SHORTER-TERM INTERNATIONAL MOBILITY AS AN INSTRUMENT FOR CAREER ADVANCEMENT OF NEXT GENERATION, EMERGING AND ESTABLISHED RESEARCHERS IN SOUTH AFRICA

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DECLARATION OF AUTHENTICITY

I declare that the thesis titled *shorter-term international mobility as an instrument for career advancement of next generation, emerging and established researchers in South Africa*, is my own work and that each source of information used has been acknowledged by means of a complete reference. This thesis has not been submitted before for any other research project, degree or examination at any university.

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LIST OF ACRONYMS

AcceINET	Accelerating Research through International Networks
ACU	Association of Commonwealth Universities
AiF	German Federation of Industrial Research Association
AIST	Japanese National Institute of Advanced Industrial Science and Technology
ARC	Agricultural Research Council
ARUA	African Research Universities' Alliance
AU	African Union
AvH	Alexander von Humboldt Foundation of Germany
BMBF	German Federal Ministry of Education and Research
CHE	Council on Higher Education
CIDA	Canadian International Development Agency
CPUT	Cape Peninsula University of Technology
CUT	Central University of Technology
CUT	Committee of University Principals
DAAD	German Academic Exchange Service
DALRRD	Department of Agriculture, Land Reform and Rural Development
Danida	Danish International Development Agency
DFG	German Research Council
DHET	Department of Higher Education and Training
DLHE	Destination of Leavers from Higher Education
DOH	Department of Health
DSI	Department of Science and Innovation
DUT	Durban University of Technology
EAIE	European Association for International Education
EC	European Commission
ECA	Economic Commission for Africa
EDI	Equity, Diversity and Inclusion
EHEA	European Higher Education Area
ERC	European Research Council
EU	European Union
GATS	General Agreement on Trade in Services
GDP	Gross Domestic Product
HAIs	Historically Disadvantaged Institutions

HCD	Human Capacity Development
HDIs	Historically Disadvantaged Institutions
HEIs	Higher Education Institutions
HEMIS	Higher Education Management Information System
HERSs	Higher Education Ranking Systems
HESA	Higher Education Statistics Agency
IAU	International Association of Universities
ICSU	International Council for Science
ICTP	International Centre for Theoretical Physics
IEASA	International Education Association of South Africa
IIE	Institute of International Education
INDOGFOE	Indo-Germany Frontiers of Engineering Symposium
IRES	International Research Experiences for Students
JINR	Joint Institute for Nuclear Research
JSPS	Japan Society for the Promotion of Science
JST	Japanese Science and Technology Agency
KIC	Knowledge, Interchange and Collaboration
MBA	Masters' Degree in Business Administration
MEA	Mobility Excellence Awards
MEXT	Ministry of Education, Culture, Sports, Science and Technology
MRC	Medical Research Council
MSCA	Marie Skłodowska-Curie Actions
MUT	Mangosuthu University of Technology
NCHE	National Commission on Higher Education
NDP	National Development Plan
NEDO	New Energy and Industrial Technology Development Organisation
NMU	Nelson Mandela University
NRF	National Research Foundation
NSF	National Science Foundation
NSFC	National Natural Science Foundation of China
NSI	National System of Innovation
NWU	North West University
ODA	Official Development Assistance
OECD	Organisation for Economic Co-operation and Development
OISE	USA's Office of International Science and Engineering
PIRE	Partnership for International Research and Education

PSET	Post School Education and Training
RDG	Research Development Grant
RF	Return Fellowships
RIKEN	Japanese Institute for Physical and Chemical Research
RISE	Research and Innovation Staff Exchange
RU	Rhodes University
SADC	Southern African Development Community
SANCOR	South African Network for Coastal and Oceanic Research
SASAC	South African Systems Analysis Centre
SIDA	Swedish International Development Agency
SMEs	Small and Medium Sized Enterprises
SMU	Sefako Makgatho University
SP	Strategic Partnerships
SPP	Strategy, Planning and Partnerships
SPU	Sol Plaatje University
STEM	Science, Technology, Engineering, and Mathematics
STI	Science, Technology and Innovation
STiM	Shorter-Term international Mobility
STINT	Swedish Foundation for International Cooperation in Research and Higher Education
SUN	University of Stellenbosch
TUT	Tshwane University of Technology
UCT	University of Cape Town
UFH	University of Fort Hare
UFS	University of Free State
UJ	University of Johannesburg
UK	United Kingdom
UKZN	University of KwaZulu-Natal
UL	University of Limpopo
UMP	University of Mpumalanga
UNISA	University of South Africa
Univen	University of Venda
UniZulu	University of Zululand
UP	University of Pretoria
USA	United States of America
USAf	Universities South Africa
UUK	Universities UK

