This study found limited understanding of doctoral education in the Seychelles, that is, poor insight into the knowledge, skills and attributes (or human capital) accumulated from doctoral education. This was evident from stakeholder perspectives of Seychellois PhD graduates. Most PhD participants claimed that the title 'doctor' used to describe both PhD graduates and medical practitioners, confused Seychellois. The data revealed some awareness of PhD graduates having studied a discipline and conducting research, but limited knowledge of the professional skills that equip them to work in non-academic sectors. Generally, understanding of doctoral education was limited to subject expertise and viewed as theoretical.

This misunderstanding is not only specific to Seychelles. Historically, a doctoral degree denoted membership of an elite community of the most learned scholars in various fields of discipline – it was mainly PhD holders who knew what a PhD entailed (Clark, 2006; Noble, 1994; Phillips & Pugh, 2000). Over the years, this perception has not changed much, and despite massification of the degree, PhD remains a mystery to most people.

During the study, most participants from the stakeholder groups frequently referred to PhD graduates as theorists who should be working at the university. This stereotypical view is not only evident in the Seychelles; employers often associate doctoral education with an "ivory tower" view (De Grande, De Boyser, Vandevelde, & Rossem, 2011, p. 1), common among those who are not closely involved in doctoral education. As can be seen from this study, misconceptions of a PhD has implications for recognition and value of the degree, and can lead to unsatisfactory utilisation of knowledge and skills, as well as impacting on sectors of employment for Seychellois PhD graduates.

Limited understanding of doctoral degrees in the Seychelles was also apparent in two public service organisations. The Seychelles National Qualifications Framework, responsible for allocating national qualification levels, awarded a qualification level of 10 to "PhD, Post-doctorate" (Seychelles Qualifications Authority, 2006, p. 10). The term 'doctorate' would have been more appropriate, given that it caters for a broader range of doctoral

qualifications. There was no reference to any other doctoral model such as the professional doctorate (including DBA, EdD). In the National Labour Force Survey Report 2011/2012 the educational classification of 'PhD' was used instead of the term 'doctorate' to represent all doctoral models (National Bureau of Statistics, 2013a, p. 40).

It is evident from the preceding discussion that doctoral education, including the PhD, is still a new concept in the Seychelles. More clarity and better understanding will wield a positive influence on policies, employment, career trajectories, skills utilisation and the value of doctoral knowledge. The next section reviews the inability of Seychelles to offer doctoral programs.

6.2.2.3 Inability to Offer Doctoral Programs

All study participants, both PhD graduates and key stakeholder groups, indicated an interest in the development of doctoral education in the Seychelles. However, SIDS are typically preoccupied with post-secondary and undergraduate education (Crossley, 2011). This is also the case in the Seychelles, where its resources go into undergraduate education, and postgraduate education tends to be under-resourced and overlooked. The development of doctoral education will be beneficial for knowledge production and could have economic and development implications in terms of costs (Academy of Science of South Africa, 2010).

The literature indicates that it takes more than two decades following establishment for a university in a SIDS to deliver PhD programs (Knowledge Transfer Office of University of Mauritius, 2016). A framework for awarding doctoral education (Bates et al., 2011) comprised four components; policies, infrastructure, doctoral management and administration of students, essential prerequisites for readiness to provide and deliver doctoral education. Materialisation of these components requires significant investment, which is unlikely in the Seychelles in the short term. It is more likely that the Seychelles will continue in its tradition of overseas training as a pathway to doctoral education or use the option of online programs.

The strategy of training doctoral students overseas has been adopted in many countries, such as the USA (Altbach, 2004b), China, South Africa, and Japan (Group of Eight, 2013). However, such a strategy carries the risk of a "brain drain", a situation where doctoral graduates do not return to their country of origin following graduation. Those who do are "key to sustaining the growth of a national knowledge-based economy and society" (Maheu et al., 2014, p. 188). Seychelles also suffers from brain drain; having lost at least 12 Seychellois PhD graduates. The next section discusses the third emergent element in this study: the absence of a national PhD graduate register and national PhD graduate induction program.

6.2.2.4 Lack of National PhD Graduate Register and Induction Program

As potential employers, participants from the four key stakeholder groups were unaware of the expertise of the Seychellois PhD graduates. They proposed the establishment of a national PhD graduate register to assist potential employers to access their expertise, including consultancy and advisory services. All four key stakeholder groups expressed an appetite for establishing an accurate and regularly updated register of Seychellois doctoral graduates with contact details and research specialisations. They viewed this as an effective strategy for the Seychelles Government to implement.

The literature on national doctoral graduate registers is scant. In the USA, an annual survey collects data on all recipients of research doctorates from accredited institutions. The census is sponsored by agencies within the National Science Foundation and details educational history, funding sources and post-doctoral plans (National Science Foundation, 2016). In Canada, a similar survey is conducted to determine labour market and mobility plans post-graduation, providing the government with rich data for policymaking. This illustrates that a national register can serve more than just one purpose; the data are also a source of valuable information and statistics that can be used to inform policy decisions.

Almost a quarter of the 24 Seychellois PhD graduates mentioned the challenges they experienced upon returning home from overseas. They recommended introducing a PhD induction program to facilitate the transition from completion of study abroad to gaining

meaningful employment in the Seychelles. The program, to be managed by the Seychelles Government, should include relevant information about career prospects and professional networks for a successful career.

Given that doctoral education is not a national priority, the absence of a national policy and training plan, limited understanding of doctoral education, and the lack of a national register and PhD induction program all have adverse effects on the productivity and contribution of PhD graduates. The next section discusses the second key finding from the analysis, that is, limited support and opportunities for PhD graduates.

6.3 Key Finding 2: Limited Support and Opportunities for PhD Graduates

The second key finding to emerge from this study was the limited support and opportunities for PhD graduates in the Seychelles, which negatively influenced their contribution to national development. Seychellois PhD graduates who returned to the Seychelles felt they received little support from key stakeholder groups and there were limited opportunities for them to use their knowledge and skills.

6. 3.1 Limited Support for PhD Graduates

Limited support for Seychellois PhD graduates was evident from the study, manifesting as poor remuneration; low recognition, little perceived value and support. These factors are discussed in the following sections.

6.3.1.1 Poor Remuneration

The majority of PhD participants in this study believed they were not remunerated commensurately with their PhD qualifications. They were dissatisfied with three aspects: a) the absence of a doctoral salary scale that recognised doctoral qualifications; b) a low scheme of service allowance; and c) salary disparities between local and expatriate PhD graduates.

Government stakeholders confirmed that the national salary scale in the public service did not include an indicative salary for PhD qualifications, claiming it was the position rather

than the incumbent's qualification level that determined the salary. In 2013, the Seychelles Government approved a Scheme of Service for Policy Analysts with the objective of improving the income of Seychellois PhD graduates. In the Seychelles, a scheme of service is a document that outlines hierarchical career progression levels with corresponding education and salary scales (Appendix Q). This document stated: "holders of doctorate qualification in related subjects… are entitled to Seychelles rupees 2000 (equivalent to around 200 US Dollars) monthly allowance, inclusive of tax" (Department of Public Administration, 2013, p. 5). This means doctoral holders receive a small allowance in addition to their salary in recognition of their specialised skills and expertise. The allowance differed by SR600 (equivalent to about 50 US Dollars) from the monthly allowance allocated to Master degree holders. None of the 24 PhD graduates benefited from the scheme of service.

The study showed that Seychellois PhD graduates were poorly remunerated compared to their expatriate counterparts. The majority of Seychellois PhD graduates complained about inequities in salaries of Seychellois and expatriate PhD holders, despite engaging in similar tasks. This scenario angered some of the Seychellois PhD graduates to the point where they sought alternative, more highly paid employment, even though they were unable to make full use of their disciplinary knowledge.

Human Capital Theory (Becker, 1993) advocates a salary premium commensurate with educational qualification. The higher the qualification, the higher the expected productivity and earnings. However, aside from qualifications, several other factors influence the salaries of PhD graduates, including field of study, experience, performance, job specificities, demand and supply of PhD graduates and the employment sector. A PhD qualification is therefore one, but not the only determinant of remuneration. Auriol et al. (2013) pointed to three key factors affecting the wage scale of PhD graduates. These included PhD field, choice of occupation and specific work location, suggesting that remuneration is influenced by a variety of factors. It is for this reason that PhD graduates who wish to earn a high wage should consider aligning their research topics with their choice of employment. The second

aspect of limited support for PhD graduates is evident from the low recognition, value and support they receive, further discussed in the next section.

6.3.1.2 Low Recognition, Value and Support

More than half the Seychellois PhD graduates felt their performance and expertise were neither recognised nor valued. They believed their employers and key stakeholders did not recognise their work through public praise or value their expertise and performance, and found them unsupportive. The others (mainly those who studied biological sciences) claimed their knowledge and skills were relevant to their occupations and in high demand; and as a result, they were pro-actively conducting, publishing and promoting their research and achievements. This group felt their work was being recognised and appreciated by the public particularly where research topics aligned with national priorities.

The literature indicates PhD graduates are internationally recognised and valued for their knowledge and skills. For instance, a study of six developing African countries; Kenya, Cameroon, Nigeria, Benin, Senegal and Rwanda found that PhD was highly recognised in those countries, although the outcomes were not well understood (International Association of Universities and the Catalan Association of Public Universities, 2012). The USA prides itself on its doctorates for national prosperity (Council of Graduate Schools and Educational Testing Service, 2012). In the UK, holders of postgraduate qualifications and doctorates are relied upon by businesses and the public sector as a highly valued resource, without whose participation, competitiveness would be lost (Clarke, 2014; A. Smith et al., 2010). In a review of doctoral skills in the UK, Leitch (2006) described PhD graduates as having the ability to provide significant returns to individuals, employing organisations and the economy. He argued that these high-level skills are key drivers of growth, innovation, entrepreneurship, management, leadership, research and development. It is therefore not surprising that PhD graduates in these countries are recognised and valued because of the benefits they bring to organisations and national development.

This research also revealed a lack of research support for Seychellois PhD graduates. For example, those in science disciplines and government departments had inadequate access

to equipment and infrastructure for conducting scientific research. PhD graduates in leadership positions in government had no time available to undertake research or publish – these were not part of their prescribed duties.

Seychellois PhD graduates expected to be recognised and valued for their PhD knowledge, skills and performance, and to derive certain benefits, such as greater earning capacity, high probability of employment, and having opportunities to contribute to the public good (Becker, 1993; Group of Eight, 2013). However, about half the 24 PhD graduates ascribed their negative post-PhD experiences to a lack of acknowledgement of their expertise, low earnings that did not reflect their PhD qualification, and negligible access to senior employment opportunities in their respective disciplines.

Key stakeholder groups anticipated PhD graduates would be innovative, perform with excellence, demonstrate their talents more publicly, and distinguish themselves from Master and undergraduate degree holders. However, their expectations were largely unmet, leading to the supposition that PhD qualifications were motivated by personal prestige rather than national interests. Seychellois PhD graduates believed they could optimise their productivity and contribution to national development if stakeholder groups recognised their expertise, valued their performance, and supported them in their research and publishing.

Limited support for Seychellois PhD graduates was associated with poor remuneration and little recognition. It is clear that the expectations of the Seychellois PhD graduates and key stakeholder groups were incongruent and needed to be reconciled in order to address the weaknesses and improve the environment. The following section discusses the limited opportunities for Seychellois PhD graduates in a SIDS context.

6.3.2 Limited Opportunities for PhD Graduates

This study revealed limited opportunities for Seychellois PhD graduates working in the country. Participants encountered limited employment and advisory services; a lack of post-doctoral positions and start-up incubator projects; and a dearth of networking opportunities.

6.3.2.1 Limited Employment and Advisory Opportunities

The perception of most Seychellois PhD graduates regarding employment and advisory opportunities in the public service emanated from current recruitment and selection procedures, the limited employment in academia and research, and limited consultancy opportunities for local PhD graduates.

About a quarter of the Seychellois PhD graduates believed they were not considered favourably for positions requiring a PhD qualification. They held the view that their prospects of gaining senior employment positions in the public sector were limited due to a lack of transparent recruitment and selection procedures. Conversely, some stakeholder participants identified several areas that needed the expertise of Seychellois PhD graduates. For example, the department responsible for the Blue Economy confirmed there was a demand for research in various aspects of the Blue Economy and aquaculture portfolios; and the National Institute for Science, Technology and Innovation stated a need for research in biotechnology. However, these two institutions had not advertised the positions, so PhD graduates were unaware that opportunities existed in fields that required their expertise. This disconnect signals a need for transparent dissemination of research and employment opportunities.

In this study, access to employment opportunities in the public service appeared to be influenced by politics. This is supported by the findings of a study conducted in the Seychelles by Philpot et al. (2015) that identified "political cronyism", described by one participant as follows: "in the Seychelles… it's not what you know but who you know… jobs are given to political affiliates rather than the most able candidates" (p. 40). This sentiment echoes the views articulated by some participants in this study, and is also consistent with a report by Everest-Phillips (2014) which indicated that appointments to senior positions in the public service in SIDS are influenced by politics. Political influence could therefore restrict employment opportunities for Seychellois PhD graduates, and in turn, impacts on their contribution to national development.

Employment opportunities in academia in the Seychelles are also limited, given that there is only one small university offering a small range of undergraduate and Master degree programs. The university employs a small number of academics in specific teaching areas. Of the 22 Seychellois PhD graduates who were employed, only three found work at the university; the remainder were employed in non-academic sectors. The proportion of Seychellois PhD graduates employed outside academia (86.3%) is aligned with Germany, where 90% of PhD graduates work outside higher education (A. Mertens & Röbken, 2013), and in Portugal, where 76.4% PhD graduates work outside academia (Auriol, 2007). These employment statistics suggest non-academic sectors are benefitting from a doctoral workforce, thereby stimulating national development.