UUKi	Universities UK International
UWC	University of the Western Cape
VUT	Vaal University of Technology
WASU	Walter Sisulu University
WITS	University of the Witwatersrand

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ABSTRACT

South Africa, like many countries in the global south, continuously examine the value and relevance of internationalisation. Particular considerations include the type(s) of internationalisation practices suitable for the country, especially in the context of a transforming higher education system. The role of government and funding agencies as enablers of the internationalisation practice have emerged strongly in these debates. Several factors have been cited as the primary reasons why governments and funding agencies would show interest and invest in internationalisation. These include, amongst others, an increase in research productivity; access to resources beyond national borders; improvement in teaching and learning processes, and curriculum development; and expansion of academic networks, mobility and research partnerships.

However, most of the benefits of internationalisation mentioned above are associated with long-term and short-term visits abroad (of more than three months) and rarely with Shorter-Term international Mobility (STiM). The value of STiM as an aspect of internationalisation has not yet been fully explored in literature. Where this approach has been covered, it largely is in casual terms whereby STiM is regarded mainly as an instrument for advancing interpersonal and intercultural skills. This study sought to illustrate the potential of STiM beyond interpersonal skills by analysing its prospects in advancing the academic and research capacity of researchers. The Knowledge, Interchange and Collaboration (KIC) programme, a shorter-term mobility and networking programme by the National Research Foundation (NRF) of South Africa, was explored as an illustration. The aim of the study was to assess the contribution of this KIC programme on the academic and research career progression of researchers in South African institutions of higher learning.

A quantitative research methodology was used and data extracted from 1 230 travel reports submitted to the NRF between 2017 and 2019 were analysed. An online questionnaire was also administered to supplement the main data for the study. The data were analysed using a combination of correlation coefficient, graphs, clustered bar charts, stacked bar charts, and cross tables for the descriptive statistic. Five key

elements emerged from the data analysis in relation to the contribution of STiM on the research career development of researchers. These include the number and quality of research outputs produced in collaboration with international partners; the ease with which established researchers are able to use STiM for the international exposure of their postgraduate students; the rate at which researchers are attracting additional sources of research funding; the recognition that emerging researchers receive in terms of NRF rating; and the manner in which researchers are able to sustain their international partnerships post the STiM funding period.

Based on the findings, practical and operational recommendations are offered in the form of a framework for the effective coordination and management of STiM. The aim is to highlight critical factors to be considered in the design, implementation, monitoring and evaluation of STiM programmes for value addition. The main findings of this study show that, if well structured, efficiently coordinated, and properly managed, STiM has the potential to provide a strong base where long-term sustainable collaboration can develop for the effective internationalisation of higher education.

Key words: Internationalisation, shorter-term international mobility, National Research Foundation, higher education, research.

CHAPTER 1: INTRODUCTION AND BACKGROUND

1.1 Introduction

The definition of internationalisation has been evolving since the 1980s. In earlier years, it was defined in terms of its activities, programmes, strategies and policies (Knight, 1994; Arum and van der Water, 1992). With the continuous changes in the role and positioning of higher education, internationalisation is now viewed in a much broader sense, as a process of change and a way of transforming higher education (de Souza *et al*., 2020; de Wit, 2015). It is currently accepted as a practical application of approaches, processes, and activities meant to improve Higher Education Institutions (HEIs) including the performance of researchers (de Wit and Altbach, 2021; Marinoni, 2019; Crăciun, 2018; Ilieva, Killingley, Tsiligiris and Peak, 2017; Gao, Baik and Arkoudis, 2015; Bostrom, 2010).

Although a number of benefits of internationalisation of higher education have been well documented (Rostovskaya *et al*, 2020; Mouton, Basson, Blanckenberg, Boshoff, Prozesky, Redelinghuys, Treptow, van Lill and van Niekerk, 2019; Ilieva *et al*., 2017; Egron-Polak *et al.*, 2015) there are however, unintended consequences (political and ethical) that cannot be ignored. Advocates of this process report the following as some of the benefits of the internationalisation of higher education: increase in academic mobility, development of intercultural understanding, global competencies, regionalisation of programmes, improvement in accreditation and ranking of institutions, tenure and promotion trajectories, increase in research productivity/ outputs, access to resources, improvement in teaching and learning processes and curriculum, expansion of academic networks and research partnerships (Tight, 2022; Knight, 2020; Ledger and Kawalilak, 2020; Rostovskaya *et al.*, 2020; Egron-Polak *et al.*, 2015).

As much as there are opportunities that come with the internationalisation process, there are also risks that should be mitigated, these include: rogue international providers, commercialisation of international student recruitment and mobility, impediment to higher education transformation and decolonisation, exclusions and

elitism, brain drain, including standardisation and quality standards (Leal, Finardi and Abba, 2022; Tight, 2022, Knight, 2020; de Souza *et al.*, 2020). Even with all these complexities and challenges, scholars agree that internationalisation is a vital part of a successful academic and research career. One of the activities associated with this is academic mobility, networking and partnerships. These activities are measured using metrics such as the number of co-authored publications in peer reviewed high impact journals, joint or collaborative research projects, international exchanges, access to resources, and participation in key international conferences, seminars and symposia (Ilieva *et al*., 2017; Ackers, 2010).

While initially the intensity of the international mobility of scholars was the concern of individual researchers, this has progressively shifted to being a concern for a broader section of stakeholders such as university management, funding agencies, and government (Nziku *et al.*, 2021; Slipchuk *et al.*, 2021; Smeds and Jones, 2020; Varghese, 2020; Kabanbayeva *et al*., 2019; Tran and Marginson, 2018). These stakeholders are now investing time and financial resources in designing international strategies and programmes in order to create an enabling environment for researchers to easily develop networks with their international counterparts (de Wit and Altbach, 2021; Ilieva *et al.*, 2017; Ackers, 2010).

It is within this context that the National Research Foundation (NRF), a South African independent government funding agency established through the NRF Act no. 23 of 1998 (as amended), places a high priority on international mobility programmes and international research networks as key imperatives for fostering and strengthening research excellence across the country's National System of Innovation (NSI) (NRF Vision, 2030). This research study therefore, analyses the NRF's international mobility and networking programmes and determine the type of contribution they make in the growth and development of researchers for the effective internationalisation of the South African higher education system.

1.2 Shorter-term mobility for internationalisation of HE

Since the 1990s, different scholars have defined the internationalisation of higher education in various ways; for example, Arum and van de Water (1992) defined it in terms of various activities, projects, and programmes taking place at HEIs. Knight's (1994) earlier definition describes internationalisation as an action that takes into account the university's international and intercultural aspects of teaching, research, and community service'. This definition recognises internationalisation as a process. In 2012 however, Knight expanded her definition by making a distinction between '*internationalisation at home*' and '*cross border education*' or '*internationalisation abroad'* which emphasises mobility in its different forms; for example, mobility of people, mobility of programmes, and mobility of providers. This extended definition, in particular the '*internationalisation abroad*' aspect as it relates to mobility of researchers, is the main focus of this research study.

Knight (2012) further identifies four different approaches to internationalisation; which include the process, activity, competency, and organisational approaches. Of particular interest to this study are both the activity and competency approaches. The activity approach defines internationalisation as a series of activities within a university, one of which is short-term mobility (Harari, 1992) while the competency approach views internationalisation in terms of developing researchers' capacities, skills and knowledge (Knight, 1994; van der Wende, 2007). The focus in the latter is on the human dimension, while the former focuses on academic activities. This research study examines the different ways in which an activity approach to internationalisation can affect the competency approach.