Almost all Seychellois PhD graduates felt the university, industry and government stakeholder groups did not provide adequate access to consultancy opportunities. A preference for expatriates caused discontent among Seychellois PhD graduates. The stakeholder groups were of the view that Seychellois PhD graduates should compete with expatriates and demonstrate their competency for consultancy work. However, Seychellois PhD graduates believed they should be given priority over expatriates in view of their local expertise and knowledge that gives them a competitive edge. Nonetheless, expatriates were used more frequently for their international experience, and the prevailing attitude in the Seychelles tended to favour them for consultancies.

Almost a quarter of the Seychellois PhD graduates believed opportunities to serve on public-sector advisory boards and committees were limited and highly selective. About half of the Seychellois PhD graduates already held committee or board memberships; the rest expressed a desire for opportunities to advise corporate boards and serve in relevant forums. Most participants from the community stakeholder group felt PhD graduates showed little interest in volunteering to train and source research funds for non-governmental institutions. The community group was receptive to receiving assistance from PhD graduates in view of their research expertise and encouraged them to volunteer their services.

Almost all industry participants acknowledged that they did not engage with Seychellois PhD graduates with regard to employment. They believed PhD graduates were more effectively employed in the university and government sector. However, university-industry partnerships are regarded as an effective way to promote employment and career opportunities that could enhance the contribution of PhD graduates. International studies on engagement and collaboration of key stakeholder groups in doctoral education recommended greater engagement and collaboration, particularly between the university and industry (Borrell-Damian, 2009), among industry stakeholders, between the university and government (Etzkowitz & Leydesdorff, 2000), and amongst universities (Jørgensen, 2012b). In the UK, cooperative proposals are developed between higher education providers and industry, with employers and learners consulted on workforce policies and strategies to enhance the employability of PhD graduates (de Weert, 2011). These networking initiatives are exemplary, and will enable dialogue on research priorities, facilitate multidisciplinary research, and encourage collaboration between stakeholders and PhD graduates.

Collecting data from the four key stakeholder groups fostered awareness of Seychellois PhD graduates, their value and potential. As a result, some of the key stakeholder participants expressed a willingness to collaborate with Seychellois PhD graduates on research consultancies, advisory services, PhD student internships and employment. The following section synthesises the lack of opportunities available to Seychellois PhD graduates.

6.3.2.2 Lack of Post-doctoral, Start-ups and Networking Opportunities

The study identified three contributors to a lack of opportunities for Seychellois PhDs: a) post-doctoral positions; b) start-up programs; and c) networking opportunities. They are discussed below in further detail.

Post-doctoral positions were not readily available in the Seychelles. This could be for a number of reasons, including the early stages of research culture and university education, the state of doctoral education, and the high employment rates of Seychellois PhD graduates in other sectors. Post-doctoral opportunities typically exist in research-intensive universities that need additional support for research projects. Such opportunities also arise in some

industry, government and non-profit organisations, and as the number of Seychellois PhD graduates increases, the need for post-doctoral opportunities will grow.

In many countries, private companies, public entities and universities sponsor start-ups and incubator programs with the objective of setting up fledgling businesses by providing support in the form of financial and technical services. Support can take the form of office space, professional or financial services to help achieve long-term success. Europe, the USA and Australia have established incubator programs as a vital part of their innovation agendas. Post-doctoral and incubator programs represent useful opportunities, yet one Seychellois PhD graduate had been unsuccessful in accessing national support for a start-up.

The Seychellois PhD graduates were eager to network with their peers and stakeholders on joint projects, brainstorming and developing innovative ideas. In order to develop this community of research, they proposed government and university assistance to establish a networking forum. They were also keen to establish an association or doctoral group on social media to build and strengthen collaboration. Academic social networking platforms such as ResearchGate, Academia.edu, and LinkedIn, have gained in popularity in recent years. ResearchGate offers researchers the option of uploading journal articles and conference papers into an online repository and promotes academic community interaction. Academia.edu is a similar resource that allows users to create a personal profile, upload academic papers, and follow and interact with other researchers. LinkedIn is also a useful tool for boosting online presence and allows one to disclose research interests and accomplishments, promote research in general and form professional connections. These low-cost networking platforms can help to create a personal identity and brand, disseminate research findings and connect with researchers worldwide. They present Seychellois PhD graduates with valuable avenues for networking.

The second key finding highlighted the limited support available to Seychellois PhD graduates including limited employment and advisory opportunities, lack of post-doctoral positions, start-up projects and networking opportunities. These factors all played a role in

limiting their contribution to national development. The third key finding, the underutilisation of PhD graduates' expertise is discussed in the next section.

6.4 Key Finding 3: Underutilisation of PhD Graduates' Expertise

The third and final key finding was the underutilisation of PhD graduates' expertise, conceptualised from two factors: a) the mismatch of knowledge and skills of PhD graduates to their occupations; and b) limited contribution from Seychellois PhD graduates.

6.4.1 Mismatch of Knowledge and Skills of PhD Graduates to their Occupations

The Seychellois PhD graduates had expertise in the following disciplinary fields: education, languages, biological sciences, physics, chemistry, economics, finance and engineering. They had the potential to drive research and innovation in these fields by contributing specialised knowledge. However, these disciplines did not include tourism, fisheries and the blue economy, central to the Seychelles government's national development goals, signaling a mismatch between doctoral research disciplines and national goals.

Most of the skills acquired by the Seychellois PhD graduates were consistent with the literature on core competencies of PhD graduates and the knowledge and skills identified in the UK's Research Development Framework (Durette et al., 2016; Platow, 2012; Vitae, 2010). When properly utilised, the knowledge and skills derived from doctoral studies, or human capital, can enhance national productivity.

In addition to disciplinary knowledge, Seychellois PhD graduates indicated they had also acquired planning, communication, decision-making and critical thinking skills. Service-based industries, such as tourism and manufacturing, emphasised the need for greater technical and practical expertise in their sectors. They also stressed the requirement for Seychellois PhD graduates to possess a wide range of technical and generic skills for employment in non-academic sectors. This supports the international call for more generic skills to enhance employability of doctoral graduates (Halse & Mowbray, 2011; Young & Chapman, 2010).

About a quarter of the 24 Seychellois PhD graduates expressed disappointment with industry, government, and university stakeholder groups for not making better use of their disciplinary expertise. Given support and opportunities, they believed they could contribute more. A study on South African PhD graduates following their return home from overseas training reported on the difficulties they encountered translating their knowledge and skills. This was attributed to inherent factors in developing countries, such as limited funding for research, inadequate policies, and limited access to employment opportunities (Harle, 2013).

Approximately half of the 24 Seychellois PhD graduates were employed in positions aligned with their disciplines. The other half felt they were not making full use of their specialist knowledge and mainly drew on their generic skills in the workplace; expressing a desire to use both disciplinary knowledge and generic skills.

A mismatch between PhD graduates' knowledge and skills and their jobs also occurs in other countries. For example, Schwabe (2011) found a misalignment between the competencies of Austrian PhD graduates and their employment roles. Herman (2011) discovered that South African PhD graduates were underutilised; and Vedder (2011) reported on a large number of American PhD graduates who had secured low-level occupations that did not require a PhD or employment germane to their discipline.

Human Capital Theory (Becker, 1993) advocates utilisation of higher-level knowledge and skills in employment for higher productivity in the workplace. In view of their in-depth, specialised knowledge, the Seychellois PhD graduates expressed a preference for employment in their respective disciplinary areas, with the goal of becoming "stewards of their disciplines" (Golde & Walker, 2006, p. 9). The findings suggest that where the expertise of PhD graduates align with their occupations they are inclined to be more productive, and by extension, generate enhanced output and contribution.

Almost half the Seychellois PhD graduates, particularly in the biological sciences, were satisfied with the utilisation of their disciplinary knowledge, having found relevant employment. Satisfaction was derived from the opportunity to work in their field of

specialisation, utilise their knowledge and advance research in their discipline. The rest were displeased with different aspects of their circumstances, such as poor employment conditions, low remuneration, and lack of opportunities to use their disciplinary knowledge. They felt undervalued and unacknowledged for their work. Less than a quarter of the Seychellois PhD graduates felt marginalised and had unfulfilled expectations, and it is probable that their negativity affected their productivity.

PhD graduates and stakeholder participants alike regarded the underutilisation of Seychellois PhD graduates as a barrier to their contribution to national development. Several areas of contribution were identified, for example, national think tanks, high-level technical committees and corporate boards; advice to politicians; and presentations to school students. Both PhD graduates and stakeholder participants were of the view that PhD graduates could engage more in activities that contributed to the development of the Seychelles.

The knowledge and skills of slightly more than half the Seychellois PhD graduates did not correspond with their employment and a misalignment that deterred engagement for Seychellois PhD graduates and represents missed opportunities to build human capital for the benefit of the nation. The following section discusses the limited extent of the contribution of Seychellois PhD graduates.

6.4.2 Limited Contribution of PhD Graduates

The final section of this chapter discusses the contribution of Seychellois PhD graduates, including their roles and accomplishments.

It was evident from the findings that Seychellois PhD graduates made a limited contribution to national development in the Seychelles. Their contribution was mainly through the roles they occupied; leadership, consulting, advising, teaching and research, where they set a positive example for colleagues and staff and made a beneficial difference in the workplace. These contributions are discussed under three key thematic findings.

The contribution of the Seychellois PhD graduates was limited due to three main barriers associated with the lack of readiness in the Seychelles for doctoral education; limited support for PhD graduates; and underutilisation of PhD graduates' expertise. Stakeholder participants observed modest contribution from PhD graduates to national development. They were of the view that Seychellois PhD graduates did not sufficiently demonstrate or promote their skills and expertise. The misalignment of PhD graduates' expertise with employment positions and national priority areas also highlight lost opportunities.

Less than a quarter of the Seychellois PhD graduates contributed to consultancies on the development of Seychelles, providing specialist knowledge to national and international institutions and organisations. Those who worked as national consultants were aiding the growth of local capacity and reducing the country's dependence on expatriates. Some PhD graduates contributed their expertise as members of high-level national committees and corporate boards, and believed they have been appointed on these committees on the strength of their PhD degrees.

Those Seychellois PhD graduates engaged in teaching imparted their knowledge and skills to their students. They taught and mentored Master degree, undergraduate and diploma students, thereby helping to prepare the next generation of PhD graduates and professionals. The contribution and impact of PhD graduates (Halse & Mowbray, 2011) is measured globally by the number of research projects and corresponding publications and citations in high-impact journals. Some (12) Seychellois PhD graduates contributed by publishing articles in overseas academic journals post-PhD.

PhD graduates who investigated topics relevant to the Seychelles claimed they received little support from employers and authorities to apply their research findings and recommendations. Opportunities to translate their research findings, particularly since they were case studies of the Seychelles, would have gone a long way towards addressing national problems.

Applying their expertise in their employment positions presented difficulties for Seychellois PhD graduates. About two thirds believed they could optimise their contribution under more

favourable conditions, such as less burdensome administrative workloads, a better match between their expertise and employment, and greater support and collaboration with the four key stakeholder groups.

The 24 Seychellois PhD participants were confident that the local stock of research expertise and high-level generic skills built national capacity in the Seychelles. These graduates believed they could enhance the reputation of both the university and the Seychelles using their doctoral expertise, and reduce reliance on foreign expertise, estimated at around 25% of the national workforce in 2010 (Agency for National Human Resource Development, 2015).

It is evident from the data that Seychellois PhD graduates made a limited contribution to national development, and did so mainly by improving organisational output and using their strategic thinking and decision-making skills in leadership and management positions. These roles produced spillover benefits through shared knowledge with colleagues and subordinates, and improved productivity and outcomes in the workplace.

The contribution of Seychellois PhD graduates was limited in three sectors of the economy – government, industry and community (non-profit organisations), however, was greatest in the government sector including the university, where more than half the 24 graduates were employed. Industry and non-profit organisations also benefitted from the services of Seychellois PhD graduates. Achievements of PhD graduates were more apparent in the biological sciences, where they demonstrated their expertise in the conservation of endangered species and sustainable management of natural resources. The education sector was also reaping benefits from a cohort of Seychellois PhD graduates who were translating the recommendations from their research into practice. It took longer to translate theoretical disciplinary knowledge into practical applications in fields of research such as economics, banking and engineering, which required new legislation and adaptation to the Seychelles context.

Seychellois PhD graduates also contributed to national development through publications in international peer-reviewed journals, books and documentaries on nature conservation and

the protection of endangered local species that shone a spotlight on the Seychelles. The development of electricity tariffs for consumers and establishment of the Bureau of Standards to promote standardisation and calibration of instruments with facilities for testing commodities, were all beneficial to society. Seychellois PhD graduates also worked as national consultants to identify solutions to problems, helping to minimise expenditure and dependence on expatriate consultants. These achievements had positive socio-economic effects in the Seychelles. In addition, the Seychellois PhD graduates were also contributing through their generic skills.

Overall, the contribution of Seychellois PhD graduates was limited due to the challenges of a SIDS context and country's lack of readiness, inadequate support, limited collaboration between PhD graduates and stakeholder groups, and underutilisation of their skills and expertise. In contrast, the achievements of PhD graduates in developed countries with research-intensive institutions, such as the USA, the UK and Germany, include breakthrough scientific research afforded by their expertise and accessibility to funds and facilities for innovation.

6.5 Summary

This chapter presented the three key findings that emerged from the data: a) Seychelles' lack of readiness for doctoral education; b) limited support for Seychellois PhD graduates; and c) underutilisation of Seychellois PhD graduates. It provides an insight into the issues that led to the findings and presents initiatives to address them in order to maximise the contributions of PhD graduates. In comparing these findings to the literature, it is apparent that some of the challenges faced by Seychellois PhD graduates are similar to those internationally, particularly employment and career opportunities and utilisation of PhD skills. Other findings are specific to the Seychelles context, mainly due to the constraints of SIDS, the early stages of doctoral education and research development, the absence of a national policy and plan for doctoral education, and misalignment of PhD graduates' expertise to national priorities. It is evident that doctoral education in the Seychelles has not been given due attention by policy makers, and there is a lack of awareness of the potential

benefits of this human capital to national development. The study suggests value in the government of Seychelles taking a strategic role in steering doctoral education towards addressing national priority areas.

In general, the study revealed that Seychellois PhD graduates contributed to national development, but were constrained due to prevailing challenges. The need for appropriate strategies to assist Seychellois PhD graduates maximise their contributions to national development was emphasised. Identifying national priority areas for the creation of new knowledge and alignment of PhD research is also a priority. As the knowledge economy grows, it is anticipated that more occupations and careers requiring doctoral expertise will emerge and the country will need to respond accordingly to unlock the potential of its local human capital.

In conclusion, about a quarter of the Seychellois PhD graduates appreciated this study for allowing them a voice to express their views. They found the interview and online questionnaire inspiring and they were encouraged to reflect on their contribution to national development.

Chapter seven draws together the findings from this research and make recommendations for maximising the contributions of Seychellois PhD graduates to national development.

Chapter Seven: Conclusions and Recommendations

7.1 Introduction

Chapter six discussed the key findings of this research, including the perceived contributions of Seychellois PhD graduates and the conditions necessary for enhancing their contributions to national development. This chapter provides a brief overview of the study, followed by the responses to the research questions, presents recommendations and states the main limitation of the study. It proposes three strategic initiatives that will facilitate the contributions of PhD graduates to the national development of the Seychelles, and concludes with implications for further research.

7.2 Overview of the study

This study provided an insight into the knowledge, skills and contributions of Seychellois PhD graduates, and recommends initiatives to maximise their contributions to national development. Insights were derived from the perspectives of Seychellois PhD graduates and four key stakeholder groups: the university, industry, government and community (non-government organisations) in the Seychelles. The research adopted a case study design and four data collection methods: online questionnaire, interviews, focus groups and document analysis to gather the required data. In total, 53 participants comprised of 24 Seychellois PhD graduates and 29 representatives from four key stakeholder groups shared their views and experiences.

The data reflects Seychellois PhD graduates' contributions through the lens of five employment roles and personal accomplishments. Roles that contributed to national development included organisational leadership, consultancy work, advisory services, teaching and academic development, conducting research and publishing. Tangible achievements were evident in areas of sustainable management of natural resources, improvements in education, and the creation of national institutions in the Seychelles. All four key stakeholder groups believed their respective sectors benefitted from the varied

contributions of Seychellois PhD graduates, although they were of the view that the gains were limited.

The key findings also highlighted the constraints perceived to have a negative influence on the contributions of Seychellois PhD graduates to national development. These included the adverse impact of the country's context as a SIDS and the absence of a national policy and doctoral training plan, resulting in a lack of readiness to optimise the expertise of Seychellois PhD graduates. In addition, there was limited support available and little collaboration between stakeholder groups and the Seychellois PhD graduates, who felt poorly remunerated for the skills and knowledge they hold.

Three strategic initiatives are proposed to respond to the findings. The first is formulation of a national strategy to improve the country's readiness for doctoral education. Second is more support for PhD graduates to encourage and enhance their contribution to national development. The third is alignment of Seychellois PhD graduates' expertise with employment opportunities, including a more positive, hands-on approach to demonstrate their capabilities. While some initiatives can be implemented in the short term, others will need medium to long-term timelines in view of the required resources. The success of these initiatives is dependent on a national policy and partnership between Seychellois PhD graduates and the four key stakeholder groups.

7.3 Research Results

Analysis and further synthesis of the data from this research generated three key results: a) the Seychelles was not ready to optimise on doctoral education; b) there was limited support for Seychellois PhD graduates; and c) the knowledge and skills of Seychellois PhD graduates were not being utilised optimally. The data also established a demographic profile of the current Seychellois PhD graduates. The results are elaborated in the responses to each of the three research questions, and concluding with the main research aim.

7.3.1 Research Question One

To what extent do Seychellois PhD graduates perceive that their knowledge and skills acquired from their PhDs have been utilised for national development?

The study exposed varied contributions to national development by Seychellois PhD graduates. Almost half the PhD graduates were satisfied in their jobs, believing they were translating their expertise into their current employment and making a significant contributing to national development. This group was primarily in the biological sciences. These Seychellois PhD graduates believed their doctoral capital was actively benefitting their respective workplaces through their roles and accomplishments, and the training they imparted to their work colleagues.

However, more than half the Seychellois PhD graduates were dissatisfied with their post-PhD experience. They felt the employment environment did not provide appropriate support and opportunities, thereby limiting their contribution to national development. They regarded the misalignment of their occupations to their skills; low remuneration; political influence; and onerous managerial duties as barriers to research and publishing, and believed their contributions could be enhanced through better alignment of their knowledge and skills with their employment positions. Areas for potential contribution for Seychellois PhD graduates included participation in national discourses and high-level debates; provision of advice on high-level corporate boards; and participation on public sector committees to provide input into government policies.

Almost all Seychellois PhD graduates expressed a preference for employment that utilised their disciplinary knowledge rather than their professional skills. However, since some of these positions did not offer the desired remuneration, some PhD graduates sought alternative employment with higher salaries where they could make extensive use of their professional skills. In these instances, PhD graduates felt their contributions were minimised because their specialist knowledge was underutilised. While there was evidence to indicate that some PhD graduates were satisfied and considered themselves to be sharing their

expertise and fully contributing to national development, the data highlights an overall perception of underutilisation.

Most Seychellois PhD graduates acknowledged they could do more to promote their expertise and augment their contribution to national development. A few were critical of their self-imposed 'isolation' and reluctance to demonstrate their expertise to the wider public. The views of the four stakeholder groups mirrored these reflections unanimously. They believed PhD graduates should be more visible in the public arena and needed to distinguish themselves from lower-level graduates through greater contribution to national development.

Overall, the participants' views were consistent with Seychellois PhD graduates in relation to improving their contributions for national development. Alignment of Seychellois PhD graduates' knowledge and skills with the national needs of the country through targeted employment and advisory opportunities was emphasised. The stakeholder groups also acknowledged that they could engage more and effectively use the expertise of Seychellois PhD graduates.

7.3.2 Research Question Two

How do key stakeholder groups engage with Seychellois PhD graduates to maximise the use of their knowledge and skills?

The study showed limited engagement by the four stakeholder groups with Seychellois PhD graduates. This manifested as limited financial assistance or employment of PhD graduates.

The government stakeholder group provided PhD scholarships (full and partial) to almost half the cohort. The government group also employed half the Seychellois PhD graduates, mainly in leadership positions, where they provided specialist advice to committees and corporate boards.

Other than employing three Seychellois PhD graduates as a research administrator and senior staff members, the university group had limited engagement with Seychellois PhD

graduates. At the time of this study, the university had recruited fewer (3) local PhD graduates than expatriates (7), attributed to a mismatch between the disciplines of the Seychellois PhD graduates and the training needs of the university. Nevertheless, during the research interviews both the university participants and the Seychellois PhD graduates working outside the university expressed keen interest to engage in future research projects.

The community group had limited but active engagement with about a third of the Seychellois PhD graduates, particularly those (7) in the biological sciences discipline. They used their knowledge and skills to prepare grant applications for research projects, and for consultancy and training services. Some provided services on a voluntary, pro bono basis, and others were entrepreneurial, having established non-profit organisations. During the interviews, community participants appealed for greater engagement and collaboration from Seychellois PhD graduates.

The industry group was the least engaged of the four stakeholder groups, with only one PhD graduate employed by this group. Industry participants were unaware of Seychellois PhD graduates' skills and potential. They had no knowledge of them or their expertise, and did not know how to support or contact them. They believed PhD graduates were overqualified for industry and better suited to academic life in the university or in government. Industry group participants focused on recruiting the best candidate for their employment needs, without preference for PhD qualifications. They felt the practical nature and small size of their businesses did not require doctoral graduates, and they could not afford to employ them. However, during the research interviews, two participants stated they were better informed and prepared to consider engaging the services of Seychellois PhD graduates on a consultancy basis in the future.

The stakeholder groups encouraged Seychellois PhD graduates to be more proactive about demonstrating their expertise and seizing opportunities for greater contribution to national development. Seychellois PhD graduates urged stakeholder groups to be more engaged in doctoral education by supporting them and providing more opportunities to better utilise their knowledge and skills.

7.3.3 Research Question Three

What are the key elements of doctoral education that could help contribute towards the development of a country?

Three of the four stakeholder groups (university, government and community), as well as the PhD graduates, believed the skills derived from completing a PhD were relevant for building national research capacity, and ultimately, the country's development. Participants from the industry stakeholder group were unable to provide insights into this question because their understanding of doctoral education was limited to a stereotypical academic view of research. However, they raised concerns about the way in which PhD candidates selected their PhD topics based on personal preferences, and emphasised the need to align PhD research with sectoral needs and applicability in the Seychelles context.

Seychellois PhD graduates were unanimous about using their PhD knowledge and skills to promote national development and recommended the alignment of PhD research topics with national priority training areas. They also proposed PhD internships in industry to improve the outcomes of doctoral education, employability of PhD graduates, and the relevance of doctoral education to the labour market.

All Seychellois PhD graduates found that completing a PhD helped improve their analytical and creative thinking skills, confidence, resilience, decision-making based on evidence, and the use of appropriate methodological approaches in their work. In particular, the disciplinary knowledge, research training and professional skills acquired were useful for career development within and outside academic sectors.

Most participants found research, generic skills and disciplinary knowledge to be the main aspects of doctoral education of value for national development. They emphasised that alignment of research topics with sectoral needs and national development goals was vital to facilitate their contribution to national development.

7.3.4 Main Research Aim

Generated insights on how Seychellois PhD graduates' contributions to national development can be maximised from a study of the perceptions of key stakeholders.

This study unveiled several constraints that diminished the contribution of Seychellois PhD graduates to national development. The main constraint was the unpreparedness of the country for doctoral education, due to limited understanding of doctoral education; the absence of doctoral education in national development plans; lack of a national priority, national policy and training plan for doctoral studies; and the absence of supportive structures and a salary scale for doctoral qualifications. Formulation of a national strategy comprising a well-articulated national policy and training plan on doctoral education; specifying PhD graduate quotas, national priority research fields, and conditions favourable for Seychellois PhD graduates, was considered essential. It is likely that improved conditions will enable Seychellois PhD graduates to strengthen their contribution to national development.

The limited support afforded Seychellois PhD graduates also inhibited their contribution to national development. Almost half the 24 PhD graduates felt their work was not recognised or valued. There were complaints about poor remuneration that was below the expectation for a doctoral qualification and lower than the salaries of expatriate PhD holders. Improved working conditions, including performance-based remuneration to better reward Seychellois PhD graduates would go a long way towards addressing the issues raised by Seychellois PhD graduates. It would provide motivation to stimulate productivity, and incentivise them to be engaged. The limited engagement and collaboration between PhD graduates and the four key stakeholder groups uncovered by this research signals a need for coordinated national strategies and policies to promote and enhance synergies between them. Collaboration will provide fertile ground for ongoing engagement, from which will flow gradual appreciation of the value of PhD graduates, particularly the locals, who bring with them not only their specialist knowledge and skills, but also an innate knowledge and understanding of the local culture and environment.

Finally, the misalignment of the Seychellois PhD graduates' knowledge and skills with relevant employment and national advisory opportunities was a further impediment. Proponents of the theory of human capital advocate that proper use of knowledge, skills and employee attributes contribute to greater productivity, in turn, yielding greater economic returns. Matching the skill sets of Seychellois PhD graduates to relevant opportunities and employment would not only place them in their element, but also give them a forum for demonstrating their capabilities as experts in their respective fields.

In summary, this study revealed a lack of readiness for doctoral education in the Seychelles, characterised by limited engagement, collaboration and support for PhD graduates, and underutilisation of their expertise. As a result, the contribution of the 24 Seychellois PhD graduates to national development in the Seychelles was limited. Figure 9 shows the three key causes of the Seychellois PhD graduates' limited contribution to national development, as identified by the research findings and represented by the downward arrow.

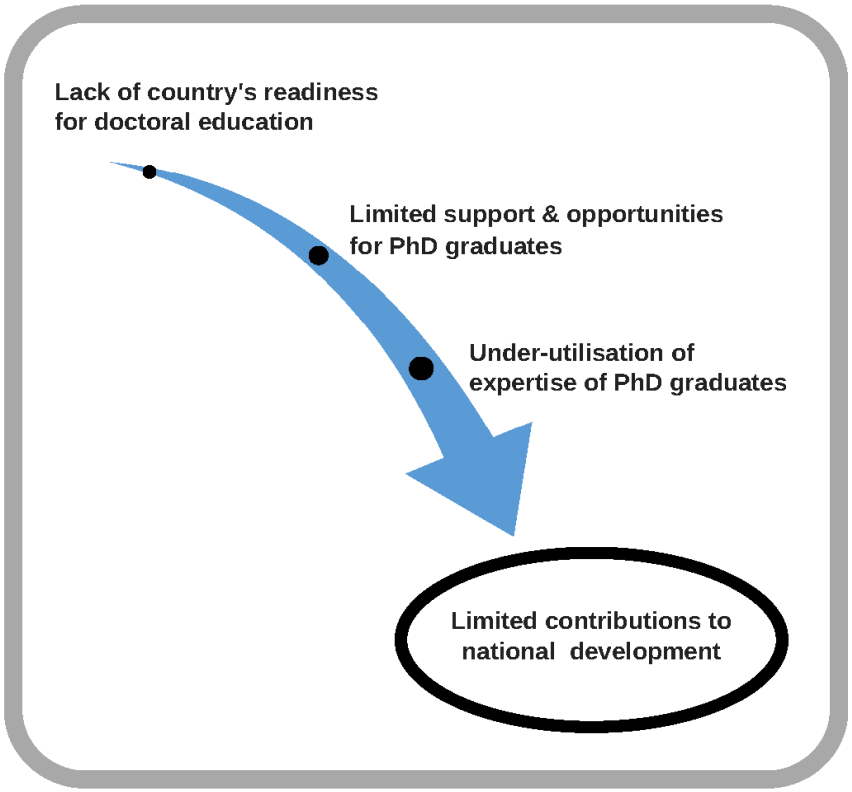

Figure 9: Key Research Findings

This exploratory study provides a glimpse into the context and issues preventing the contribution of Seychellois PhD graduates to national development. It presents a countrywide and cross-disciplinary perspective of the PhD graduates, as compared with existing international studies that focus on specific PhD disciplines and research fields. In this way, these three key findings from this national study add to the existing knowledge of the contributions of PhD graduates. The study exposed the potential for Seychellois PhD graduates to increase their contribution to national development. The findings highlight the importance of favourable conditions to facilitate the contribution of doctoral graduates, through national policy; a doctoral training plan; commensurate remuneration for doctoral qualifications; and appropriate resources to support academic and professional activities.