Recent studies have focused on the distinction between cross-border education, also known as outward or outbound mobility, which means mobility in terms of researchers going outside their country of origin; and internationalisation at home or inward/inbound mobility, referring to mobility of researchers coming into the host country (Erdei and Káplár-Kodácsy, 2020; Yang *et al*., 2020; Ivancheva and Gourova, 2011). In terms of this classification of mobility, this research study focuses on the analysis of outward (outbound) mobility. The most recent definition however, is the one that recognises

internationalisation as a process of change, shifting from an activity based definition to a process one (de Souza *et al.*, 2020). This definition presents internationalisation as a transformational process, transforming higher education for the better. This definition makes allowance for countries like South Africa to reimagine internationalisation in line with critical national debates such as the decolonisation of higher education. The definition allows for internationalisation that is contextually relevant where plurality of knowledges could potentially be respected.

International mobility has become an integral part of the research process. The mobility of researchers has, over a number of years now, been viewed as an indication of excellence (Erdei and Káplár-Kodácsy, 2020; Ackers, 2008). This has made international mobility the most sought-after activity for the internationalisation of higher education. The value of international mobility on the career development of researchers and those involved in the practice is widely acknowledged. Research scholars at HEIs increasingly find themselves pressured to engage in international partnerships and expand their international networks. International networks provide researchers and institutions access to opportunities and knowledge facilities they might not otherwise have access to. Through international university partnerships and staff and faculty exchanges, scholars and universities in the global south can thus benchmark themselves with the best in the world.

This can enhance and strengthen an individual researcher's research profile by providing new opportunities to publish jointly conducted research results in internationally accredited journals, as well as improving the university's international ranking. (Scott, 2015; Knight, 2012). Notwithstanding the above, the assessment of international mobility and networking programmes, and the potential benefit on individual researchers in South Africa has received considerable attention with the analysis differing in terms of the duration of the visit. There is ample research on long-term and short-term mobility of more than a month in duration (Laakso, 2021; Blankvoort, Kaelin, Poerbodipoero and Guidetti, 2019; Nguyen, 2017) however, there are only a few studies specifically synthesising the impact of short-term international mobility that is a minimum of three days and a maximum of four weeks. Those studies that have reported on this type of mobility (Guthrie, Lichten, Harte, Parks and Wooding,

2017; Farrugia and Sanger, 2017; Galipeau-Konate, 2015; CFE Research, 2014) present sets of benefits (e.g. cognitive, interpersonal, or intercultural) that are different from those usually presented under long-term international mobility.

The study finds this to be problematic, especially since a large number of international academic mobility programmes could easily be classified as short-term. In addition, stakeholders across the board are beginning to devote more resources to supporting short-term trips abroad, to the point that they have begun to replace longer visits (Allinson and Stevenson, 2021). National funding agencies, such as the NRF, implement programmes of this nature with little quantifiable evidence for the return on investment.

Funding agencies across the world, such as the German Academic Exchange Service (DAAD), the Alexander von Humboldt (AvH) Foundation, also based in Germany, the Swedish Foundation for International Cooperation in Research and Higher Education (STINT), the National Science Foundation (NSF) in the United States of America (USA), the Japan Society for the Promotion of Science (JSPS in Japan), the National Natural Science Foundation of China (NSFC), amongst others, have invested in structured mobility programmes as a way of advancing their national research capacities. Even at regional levels, there has been an increase in the amount of funds allocated for international mobility. One example of this is the Marie Skłodowska-Curie Actions (MSCA) under the European Commission's research and innovation framework programme, which aims to promote staff exchanges and mobility between European researchers and the rest of the world. These actions are meant to encourage collaboration and the sharing of ideas between different sectors and research disciplines. The Research and Innovation Staff Exchange (RISE) programme within MSCA in particular, funds short-term exchanges between academic, industrial, and commercial organisations throughout the world (EC, 2020).

In South Africa, the NRF also has a number of international programmes that promote and support the mobility of individual researchers as a way of increasing the global competitiveness of the South African NSI. However, the real impact of these programmes has not yet been quantified. Between 2016 and 2019 the NRF sponsored

a study interrogating the 'Mobility of the Highly Skilled' (MOTHS) (Kahn and Oghenetega, 2021). Although critical, the approach used in the MOTHS study differed significantly from this research study. The MOTHS study interrogated the flow of international students to and from South Africa, and the reasons why international African students chose to study in South Africa, focusing primarily on study abroad, which is classified as long-term mobility (Kahn and Oghenetega, 2021). In contrast, this study focuses on the advantages of short-term visits for researchers.