This study supplements the paucity of research on doctoral education in SIDS, and contributes to understanding and awareness of the complexity of the context, the cultural setting, vulnerabilities and lack of resources that impinge on the contributions of PhD graduates to development of the Seychelles. This case study recommends three initiatives for maximising the contribution of PhD graduates to national development in the Seychelles, and possibly other countries at a comparable stage of development. This research expands the existing literature on the contribution of PhD graduates post-graduation.

7.4 Limitations of the Study

The main limitation of this study was the timing of data collection. Data were collected in the first half of 2015, which coincided with an unexpected ministerial reform in the Seychelles. The reform resulted in a re-organisation of the Cabinet of Ministers, transfer of portfolio responsibility for some senior public service officials, and an imminent presidential election. The political and public service environment was unstable and potential interviewees were uncertain about their new portfolios. Consequently, a few important interviewees were unable to participate in the study. The availability of these interviewees could have enriched the data collection and the research findings.

7.5 Recommendations

In response to the three key findings, this study has identified three initiatives to facilitate greater contribution by Seychellois PhD graduates to national development: a) formulation of a national strategy for doctoral education, driven by the Seychelles Government; b) support structures for Seychellois doctoral graduates; and c) alignment of knowledge and skills with employment (Figure 10). The following three initiatives, individually and in combination, would facilitate an environment for current and future PhD graduates to maximise their contribution to national development.

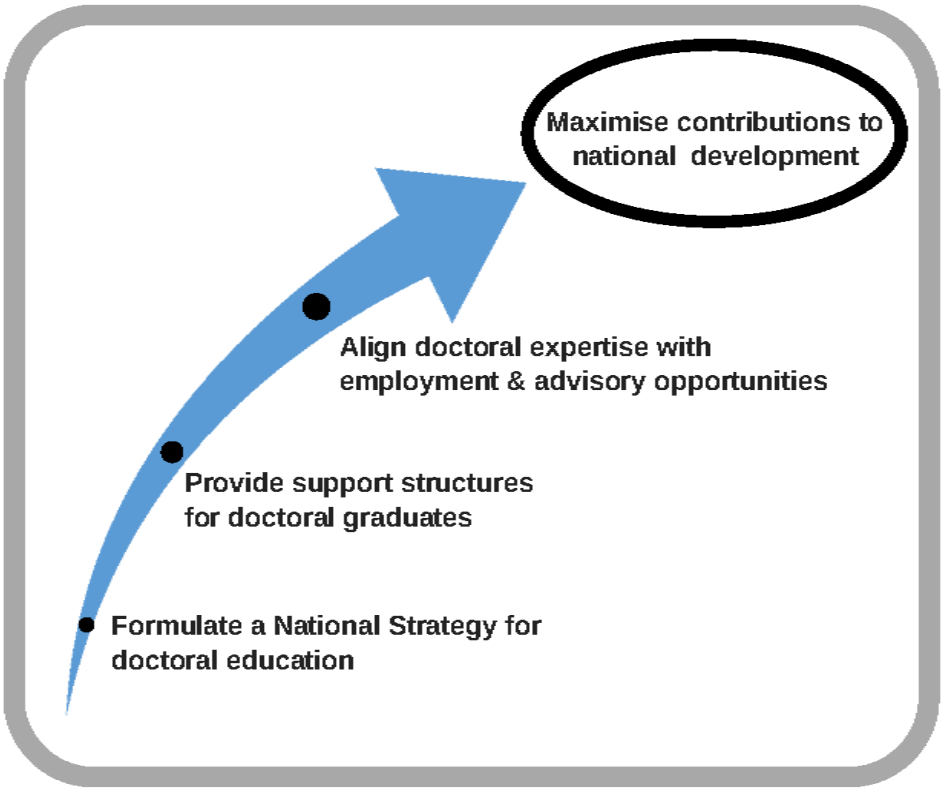

Figure 10: Initiatives to maximise PhD graduates' contributions

7.5.1 Formulating a National Strategy for Doctoral Education

The first key finding of this study was a lack of readiness to benefit from Seychellois PhD graduates. A national strategy for doctoral education will help to address this issue and allow

the Seychelles to benefit more from its graduates. This could be linked with national plans for numerous sectors, particularly education and national human resource development, to help drive national development. A national strategy will also provide a national action plan for capacity building and minimise employment of expatriates. Formulated in partnership with key stakeholder groups, a national strategy will forge engagement and collaboration, boosting outcomes for all.

A national strategy will need commitment from the Seychelles government to formulating a comprehensive national policy for doctoral education. This will need to include scholarships criteria and funding allocations; a career progression scheme for researchers; a strategic plan documenting national priority research areas; creation of a national PhD graduate register; and an induction program. The policy should be supplemented with a doctoral training plan that quantifies the demand for doctoral graduates and aligns their research topics with national goals.

Creation of a national PhD graduate register, regularly updated, with both Seychellois and expatriates in the Seychelles, specifying areas of specialisation, skills and contacts details will be a useful resource for government, employers and other stakeholders to facilitate communication and collaboration with Seychellois PhD graduates.

The introduction of a PhD graduate induction program to enable smooth transition of Seychellois PhD graduates into employment will further enhance the environment. It could also serve as a source of relevant information, professional networks, and career pathways for graduates.

National press and media also have a role to play in demystifying and disseminating a clear message about the value of a PhD qualification, and of doctoral education and research in general for the public good. They can also provide a valuable vehicle for publicising and celebrating the achievements of Seychellois PhD graduates, increasing visibility of their performance and capacity.

7.5.2 Support Structures for Doctoral Graduates

This study found there was limited support for Seychellois PhD graduates, evidenced by the absence of a doctoral graduate network; post-PhD employment and career support system; incentive scheme for engagement and collaboration; and a performance-based salary scale.

An inter-government department or PhD graduate forum could establish a network that will assist PhD graduates to connect with and support one another, share research findings, engage in intellectual debates, induct and mentor early-career researchers, organise seminars and conferences, and offer interdisciplinary consultancies in teams.

To support the career progression of Seychellois PhD graduates, post-doctoral opportunities will benefit their transition into employment, while providing mentoring and participation in entrepreneurial projects. The establishment of professorships at the university will open up career prospects for Seychellois PhD graduates and they will aspire to progress. In time, the National Institute of Science, Technology and Innovation will be better positioned to offer more research projects and opportunities to Seychellois PhD graduates.

Incentive schemes to promote stakeholder engagement in doctoral education can be implemented through tax concessions for financing aspiring doctoral students to pursue research in specific topics relevant to targeted sectors. For example, focus for new PhD support could be on environmental sciences with respect to climate change and rising sea levels, biological sciences to grapple with the collapse of fish populations predicted worldwide by 2050, and learning sciences to enhance educational opportunities at every level of society in the Seychelles. Other forms of engagement include employment, and using the services of doctoral graduates for teaching and consultancy.

A government scheme to fund and facilitate start-ups for doctoral graduates to validate their ideas, realise their potential, and improve their prospects of achieving commercial success will also encourage innovation and entrepreneurship. The participation of other stakeholder groups will add value to the outcomes. An incubator and induction workshops are proposed for developing ideas driving innovation.

PhD graduates can draw on their expertise to apply for research grants in partnership with stakeholder groups. Strategies will be needed to facilitate working rights for Seychellois PhD graduates to work on projects for more than one employer. This will broaden their options for contributing to various economic sectors and society in general.

It is recommended that remuneration packages of Seychellois PhD graduates be reviewed to ensure transparency and equity with those of expatriate PhD graduates working in similar positions in the Seychelles. Salaries should be based on performance, with rewards built in for innovative ideas and outstanding accomplishments. These initiatives can be implemented immediately as a show of recognition of Seychellois PhD graduates' expertise and the human capital value they represent.

7.5.3 Doctoral Expertise Aligned with Employment and Advisory Opportunities

To address the underutilisation of PhD graduates' knowledge and skills, aligning their expertise with employment is crucial. Consultancy work, advisory services and national think tanks require specialist expertise to inform discourse and debate. PhD graduates possess substantial knowledge that can be used effectively in relevant employment and numerous other forums to contribute to national development in both the academic and non-academic sectors.

Employers and Human Resource Managers will need to understand the disciplinary knowledge and generic skills of PhD graduates so that they can effectively recruit, manage and develop their competencies for fulfilling their career prospects. Aspiring Seychellois PhD students must ensure alignment of their research topics with national requirements to be identified and articulated in a national plan, from which they can select and pursue appropriate studies for the Seychelles context.

To assist effective utilisation of their expertise it is incumbent upon Seychellois PhD graduates to promote proactively their knowledge and skills using online tools such as personal websites, and national and social media (LinkedIn) to increase outreach. They should also participate in national debates, televised programs, keynote addresses in

academic conferences, and present their work to the national and international community and fellow researchers, with the objective of raising their profiles, promoting their expertise and networking with peers and stakeholders.

7.6 Implications for Further Research

One major implication surfaced from this study. The Seychellois PhD graduates who were working in biological sciences were more satisfied with their contribution than the others. The data suggest that their satisfaction was associated with a high demand for their expertise and alignment of their PhD field of research with their employment. There could however be other factors at play that were not uncovered in this exploratory study, given the participants' disparate perspectives of the demand and supply of doctoral expertise in the Seychelles. Further research could investigate these factors, which are amenable to high-level contributions, with the aim of developing a framework of comprehensive factors that facilitate contribution from doctoral education. The results could potentially be applied to other employment sectors to help maximise the contribution of doctoral graduates to national development.

A study that examines and assess the demand and supply of doctoral expertise in Seychelles could also be valuable for deriving further benefits from doctoral education and align national priorities with national development goals.

7.7 Conclusion

This study provided insights into the current contribution of Seychellois PhD graduates to national development and revealed that their contribution was limited. Some of the contributions were made through various leadership, consultancy and specialist advice roles, as well as teaching, research and publishing. Some Seychellois PhD graduates made socio-economic and national contributions through their own personal achievements. A more indirect contribution was made in their workplaces, where the spillover effects of their skills and expertise influenced and inspired colleagues and subordinates. The study found that, despite having substantial knowledge and skills in their fields of study, PhD graduates had

limited impact on national development, and had potential to contribute more to advancing research in the Seychelles. Nevertheless, the country was not making full use of the knowledge, skills, capabilities and human capital of the Seychellois PhD graduates because of adverse conditions. Three key factors were found to influence the contributions of Seychellois PhD graduates to national development: a) the country's unpreparedness for doctoral education; b) limited support for PhD graduates; and c) underutilisation of PhD graduates' expertise. These factors not only diminished their contribution to national development, but also prevented Seychellois PhD graduates from reaching their potential.

In seeking approaches to maximise the contribution of Seychellois PhD graduates to national development, the study identified three initiatives for improving readiness and deriving more benefits from Seychellois PhD graduates. These initiatives are: a) formulation of a national strategy; b) development of support structures for PhD graduates; and c) alignment of doctoral graduates' expertise with employment and advisory services. Such initiatives could boost innovation and enable the Seychelles to achieve its aspiration of becoming a knowledge-based economy, a knowledge hub for the Indian Ocean region, and to compete in the world market of the 21st century.

A national strategy for doctoral education, including a policy and strategic investment, will help strengthen national research capability, harness greater contribution from Seychellois PhD graduates and drive national development. The investment has the potential to yield high returns, since doctoral graduates can help to increase productivity, enhance national development and create national prosperity for the Seychelles.

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Appendices

Appendix A: Geographic Location of the Seychelles

Location of the case study and data collection site. Accessed from https://www.google.com.au/search?q=map+of+seychelles+and+surrounding+countries

Appendix B: Pseudonyms of Participants

PhD graduates survey participants (24)

Pseudonym	Gender	Questionnaire submission date
QR1	Female	30.1.2015
QR2	Female	3.2.2015
QR3	Male	3.2.2015
QR4	Female	3.2.2015
QR5	Female	3.2.2015
QR6	Male	5.2.2015
QR7	Female	5.2.2015
QR8	Male	6.2.2015
QR9	Female	7.2.2015A
QR10	Female	7.2.2015B
QR11	Male	9.2.2015A
QR12	Female	9.2.2015B
QR13	Female	9.2.2015C
QR14	Male	11.2.2015
QR15	Female	13.2.2015
QR16	Female	22.2.2015
QR17	Female	23.2.2015
QR18	Male	26.2.2015
QR19	Male	27.2.2015
QR20	Male	12.3.2015
QR21	Male	1.4.2015
QR22	Male	23.4.2015
QR23	Female	16.5.2015
QR24	Female	22.5.2015

Interviewed PhD graduates (17)

No	Pseudonym	Interview date	Duration
1	Liam	9/2/15	52:29
2	Garry	10/2/15	46:13
3	James	12/2/15	46:57
4	Mona	12/2/15	50:17
5	Judy	13/2/15	37:15
6	Flory	16/2/15	36:44
7	Olga	16/2/15	47:48
8	Mina	20/2/15	45:32
9	Suzy	23/2/15	39:34
10	Rose	24/2/15	38:49
11	Mary	25/2/15	51:05
12	Sammy	26/2/15	34:02
13	Dina	3/3/15	48:27
14	Sonny	3/3/15	49:51
15	Vanessa	5/3/15	34:18
16	Emma	6/3/15	47:18
17	Alex	7/4/15	44:50

PhD graduates Focus group participants

	PhD Graduates	Date	Duration
1	Liam	20/5/15 (am)	90:00
2	Susan	20/5/15 (pm)	90:00
3	Judy	26/5/15 (am)	90:00

Stakeholder group participants (29)

No	Stakeholder participants	Interview date	Duration
1	Basil	11/3/15	38:24
2	Dave	4/3/15	55:03
3	Joan	19/3/15	59:14
4	Mario	3/3/15	37:55
5	Sally	9/3/15	57:33
6	Carl	25/3/15	59:27
7	Diana	24/3/15	66:28 (average 43.4)
8	Jason	26/3/15	52:10
9	Jules	31/3/15	47:53

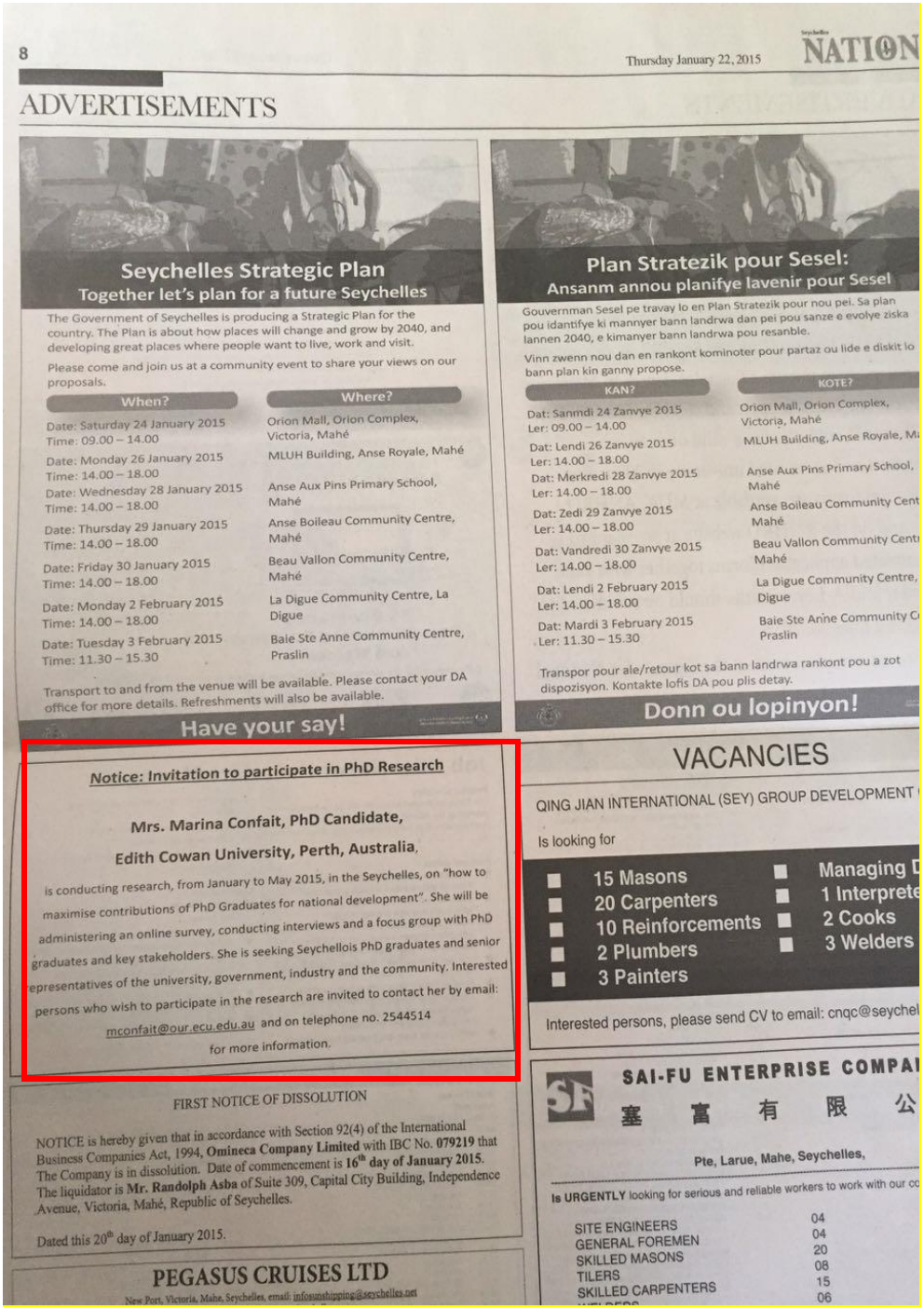
10	Mark	13/3/15	41:41
11	Vince	2/4/15	46:46
12	Danny	29/4/15	49:01
13	Mifa	29/4/15	54:03
14	Nigel	23/4/15	58:03
15	Rosa	24/4/15	41:04
16	Viola	5/5/15	63:44
17	Josie	14/4/15	55:29
18	Myra	30/3/15	55:53
19	Rhonda	28/4/15	18:27
20	Vicky	1/4/15	60:06
21	Tony	1/4/15	58:06
	Focus group		
22	June	20/5/15 (am)	90:00
23	Peter	20/5/15 (am)	90:00
24	Derek	20/5/15 (am)	90:00
25	Barry	20/5/15 (am)	90:00
26	Alan	20/5/15 (pm)	90:00
27	Maya	20/5/15 (pm)	90:00
28	Bill	26/5/15	90:00
29	Lucy	26/5/15	90:00

Appendix C: Data Sources and Data Collection Process

	Questions	Data Sources	Data collection process
1.	How can the contributions of PhD graduates be maximised for national development?	• Completion of online questionnaire by PhD graduates • Interview with PhD holders • Individual and focus group interview with representative of key Stakeholders • Document Analysis	• Online questionnaire provided anonymous data on the background and perspectives of PhD graduates. Interview of PhD graduates revealed their perceptions of the use of their knowledge and skills and implementation of their theses, leading to their contributions to national development. • Interview of the stakeholders unveiled their perceptions of the impact of the doctoral holders and recommended strategies to maximise national contributions. • Relevant official documents were analysed to identify evidence e.g. availability of policy and financial investment in doctoral education.
2.	To what extent do PhD graduates perceive that the knowledge and skills acquired from their studies have been fully utilised for the prosperity of the Seychelles?	• Online questionnaire • Interview PhD holders	• Online questionnaire provided demographic information about the graduates and triangulated the information from interviews. • Interviews allowed graduates to reflect on their studies and revealed their perceptions regarding their contributions nationally.
3.	How do key stakeholders engage with PhD graduates to maximise the use of their	• Interview key stakeholder groups	• Interviews allowed representatives of stakeholder groups to describe their perceptions regarding their engagement and other issues to maximise the use of the knowledge and skills of PhD graduates.

	knowledge and skills?	• Analysis of relevant documents	• Analysis of official documents to understand the institutional, policy framework, and long-term plan for doctoral education.
4.	What key elements of PhD education help contribute towards the development of a country?	• Online questionnaire. Interview PhD graduates • Interview representative of stakeholder groups	• Online questionnaire and interviews provided feedback, which can indicate the appropriateness of the PhD to the labour market. • The interviews provided additional information and served to validate the data gathered through online questionnaire and interviews.

Appendix D: Advertisement in Nation and Today Newspapers



8 Thursday January 22, 2015 NATION

ADVERTISEMENTS

Seychelles Strategic Plan
Together let's plan for a future Seychelles

The Government of Seychelles is producing a Strategic Plan for the country. The Plan is about how places will change and grow by 2040, and developing great places where people want to live, work and visit.

Please come and join us at a community event to share your views on our proposals.

When?	Where?
Date: Saturday 24 January 2015 Time: 09.00 – 14.00	Orion Mall, Orion Complex, Victoria, Mahé
Date: Monday 26 January 2015 Time: 14.00 – 18.00	MLUH Building, Anse Royale, Mahé
Date: Wednesday 28 January 2015 Time: 14.00 – 18.00	Anse Aux Pins Primary School, Mahé
Date: Thursday 29 January 2015 Time: 14.00 – 18.00	Anse Boileau Community Centre, Mahé
Date: Friday 30 January 2015 Time: 14.00 – 18.00	Beau Vallon Community Centre, Mahé
Date: Monday 2 February 2015 Time: 14.00 – 18.00	La Digue Community Centre, La Digue
Date: Tuesday 3 February 2015 Time: 11.30 – 15.30	Baie Ste Anne Community Centre, Praslin

Transport to and from the venue will be available. Please contact your DA office for more details. Refreshments will also be available.

Have your say!

Plan Stratezik pour Sesel:
Ansanm annou planifye lavenir pour Sesel

Gouvernman Sesel pe travay lo en Plan Stratezik pour nou pei. Sa plan pou idantifye ki mannyer bann landrwa dan pei pou sanze e evolye ziska lannen 2040, e kimanyer bann landrwa pou resanble.

Vinn zwenn nou dan en rankont kominoter pour partaz ou lide e diskit lo bann plan kin ganny propose.

KAN?	KOTE?
Dat: Sanmdi 24 Zanvye 2015 Ler: 09.00 – 14.00	Orion Mall, Orion Complex, Victoria, Mahé
Dat: Lendi 26 Zanvye 2015 Ler: 14.00 – 18.00	MLUH Building, Anse Royale, Mi
Dat: Merkredi 28 Zanvye 2015 Ler: 14.00 – 18.00	Anse Aux Pins Primary School, Mahé
Dat: Zedi 29 Zanvye 2015 Ler: 14.00 – 18.00	Anse Boileau Community Cent Mahé
Dat: Vandredi 30 Zanvye 2015 Ler: 14.00 – 18.00	Beau Vallon Community Centr Mahé
Dat: Lendi 2 February 2015 Ler: 14.00 – 18.00	La Digue Community Centre, Digue
Dat: Mardi 3 February 2015 Ler: 11.30 – 15.30	Baie Ste Anne Community C Praslin

Transpor pour ale/retour kot sa bann landrwa rankont pou a zot dispozisyon. Kontakte lofis DA pou plis detay.

Donn ou lopinyon!

Notice: Invitation to participate in PhD Research

Mrs. Marina Confait, PhD Candidate,

Edith Cowan University, Perth, Australia,

is conducting research, from January to May 2015, in the Seychelles, on "how to maximise contributions of PhD Graduates for national development". She will be administering an online survey, conducting interviews and a focus group with PhD graduates and key stakeholders. She is seeking Seychellois PhD graduates and senior representatives of the university, government, industry and the community. Interested persons who wish to participate in the research are invited to contact her by email: mconfait@our.ecu.edu.au and on telephone no. 2544514 for more information.

VACANCIES

QING JIAN INTERNATIONAL (SEY) GROUP DEVELOPMENT

Is looking for

- 15 Masons
- 20 Carpenters
- 10 Reinforcements
- 2 Plumbers
- 3 Painters
- Managing D
- 1 Interprete
- 2 Cooks
- 3 Welders

Interested persons, please send CV to email: cnqc@seychel

FIRST NOTICE OF DISSOLUTION

NOTICE is hereby given that in accordance with Section 92(4) of the International Business Companies Act, 1994, **Omineca Company Limited** with IBC No. **079219** that The Company is in dissolution. Date of commencement is **16th day of January 2015**. The liquidator is **Mr. Randolph Asba** of Suite 309, Capital City Building, Independence Avenue, Victoria, Mahé, Republic of Seychelles.

Dated this 20th day of January 2015.

PEGASUS CRUISES LTD

New Port, Victoria, Mahe, Seychelles, email: infoyachtshipping@seychelles.net

SAI-FU ENTERPRISE COMPA

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Is **URGENTLY** looking for serious and reliable workers to work with our co

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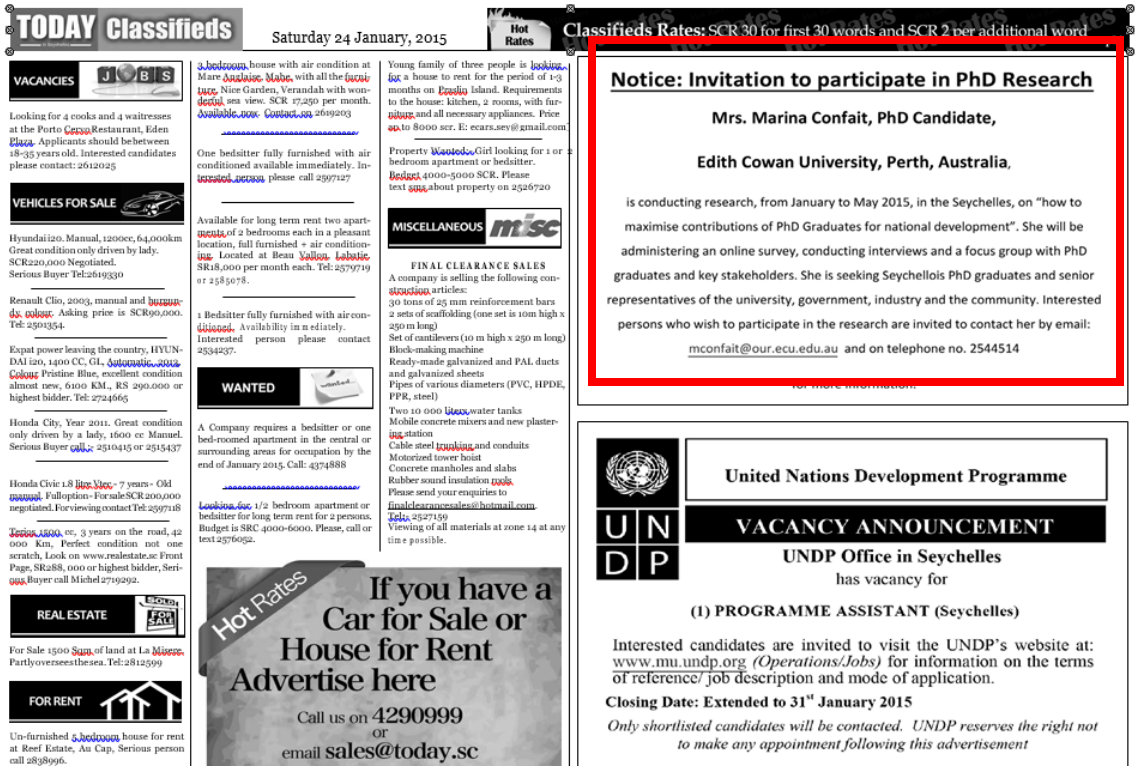
Advertisement in Today's newspaper



TODAY Classifieds

Saturday 24 January, 2015

Hot Rates

Classifieds Rates: SCR 30 for first 30 words and SCR 2 per additional word

VACANCIES

JOBS

Looking for 4 cooks and 4 waitresses at the Porto Cervo Restaurant, Eden Plaza. Applicants should be between 18-35 years old. Interested candidates please contact: 2612025

VEHICLES FOR SALE

Hyundai i20. Manual, 1200cc, 64,000km Great condition only driven by lady. SCR220,000 Negotiated. Serious Buyer Tel:2619330

Renault Clio, 2003, manual and burgundy colour. Asking price is SCR90,000. Tel: 2501354.