Some of the aspects associated with short-term visits, i.e. the duration, timing, actual destinations, nature of the visit, and sustainability of the networks established, have not been fully explored (Wohlert, Norm, Seidelin and Klöcker-Gatzwiller, 2016) especially in terms of advancing the academic career of researchers. The uniqueness and value of this study is in the type of international mobility programmes analysed. Short-term mobility is mostly defined as study or research visits abroad that are at least a minimum of one month in duration. The duration for short-term is also viewed in terms of semesters, as any trip that is less than a semester (Western Sydney International, 2021), or less than three months (Haupt, 2021).

When defined this way, it becomes inclusive of a variety of activities such as research field trips, internships, study tours, short courses, summer schools, and academic positions as a visiting scholar, amongst others. Focused research is required to analyse the benefits of research visits abroad that are less than a month (i.e. a minimum of three days and a maximum of four weeks), hence the emphasis here on 'shorter-term' international mobility (STiM) instead of the traditional 'short-term'.

The study presents different ways in which these types of mobility programmes could be efficiently coordinated and managed for effective internationalisation of higher education. Both the literature review and the outcomes of the data analysis are used to present a framework describing processes, at an operational level, that could be used as a reference for the effective coordination and management of STiM. It is anticipated that such an operational framework, once properly implemented, can serve as an illustration of how an activity, as subtle as STiM, can potentially contribute to

advancing the academic careers of researchers, and ultimately enhancing the quality of higher education.

1.3 Rationale

As indicated above, the potential academic-related benefits of international mobility and networking programmes on individual researchers have largely been linked to long-term mobility. Only in the last few years have scholars begun documenting how short-term international mobility can contribute to the growth and development of researchers (Allinson and Stevenson, 2021; Erdei and Káplár-Kodácsy, 2020). According to Farrugia and Sanger (2017)'s study on the impact of study abroad on careers and skills in the 21st century United States, only well-structured short-term international mobility programmes can have a meaningful impact on skills and career prospects. This case study highlights short-term mobility as being effective in developing researchers' skills in terms of their cognitive, interpersonal and intercultural abilities.

Some of the benefits that have been recorded in terms of short-term mobility include increased possibilities for future career development, improved confidence, academic skills enhancement, enrichment of the research or study topic (Allinson and Stevenson, 2021), as well as the notion of ensuring complementary experiences including earning respect and politeness at all levels (Ivancheva and Gourova, 2011). The benefits are usually linked to the facilitation of networks for the exchange of knowledge and the transfer of interpersonal skills. In-depth research interrogating the link between STiM and academic research, teaching, and community service is required, as observed by Haupt (2021). There is insufficient evidence that clearly demonstrates the benefits of STiM programmes for researchers beyond those relating to interpersonal skills (Laakso, 2021; Blankvoort *et al.*, 2019; Nguyen, 2017). This is the knowledge gap the study is aiming to address. This study therefore, endeavours to interrogate the link between STiM programmes and some of the reported academic-related benefits of internationalisation (i.e. the quantity and quality of academic research outputs, support for postgraduate students, access to additional research funds, advancement in academic standing, and long-term sustainability of partnerships).

The study analyses STiM for all the three categories of researchers mentioned below (NRF, 2021; DHET, 2019; DST, 2018; Beaudry, Mouton and Prozesky, 2018):

i. Next generation researchers: researchers currently completing doctoral studies.
ii. Emerging researchers: researchers with doctoral degrees and working towards their postdoctoral research or are employed as academics in universities.
iii. Established researchers: professors at universities or science councils who are also experienced supervisors.

It is critical to focus on all three categories of researchers as investment in this type of mobility and networking programmes is usually made across the spectrum.