Expat power leaving the country, HYUNDAI i20, 1400 CC, GL, Automatic, 2012 Colour Pristine Blue, excellent condition almost new, 6100 KM., RS 290.000 or highest bidder. Tel: 2724665

Honda City, Year 2011. Great condition only driven by a lady, 1600 cc Manuel. Serious Buyer call :- 2510415 or 2515437

Honda Civic 1.8 litre Vtec - 7 years - Old manual. Full option - For sale SCR 200,000 negotiated. For viewing contact Tel: 2597118

Terios 1800 cc, 3 years on the road, 42 000 Km, Perfect condition not one scratch, Look on www.realestate.sc Front Page, SR288, 000 or highest bidder, Serious Buyer call Michel 2719292.

REAL ESTATE

For Sale 1500 Sqm of land at La Misere. Partly overseas the sea. Tel: 2812599

FOR RENT

Un-furnished 5 bedroom house for rent at Reef Estate, Au Cap, Serious person call 2838996.

3 bedroom house with air condition at Mare Anglaise, Mahe, with all the furniture, Nice Garden, Verandah with wonderful sea view. SCR 17,250 per month. Available now. Contact on 2619203

One bedsitter fully furnished with air conditioned available immediately. Interested person please call 2597127

Available for long term rent two apartments of 2 bedrooms each in a pleasant location, full furnished + air conditioning. Located at Beau Vallon, Labatie. SR18,000 per month each. Tel: 2579719 or 2585078.

1 Bedsitter fully furnished with air conditioned. Availability in n ediately. Interested person please contact 2534237.

WANTED

A Company requires a bedsitter or one bed-roomed apartment in the central or surrounding areas for occupation by the end of January 2015. Call: 4374888

Looking for 1/2 bedroom apartment or bedsitter for long term rent for 2 persons. Budget is SRC 4000-6000. Please, call or text 2576052.

Young family of three people is looking for a house to rent for the period of 1-3 months on Praslin Island. Requirements to the house: kitchen, 2 rooms, with furniture and all necessary appliances. Price up to 8000 scr. E: ecars.sey@gmail.com

Property Wanted - Girl looking for 1 or 2 bedroom apartment or bedsitter. Budget 4000-5000 SCR. Please text sms about property on 2526720

MISCELLANEOUS

misc

FINAL CLEARANCE SALES

A company is selling the following construction articles:
30 tons of 25 mm reinforcement bars
2 sets of scaffolding (one set is 10m high x 250 m long)
Set of cantilevers (10 m high x 250 m long)
Block-making machine
Ready-made galvanized and PAL ducts and galvanized sheets
Pipes of various diameters (PVC, HPDE, PPR, steel)
Two 10 000 litres water tanks
Mobile concrete mixers and new plastering station
Cable steel trunking and conduits
Motorized tower hoist
Concrete manholes and slabs
Rubber sound insulation rools
Please send your enquiries to finalclearancesales@hotmail.com. Tel.: 2527159
Viewing of all materials at zone 14 at any time possible.

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If you have a Car for Sale or House for Rent Advertise here

Call us on 4290999 or email sales@today.sc

Notice: Invitation to participate in PhD Research

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Edith Cowan University, Perth, Australia,

is conducting research, from January to May 2015, in the Seychelles, on "how to maximise contributions of PhD Graduates for national development". She will be administering an online survey, conducting interviews and a focus group with PhD graduates and key stakeholders. She is seeking Seychellois PhD graduates and senior representatives of the university, government, industry and the community. Interested persons who wish to participate in the research are invited to contact her by email: mconfait@our.ecu.edu.au and on telephone no. 2544514

United Nations Development Programme

UNDP

VACANCY ANNOUNCEMENT

UNDP Office in Seychelles

has vacancy for

(1) PROGRAMME ASSISTANT (Seychelles)

Interested candidates are invited to visit the UNDP's website at: www.mu.undp.org *(Operations/Jobs)* for information on the terms of reference/ job description and mode of application.

Closing Date: Extended to 31st January 2015

Only shortlisted candidates will be contacted. UNDP reserves the right not to make any appointment following this advertisement

Appendix E: Copy of Online Questionnaire

PHD GRADUATES SURVEY QUESTIONNAIRE

This survey is administered by Mrs. Marina Confait, PhD Candidate, Edith Cowan University (ECU), Perth, Western Australia. She is conducting a PhD research project entitled "Maximising Contributions of PhD Graduates for National Development: The case of the Seychelles" which has ethics approval from the Human Research Ethics Committee at ECU. She would like to invite you to take part in this research, which is part of the requirements of her PhD degree, by completing this questionnaire, which will take less than 20 minutes of your time. The responses to this questionnaire will be anonymous and will be treated confidentially.

If you have any questions about this research or require further information you may contact the following: Mrs. Marina Confait, PhD Candidate, School of Education, Edith Cowan University, 2 Bradford Street, Mount Lawley, Western Australia 6050, telephone 2544514, email: mconfait@our.ecu.edu.au or A/Prof Jan Gray, Principal Supervisor, School of Education, Edith Cowan University, 2 Bradford Street, Mount Lawley, Western Australia, Telephone +618 93706320, Email jan.gray@ecu.edu.au

For independent contact: Research Ethics Officer, Edith Cowan University, Telephone: +6186304217, email: research.ethics@ecu.edu.au

Consent

I have read and understood the survey purpose and desire of my own free will to participate in this research. The completion of the questionnaire indicates that I give consent to participate in this research. *Please tick the circle for your answer*.

○ Yes

○ No

Structure of the questionnaire

This questionnaire is in 4 parts: Part 1- Background; Part 2- Your PhD studies; Part 3- National contributions from PhD and Part 4- Other comments. Kindly complete the questionnaire ticking the appropriate circle or type your answers to the questions in the text box provided, as appropriate.

Part 1: Background

Please indicate your gender

○ Male

○ Female

What is your current occupational title? If you are not employed state 'None'

In which sector are you currently employed?

- ○ Public
- ○ Private
- ○ Body Corporate (Parastatal)
- ○ Non-Governmental Organisation
- ○ Self-employed
- ○ Other, state below

What type of PhD did you undertake?

- ○ PhD by thesis
- ○ PhD by Project
- ○ PhD by Publication
- ○ Other, please state below

In which year were you awarded your PhD?

How long did it take to complete your PhD?

- ○ 2 years
- ○ 3 years
- ○ 4 years
- ○ 5 years
- ○ 6 years+

Which university did you attend?

In which country did you do your PhD training?

What was your mode of study?

- ○ Full time
- ○ Part time
- ○ Other (state)

State the number of years of working experience you had prior to your PhD training.

- ○ None
- ○ 1-5 years
- ○ 6-10 years
- ○ 11-15 years
- ○ 16-20 years
- ○ 21 years +

Part 2: Your PhD studies

What was the topic of your PhD Thesis?

How did you choose the topic?

- o On my own in an area of my choice
- o Determined by my sponsor
- o Encouraged by my supervisor/s
- o Considered the national interest
- o Other (state)

What was the key research area and focus of your thesis? Select one area from the list below.

- ○ Mathematical sciences
- ○ Physical sciences
- ○ Chemical sciences
- ○ Earth sciences
- ○ Environmental sciences
- ○ Biological sciences
- ○ Agricultural and veterinary sciences
- ○ Information and computing sciences
- ○ Engineering
- ○ Technology
- ○ Medical and health sciences
- ○ Built environment and design
- ○ Education
- ○ Economics
- ○ Commerce, Management, tourism and services
- ○ Studies in human society
- ○ Psychology and cognitive sciences

- ○ Law and legal studies
- ○ Studies in creative arts and writing
- ○ Language, communication and culture
- ○ History and archeology
- ○ Philosophy and Religious studies

State briefly the disciplinary knowledge, which you think you acquired from your PhD training?

State briefly the skills you acquired from your PhD training.

Since you obtained your PhD, what research have you undertaken?

Have you published any referred articles since your PhD graduation?

- ○ Yes
- ○ No
- ○ If not, please give reasons

If you have published, please indicate the number of refereed article/s.

- ○ 1-5
- ○ 6-10
- ○ 11+

Have you disseminated your research knowledge and findings in the media through radio and TV?

- ○ Yes
- ○ No

If yes, please provide more information.

To what extent do you think you acquired the following knowledge and skills from your PhD training? Select by underlying one rating option below

Knowledge of the discipline (thesis)	None	some	Great extent
Development of innovative ideas	None	some	Great extent
Research skills	None	some	Great extent
High level employment skills	None	some	Great extent
Leadership skills	None	some	Great extent

Communication skills	None	some	Great extent
Problem solving skills	None	some	Great extent
Teaching skills	None	some	Great extent
Planning skills	None	some	Great extent
Project management skills	None	some	Great extent

Other (state)

Part 3: National Contributions from PhD

(Contributions means demonstrable gains, advantages, benefits to society and the country)

As a PhD graduate working in the Seychelles, how is the country benefitting from your knowledge and skills acquired from your PhD training?

How do you think PhD graduates contribute to society in the Seychelles?

How do you think society, government and industry could better utilize the knowledge and skills of PhD graduates in the Seychelles?

What strategies would you recommend to maximise the contributions of PhD graduates for national development in Seychelles"

In your opinion, what structure of PhD programs would best suit the labour market of Seychelles?

What are your views regarding the University of Seychelles offering PhD programs in the future?

What are your views regarding PhD education as preparation for the following roles? Underline if you agree or disagree

Researcher	Agree	Disagree	Not applicable
University Lecturer	Agree	Disagree	Not applicable
Non-academic employee	Agree	Disagree	Not applicable
Entrepreneur	Agree	Disagree	Not applicable
Leader	Agree	Disagree	Not applicable

Other (state)

Part 4: Other Comments

The researcher would like to give you the opportunity to expand on your responses through a face-to-face interview. If you would like to take the opportunity, you can contact the researcher on email address: mconfait@our.ecu.edu.au as soon as possible to organize and interview date and time.

You have now completed the questionnaire.

Thank you for your kind acceptance and participation in this research project.

Please submit the questionnaire to: mconfait@our.ecu.edu.au

Appendix F: Copy of Invitation Letter

From: Marina CONFAIT To:……

Subject: online Questionnaire

Dear Dr xxxx,

Thank you for agreeing to participate in my PhD research. The project entails completion of a survey online questionnaire through a link provided below and a face-to-face interview subsequent to questionnaire completion.

I would like to have your candid views and perception on maximising contributions of PhD graduates to national development through the questionnaire. Your responses to the questions will be anonymous. The results of the survey will be reported in a summary format therefore you will not be linked to your responses.

Attached below is the link, which you should click on to complete the questionnaire:
https://ecuau.qualtrics.com/SE/?SID=SV_eKCzSyzi9AUL2eh

Upon completion of the questionnaire, click on the 'submit' button to ensure that your completed questionnaire is submitted. As a token of appreciation for your participation in the research, you will enter a draw, which all respondents, within the set time frame, are eligible, to win a 64GB USB. Given that the response is anonymous, to enter the draw you have to send an email to the undersigned on mconfait@our.ecu.edu.au to confirm that you have completed and submitted the questionnaire, by Friday 6th February 2015.

The draw will be held on 9th February, 2015, at 11 a.m, in the presence of staff members, at the Agency for National Human Resource Development (ANHRD), Le Chantier Mall, where I have a temporary office. You are invited to attend the draw. If you are unable to attend, I will organize for the USB to be delivered to the winner.

Prompt completion and submission of the questionnaire will give you the chance to win the token. Don't miss the opportunity!

I thank you for your participation in this important study and I look forward to receive your completed questionnaire.

Yours sincerely,

Marina Confait (Mrs)
PhD Candidate
Edith Cowan University

Appendix G: Invitation Letter to Attend Interview

From: Marina CONFAIT

Dear Dr XXX,

Re: Interview

We discussed and you volunteered to participate in the interview.
This is to confirm that we can hold the interview at 3.15 pm on 20th May 2015 at Le Chantier Mall on the 2nd Floor at the Agency for National Human Resource Development.

Kindly confirm if you agree.

Thank you for agreeing to the interview.

Kind regards

Yours sincerely,

Marina Confait (Mrs)

Appendix H: Interview Protocol for PhD Graduates

The objective of the interview is to expand on the survey by giving an opportunity to PhD graduates to enrich their answers face to face with the research in response to the following research questions:

How can the contributions of PhD graduates be maximised for national development?

To what extent do PhD graduates perceive that the knowledge and skills acquired from their studies have been fully utilised for the prosperity of the Seychelles?

How do key stakeholders engage with PhD graduates to maximise the use of their knowledge and skills?

What key elements of PhD education help contribute towards the development of a country?

Part 1: Introduction/Ice breaking

(i) Put on voice recorder following issuance of information letter and signature of consent form.
(ii) Define: contributions, national development and stakeholders
(iii) Tell me why you pursued a PhD? How was it funded?
(iv) How has it been useful?

Part 2: Main interview

1. What knowledge and skills did you acquire from your PhD thesis?

---

2. What knowledge and skills did you acquire from the process of your PhD training?

---

*(**Probe**: seeking views on some known skills e.g research, innovation, critical thinking, analytical skills, scholar, high-skill employee, entrepreneurship, leadership etc., if not mentioned).*

3. How do you utilise the knowledge and skills you acquired from the PhD training?

---

4. Do you think your PhD knowledge and skills have been used effectively?
   - Yes: How----------
   - No: Why----------

5. Are there any barriers to utilise your PhD knowledge and skills?
   - ○ Yes: What are they----------
   - ○ No

6. How do you overcome these barriers?

---

7. How can your knowledge and skills from your PhD training be better put into practice?

---

8. What is the value of the knowledge and skills from PhD training to national development?

---

9. What contributions can PhD graduates make to national development? ----------

---

10. How can PhD graduates make greater contributions for the benefit of society in the Seychelles?

---

11. Having acquired specific disciplinary knowledge and a range of skills through completing a PhD, how do you think these have equipped you to contribute to society in the Seychelles?

---

12. What elements, (i.e. PhD curriculum, mode of delivery, knowledge and skills) of PhD education help to contribute to national development?

---

13. How do you think stakeholders can help aspiring PhD students to acquire relevant knowledge and skills from PhD education to national development?

---

14. How can key stakeholders in the Seychelles better support returning PhD graduates to enable more effective utilisation of their knowledge and skills for national development? ***(Probe:*** *Government support, Industry ignorance/funding, partnerships, employment opportunities, interest in PhD education, resistance to welcome PhD)*

Part 3: Concluding the interview

15. Identify one or two strategies, which you think would assist to increase contributions from PhD holders to national development.(i)----------
    (ii)----------
16. What message/s would you like me to convey to specific stakeholders regarding how to maximise contributions from PhD graduates for national development?

(i)----------(ii)----
---------- (iii)----------
---

17. I would like to invite you to raise any other points, about maximising contributions of PhD graduates to national development, which may have been omitted during the interview.

Part 4: Thank the participant

Thank you for kindly agreeing to be interviewed. Your participation in this research will assist in developing principles/framework to maximise contributions of PhD graduates for national development, which will be of mutual benefit.

I wish you a good day/evening!

Appendix I: Information Letter to Research Participants

Edith Cowan University
School of Education

Mrs. Marina Confait
PhD Candidate
Edith Cowan University
2Bradford Street
Mt. Lawley 6050
Tel: 2544514
Email: mconfait@our.ecu.edu.au

Date: 7th April, 2015

Dear Participant,

I am a PhD Research candidate at Edith Cowan University (ECU) Perth, Western Australia, who is conducting research on the topic: '*Maximising contributions of PhD graduates to national development: The case of the Seychelles*'. I would like to invite your participation in this research, which is part of the requirements for my PhD degree. The research has ethics approval, project number 11150, from the Human Research Ethics Committee at ECU.

This research aims to explore how to maximise the contributions of PhD graduates for national development, hence, as a PhD graduate, I would like to obtain your perception of your contributions to the Seychelles. If you agree to take part in this research, you are invited to participate in two stages of the research, that is, to complete an anonymous online questionnaire, which you have done and I thank you. I would now like to invite you to attend a one-hour interview to provide further information about the topic.

I do not anticipate any risks associated with your participation in this research. All data collected during the research will be treated confidentially. Data from the interview will be de-identified, coded and will be stored securely on ECU premises for five years after the research has been concluded, and then be destroyed. The information gathered during this research will be presented in a written report in which your identity will not be revealed. You will be sent a summary of the final report on request.

Participation in this research is voluntary and you are free to withdraw your participation in the interview at any time, and there will be no penalty for doing so. If you would like to take part in the research, you will be asked to give your consent before your participation.

If you have any questions about the research or require further information, you may contact the Researcher on the above address or the following:

A/Prof Jan Gray
Principal Supervisor
Edith Cowan University
School of Education
2 Bradford Street
Mount Lawley
Western Australia 6050
Telephone: (+61 8) 9370 6320
Email: jan.gray@ecu.edu.au

For independent contact you may communicate with the Research Ethics Officer below:

Research Ethics Officer
Edith Cowan University
Telephone: (+61 8) 6304 217
Email: research.ethics@ecu.edu.au

I would like to thank you for your participation in this research.

Yours sincerely,

Marina Confait (Mrs)

Appendix J: Consent Form for Research Participants

Edith Cowan University
School of Education

Research Project: Maximising contributions of PhD Graduates to national development: The case of the Seychelles

PhD Researcher: Mrs. Marina Confait

I have been provided with an information letter explaining the research and I understand the contents of the letter. I have been given the opportunity to ask questions and all my questions have been answered satisfactorily. I am aware of the personnel to contact, if I have any further queries, or if I have concerns or complaints. I have been given their contact details in the Information Letter.

I understand that participating in this research will involve:

- Attending an interview and my response will be audio recorded;
- Only the researcher and her supervisors will have access to the recording;
- Audio recording will be erased following transcription;

I consent to having my voice recorded during this research.

I understand that the researcher will be able to identify me but that all the information I give will be coded and analysed into themes kept confidential and will be accessed only by the researcher and her supervisors. I understand that I will not be identified in any report, thesis, or presentation of the results of this research.

I freely agree to participate in this research:

NAME of PARTICIPANT ……..

SIGNATURE …….

DATE ……. /……. /……..

Appendix K: Protocol for Focus Groups

1. **INTRODUCTION**
   - Welcome and thank participants for agreeing to participate in my research
   - Reiterate title: Maximising the contributions of PhD graduates to national development

2. **CONFIDENTIALITY**
   - The information, which you provide will be kept confidential.

3. **GROUND RULES**
   - I would appreciate if you would Kindly switch your mobile phone to silent
   - I would like everyone to participate
   - I may call on you if I find that you are quiet
   - There are no right or wrong answers
   - Your experience and perceptions are important
   - Speak up whether you agree or disagree
   - One person will speak at a time
   - What is said in this room remains here and will not repeated outside the room
   - I will be audio recording the focus group with your consent, for record accuracy
   - You will remain anonymous and no one will be identified by name in the report
   - The focus group will be used for the thesis only.

4. **QUESTIONS**
   - I have 5 questions for the focus group to discuss over a duration of 90 minutes
   - I will be moderating the group and keeping the time

5. **SIGNING CONSENT FORM AND COMPLETION OF DEMOGRAPHIC DATA**
   - Each participant to sign consent form and complete demographic form

6. **START FOCUS GROUP**
   - ***Put on recorder***
   - Ice breaker to start the focus group
   - Go through the questions and probe/explore/prompt

7. **CONCLUDE FOCUS GROUP**
   - Summarise discussions,
   - Thank participants and
   - Conclude focus group

Appendix L: Documents and Data Corpus Analysed

Document	Source	Findings
1.Titles and findings of PhD theses	Individual PhD graduates and university websites/library	Analysed 12 Seychellois PhD graduates theses. Findings incorporated in the research results.
2.National Policy on scholarships awarded for PhD studies	ANHRD & MLHRD	Participants at interviews confirmed that there was no formal written policy on doctoral education. ANHRD has advertised for interested Consultant to bid to formulate HRD Policy. The latter was finalised in May 2017 and contains no reference to doctoral education.
3.Statistics about PhD education	Labour Force Survey Report 2011/2012 from National Bureau of Statistics	Inaccurate data of 109 PhD graduates, which was reported in the Report. Sought clarification from the Author of the Report. Acknowledged inaccuracy in letter to this Researcher.
4.Seychelles Qualifications Framework	Seychelles Qualifications Authority	Checked classification of PhD. Consistent with International Qualifications Frameworks. But shows misunderstanding of the academic title of PhD and fails to distinguish and incorporate different models.
5.Government expenditure on PhD education for last 5 years	ANHRD and Ministry of Finance	Both institutions did not collect accurate records. Records are compiled from staff's memory, on a needs basis and are inaccurate due to lack of a recording system.
6.Human Resource Development/Workforce Plan	ANHRD	Was not available. ANHRD informed that the study had just been commissioned to external Consultants. The

		study produced a National HRD Strategy and Policy only.
7.Education Mid-term Development Strategy 2013-2017	Ministry of Education Website	The strategy was perused and there was no mention of doctoral education.
8.Seychelles Sustainable Development Strategy 2012-2020	Ministry of Environment Website	The Strategy was perused and there was no reference to doctoral education.
9.National Medium Term Development Plan	Ministry of Foreign Affairs	Obtained copy. No reference to doctoral education.
10. **Policy on research**	University of Seychelles	Downloaded copy from university's website. Draft copy.
11**. National Institute of Science, Technology and Innovation Act 2014**	Institute of Science, Technology and Innovation	Downloaded copy of the Act from internet. Public sector organisation responsible for research.
12. Equator Institute	Equator Institute	Established in March 2010 as a recommendation of the ruling party's recommendation. Aim was to create a National Think Thank to harness national human capital. **Inactive**
13. Scheme of Service of Policy and Research Cadre	Department of Public Administration	Obtained copy. PhD holders are awarded a marketable qualifications allowance of SCR 2,000 per month, includes SCR 600 more than master degree.
14. Training plan of PhD needs.	ANHRD	Obtained copy. Missing information.
15. The Blue Economy	Department of Blue Economy	Obtained copy of a booklet on the blue economy. Still in development stage.

Appendix M: Research Ethics Approval Letter

HUMAN RESEARCH ETHICS COMMITTEE
For all queries, please contact:
Research Ethics Officer
Edith Cowan University
270 Joondalup Drive
JOONDALUP WA 6027
Phone: 6304 2170
Fax: 6304 5044
E-mail: research.ethics@ecu.edu.au

OFFICE OF RESEARCH AND INNOVATION
270 Joondalup Drive,
Joondalup
Western Australia 6027
Telephone 134 328
Facsimile: (08) 9300 1257
CRICOS 00279B
ABN 54 361 485 361

27 November 2017

Mrs Marina Confait
School of Education
MT LAWLEY CAMPUS

Dear Marina

CONFIRMATION OF ETHICS APPROVAL

Project Code:	11150	
Project Title:	**Maximising Contributions of PhD Graduates to National Development: The Case of the Seychelles**	
Chief Investigator:	Mrs Marina Confait	
Approval Dates:	*From:* 14 November 2014	*To:* 31 March 2018

Ethics approval for this project was originally granted from 14 November 2014 to 31 August 2017.

Two extensions of ethics approval were subsequently granted (the first until 31 December 2017 and the second until 31 March 2018). I can therefore confirm that ethics approval for this project currently extends until 31 March 2018.

We wish you success with your research project.

Yours sincerely

Kim Gifkins
SENIOR RESEARCH ETHICS ADVISOR

Conditions of approval

1. Monitoring of Approved Research Projects

Monitoring is the process of verifying that the conduct of research conforms to the approved ethics application. Compliance with monitoring requirements is a condition of approval.

The *National Statement on Ethical Conduct in Human Research* indicates that institutions are responsible for ensuring that research is reliably monitored. Monitoring of approved projects is to establish that a research project is being, or has been, conducted in the manner approved by the Ethics Committee. Researchers also have a significant responsibility in monitoring, as they are in the best position to observe any adverse events or unexpected outcomes. They should report such events or outcomes promptly to the Ethics Committee and take prompt steps to deal with any unexpected risks.

All projects approved by an ECU Ethics Committee are approved subject to the following conditions of approval:

- If the research project is discontinued before the expected date of completion, researchers should inform the Ethics Committee as soon as possible, giving reasons.
- An annual report (for projects that are longer than one year) and a final report at the completion of the research will be provided to the Ethics Committee. You will also be notified when a report is due. The ethics report form can be found on the ethics website http://www.ecu.edu.au/GPPS/ethics/human_ethics_resources.html
- Researchers must also immediately report anything that might warrant review of the ethical approval of the protocol, including:
  - Any serious or unexpected adverse effects on participants
  - Any unforeseen events that might affect continued ethical acceptability of the project.

The Ethics Committee retains the right to require a more detailed and/or more frequent report if the research is deemed to be of high risk, and to recommend and/or adopt any additional appropriate mechanism for monitoring including random inspections of research sites, data and signed consent forms, and/or interview, with their prior consent, of research participants.

2. Changes and amendments

Compliance with the approved research protocol is a condition of approval, and any changes to the research design must be reported to the Ethics Committee. Amendments to the research design that may affect participants and/or that may have ethical implications must be reviewed and approved by the Ethics Committee before commencement.

Any changes to documents and other material used in recruiting potential research participants, including advertisements, letters of invitation, information sheets and consent forms, should be approved by the Ethics Committee.

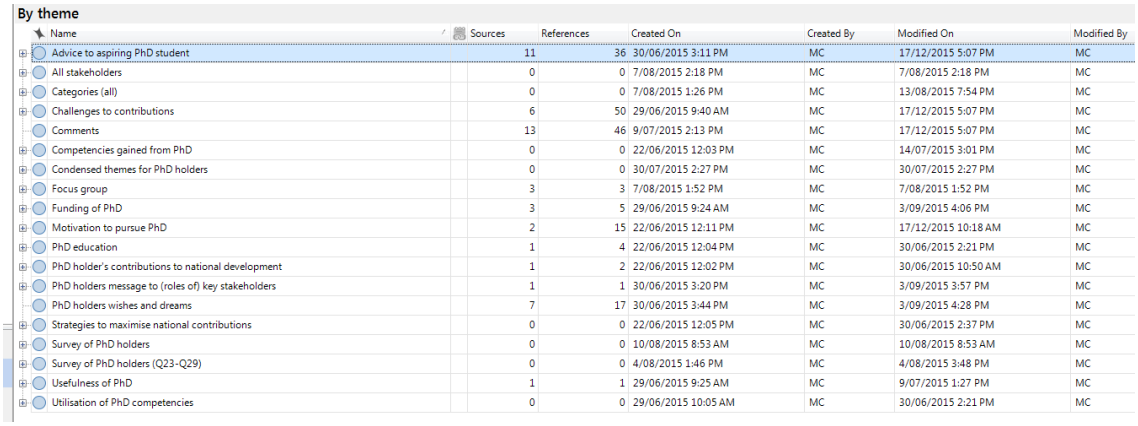
In order to request approval for a change, please send an email to the Ethics Office outlining why the change is needed, describing the change (e.g. the new participants or new research procedures), and attach a copy of any amended documents.

3. Extension of ethics approval

All research projects are approved for a specified period of time – from the date of approval until the date of completion provided in the ethics application. If an extension of the approval period is required, a request must be submitted to the Ethics Committee. Please ensure that requests for extension of approval are submitted before the original approval expires.

In order to request an extension of ethics approval, please send an email to the Ethics Office providing a brief reason why the extension is needed and giving the new expected date of completion.

Appendix N: Sample Thematic Analysis in NVivo



By theme

Name	Sources	References	Created On	Created By	Modified On	Modified By
Advice to aspiring PhD student	11	36	30/06/2015 3:11 PM	MC	17/12/2015 5:07 PM	MC
All stakeholders	0	0	7/08/2015 2:18 PM	MC	7/08/2015 2:18 PM	MC
Categories (all)	0	0	7/08/2015 1:26 PM	MC	13/08/2015 7:54 PM	MC
Challenges to contributions	6	50	29/06/2015 9:40 AM	MC	17/12/2015 5:07 PM	MC
Comments	13	46	9/07/2015 2:13 PM	MC	17/12/2015 5:07 PM	MC
Competencies gained from PhD	0	0	22/06/2015 12:03 PM	MC	14/07/2015 3:01 PM	MC
Condensed themes for PhD holders	0	0	30/07/2015 2:27 PM	MC	30/07/2015 2:27 PM	MC
Focus group	3	3	7/08/2015 1:52 PM	MC	7/08/2015 1:52 PM	MC
Funding of PhD	3	5	29/06/2015 9:24 AM	MC	3/09/2015 4:06 PM	MC
Motivation to pursue PhD	2	15	22/06/2015 12:11 PM	MC	17/12/2015 10:18 AM	MC
PhD education	1	4	22/06/2015 12:04 PM	MC	30/06/2015 2:21 PM	MC
PhD holder's contributions to national development	1	2	22/06/2015 12:02 PM	MC	30/06/2015 10:50 AM	MC
PhD holders message to (roles of) key stakeholders	1	1	30/06/2015 3:20 PM	MC	3/09/2015 3:57 PM	MC
PhD holders wishes and dreams	7	17	30/06/2015 3:44 PM	MC	3/09/2015 4:28 PM	MC
Strategies to maximise national contributions	0	0	22/06/2015 12:05 PM	MC	30/06/2015 2:37 PM	MC
Survey of PhD holders	0	0	10/08/2015 8:53 AM	MC	10/08/2015 8:53 AM	MC
Survey of PhD holders (Q23-Q29)	0	0	4/08/2015 1:46 PM	MC	4/08/2015 3:48 PM	MC
Usefulness of PhD	1	1	29/06/2015 9:25 AM	MC	9/07/2015 1:27 PM	MC
Utilisation of PhD competencies	0	0	29/06/2015 10:05 AM	MC	30/06/2015 2:21 PM	MC

Appendix O: Letter from National Bureau of Statistics

Fwd: LFS 90

MC Marina Confait
Tue 08/11/2016, 12:04
Marina CONFAIT

Reply all |

Inbox

Flag for follow up. Start by 27 September 2017. Due by 27 September 2017.

---------- Forwarded message ----------
From:
Date: Thu, Mar 12, 2015 at 9:15 PM
Subject: RE: LFS 90
To: Marina Confait <mdconfait@gmail.com>

Dear Marina,

With reference to the above, I checked the LFS raw data. As indicated during our conversation, we weighted the survey data and sometimes this has the effect of increasing the variance of the estimator.

The survey recorded 9 cases for doctoral qualifications. Normally with cell counts fewer than 20, one would collapse them to form fewer categories. In this case the categories of "level of certificate obtained" was of interest and left as is. So please use the data with caution and note the underlying issues.

From: Marina Confait
Sent: Thursday, February 05, 2015 3:59 PM
To:
Subject: LFS 90

Hi ,

We spoke. See LFS 90 of the Labour Force Survey report 2011/2012.

Cheers

Appendix P: Proposed Training Needs

No	Training Field
1.	Blue economy
2.	Aquaculture
3.	Biotechnology
4.	Renewable energy – reduction in energy consumption
5.	Tourism carrying capacity – eco tourism, tourism value chain, HR planning
6.	Building hotel in the mountains rather than on the beachside
7.	Fish management – tuna stock and sustainable fishing
8.	Contribution of Indian Ocean Tuna Canning Factory to Seychelles economy
9.	Zoology
10.	Botany
11.	Internet Protocol
12.	Traffic management
13.	Economic modelling
14.	Private sector competitiveness
15.	Oil extraction – sea weeds for pharmaceutical purposes
16.	Human rights
17.	Policy
18.	Agriculture
19.	Socio –economics and anthropology
20.	Psychology
21.	Improving testing of construction materials
22.	Development of young leaders
23.	Sociology

Appendix Q: Scheme of Service

SCHEME OF SERVICE

POLICY ANALYSTS

I. BACKGROUND

This Scheme of Service is designed for all Policy Analysts employed in Ministries and Departments within the Public Service.

Policy Analysts act as advisors that develop public policies in organizations. The quality of policy advice is determined not by inputs and outputs, but by its outcomes. Advice given helps decision-makers to choose policies and associated interventions that support strategic directions and are effective in leading to desired policy outcomes.

All policy is value-based, but value-creating advice is explicit regarding the values, criteria and assumptions that underpin the analysis of options. Policy Analysts use policy analysis techniques which provide the means for assessing policy options and recommending the preferred course of action to achieve various organizational, political, social or economic goals. Policy analysis represents a systematic approach to comparing a range of policy alternatives with existing actions. Analysis also provides a way to examine existing policies with an eye towards recommending modifications or improvements.

Public policy represents an effort by government to address a particular problem or issue. With this same intent Policy Analysts conduct policy analysis beginning with identifying a key problem or issue.

The role of Policy Analysts differs according to characteristics found in their working environment. They may be employed as objective technicians or as advocates of their own initiatives or as proponents of the positions adopted by their employers.

Their duties mainly involves identifying issues to research, developing and analysing public policy issues; evaluate the effectiveness of existing policies and interpret and review these policies; evaluate options and make recommendations for new policies; review and edit analytical reports and prepare analyses for publication; prepare speeches, correspondence and Cabinet papers for ministers; write and present reports.

This scheme therefore has been designed to attract and retain qualified and experienced Policy Analysts within the Public Service.

The Scheme provides for:

1. A clearly defined career structure and enhanced remuneration package to attract and retain suitably qualified and competent incumbents in the technical aspects of the Divisions.
2. A well-defined job description with clear delineation of duties and responsibilities at all levels within the career structure to enable incumbents to understand the requirements and demands of the job.
3. Standards for recruitment, training and advancement within the career structure on the basis of qualifications, merit and ability as reflected in work performance and results.
4. The starting salary and minimum entry criteria to be set in line with the Government Salary Structure.

II. POSTS AND SALARY SCALES

1.	Assistant Policy Analyst	SG7
2.	Policy Analyst	SG8
3.	Senior Policy Analyst	SG9
4.	Principal Policy Analyst/Director Policy	SG10

III. QUALIFICATIONS, EXPERIENCE AND PROGRESSIONS

1. Assistant Policy Analyst SG7

1.1 Recognised qualifications and requirements for the post.

Bachelor's Degree in Social Science, Economics, Resource Management, Law or related field.

Note:

i. Graduates entering at this level will benefit from the graduate housing allowance for a period of 36 months provided that they have been absent from the Republic on a training course of a duration not less than 24 months and have graduated with a first degree equivalent qualification or have graduated with a first degree qualification from a local University/Institution. Claim for the allowance should be in line with PSO 39. All claims will be subject to approval by the department of Public Administration. Upon *cessation* of the housing allowance, Graduates who are not being promoted will be enhanced to SG8, step 10 whilst still retaining their post title.

ii. Upon completion of five years post qualifying experience, Graduates who are not being promoted will be enhanced to SG9, step 6 whilst still retaining their post title.

2. Policy Analyst SG8

2.1. Recognised qualifications and requirements for the post

i. Bachelor's Degree in Social Science, Economics, Resource Management, Law or related field plus three years relevant work experience or as an Assistant Policy Analyst SG7. **OR**

ii. Master's Degree in Social Science, Economics, Resource Management, Law or related field plus one year relevant post-qualifying work experience.

3. Senior Policy Analyst SG9

3.1. Recognised qualifications and requirements for the post.

i. Bachelor's Degree in Social Science, Economics, Resource Management, Law or related field plus five years relevant work experience; **OR**

ii. Master's Degree in Social Science, Economics, Resource Management, law or related field plus three years relevant work experience; **OR**

iii. Two years satisfactory post-qualifying work experience as a Policy Analyst SG8.

Note: i. Graduates entering at point (ii) above may be awarded a PSC contract only upon cessation of housing allowance.

4. Principal Policy Analyst/Director Policy SG10

4.1. Recognised qualifications and requirements for the post.

i. Master's Degree in Social Science, Economics, Resource Management, Law or related field plus five years relevant work experience or two years post qualifying work experience as a Senior Policy Analyst SG9.

IV. TRAINING SCOPE AND ENHANCEMENT.

Employees in this cadre will be further compensated for additional qualification that is relevant to their field of work if they possess qualifications at the following levels:-

i) National/Advanced Certificate - move one step on the allocated salary grade upon successful completion of the training and after having produced a copy of the qualification.

ii) National Diploma - move two steps on the allocated salary grade upon successful completion of the training and after having produced a copy of the qualification.

iii) National Advanced Diploma -move three steps on the allocated salary grade upon successful completion of the training and after having produced a copy of the qualification.

Note: The qualifications must be relevant to the area of work and must not be the qualification required for the post.

V. ALLOWANCES

All allowances below are payable on a monthly basis

1. **Inducement Allowance**

Professionals in this cadre are widely qualified and are scarce resources. They have important responsibilities and are held accountable for ensuring accurate information is provided for policy decisions. Policy Analysts can also be easily enticed to take other challenging positions–in the country.

To ensure continuity and to entice these employees to remain in the Public Service this category of employees will be paid an inducement allowance, at the rate listed in the table below, in addition to their basic salary.

Normal annual leave and sick leave up to 30 days will not affect payment of the allowance.

The allowance rate is inclusive of income tax and will be paid in respect of all cadre members who have been confirmed in post as follows:

POST TITLE	Rate
Assistant Policy Analyst SG7	SR 2000.00
Policy Analyst SG8	SR 2,400.00
Senior Policy Analyst SG9	SR 3,000.00
Principal Policy Analyst/Director Policy SG10	SR 4,000.00
Director General with specific responsibility for policy matters	SR 4,500.00

Note:

i. PSC holders will be paid their Inducement allowance at the rate prescribed in the table above, over and above their PSC salary;
ii. Graduates will be paid a basic salary on the wage grid, graduate housing as applicable and the approved inducement as per the table above.
iii. The rates of Inducement covers for any work performed outside the normal working hours, therefore no overtime is to be paid to staff receiving the Inducement Allowance.

2. Marketable Skills Allowance (to be paid under code 50)

A Marketable Skills Allowance will be paid to members of this cadre, in recognition of the fact that their specialized skills and expertise are highly sought after in the private sector. The allowance rates listed in the table below are inclusive of income tax and are subject to acquisition of the following qualifications:

QUALIFICATION	Rate
Bachelor's Degree in Social science related subject, Economics, Finance, Law, Trade, International Business or relevant field.	SR 1200.00
Post Graduate Diploma in Social science related subject, Economics, Finance, Law, Trade, International Business or relevant field.	SR 1300.00
Master's Degree in Social science related subject, Economics, Finance, Law, and Trade, Business Administration or relevant field.	SR 1400.00
Doctorate Degree in Social science related subject, Economics, Finance, Law, Trade, Business Administration or relevant field.	SR 2000.00

Note: Cadre members will be rewarded for the highest certificate at any given time either upon appointment or during the course of employment upon acquisition of the necessary recognized qualification

VI. PROVISIONS OF POST AND JOB DESCRIPTION

A Scheme of Service does not in itself constitute authority for creation or upgrading of posts. Any new posts required under this new Scheme of Service will require approval in accordance with normal established procedures. The organization shall be responsible to develop job descriptions and amend them from time to time as appropriate.

VII. IMPLEMENTATION OF THE SCHEME

This Scheme of Service will become operational with effect from 1st January 2013. On implementation all Policy Analysts who do not fall in any other technical schemes in the Public Service should abide to this Scheme.

Status: Approved.