1.4 Significance of the study

It has been argued that the actual academic benefits that an international mobility programme provides depend largely on the design of the programme and its beneficiaries/ participants (Perna, Orosz, Jumakulov, Kishkentayeva and Ashirbekov, 2015). This study therefore strives to document, in details, the contribution of STiM programmes in advancing researchers' academic and research career. Knowledge of the real contribution of STiM is particularly important to funders, such as the NRF, who spend significant amounts of resources supporting these programmes. For instance, the NRF invested R39 165 125 million in 2016, and on average R36 159 366 million per annum (2017-2019) for all its international networking grants (travel, training, and conference). The amount reduced significantly in 2020 (R8 380 444 million) and 2021 (R5 014 326 million) due to the COVID-19 global pandemic which imposed international travel restrictions across the globe (summarised in Figure 1.1 below).

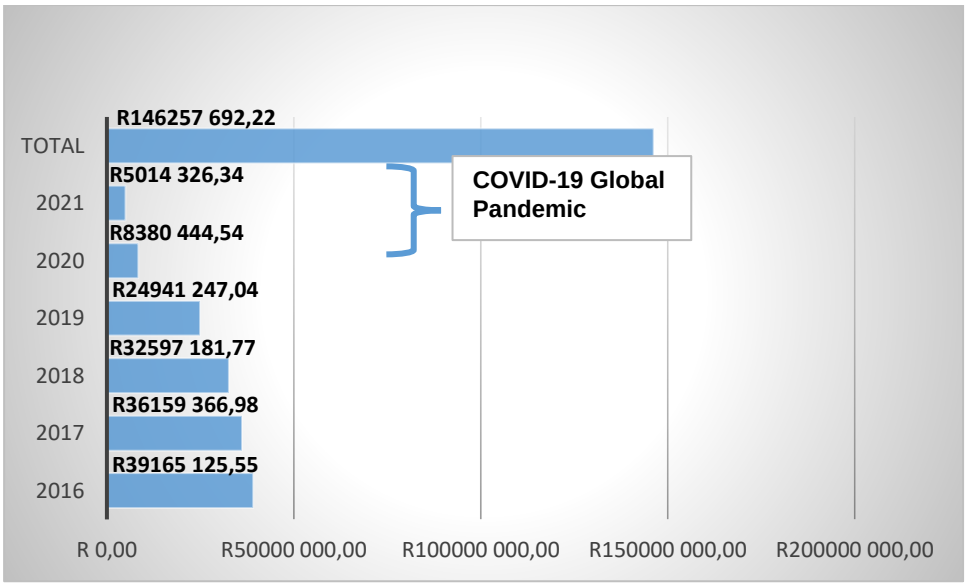


Figure 1-1: NRF Investment: networking grants, 2016-2020 (NRF resources)

This study is highly critical since the case for maintaining and continuing support for these types of international mobility and networking programmes depends largely on the ability to demonstrate returns on investment and a long-term positive impact based on measurable outputs and outcomes, as derived from empirical data.

1.5 Problem statement

The problem that this study seeks to address concerns the lack of quantifiable and sufficient evidence of the contribution of STiM on the academic career progression of researchers. Although there is extensive research on long-term and traditional short-term mobility, there has not been comprehensive research on STiM and its effects on the career development and growth of individual researchers. This is a challenge since a large number of stakeholders across the spectrum, including governments, devote major resources in supporting short-term trips abroad. This study therefore provides a more focused, in-depth assessment of STiM programmes and their contribution to the academic career of researchers based at South African HEIs. It is envisaged that evidence of the contribution of STiM programmes may inform future planning, as well as offer practical recommendations for value add and ensuring return on investment.

1.6 Aim and objectives of the study

The aim of this study is to assess the contribution of STiM programmes of the NRF, known as the Knowledge, Interchange and Collaboration (KIC) Programme, between the period 2017 to 2019 (inclusive), on the career progression of the next generation, emerging and established researchers in South African HEIs. Through the review of literature and data analysis, the study seeks to draw lessons and best practices in order to develop an operational framework for targeted outcomes; a framework that can serve as a starting point towards establishing a comprehensive STiM approach for the internationalisation of higher education. Based on this, the specific objectives of the study (relating to the beneficiaries of the four categories of researchers embedded in the KIC programme) are to:

i. evaluate the outcomes of the KIC programme of the NRF in relation to its intended objectives;
ii. examine the contribution of the KIC programme on the academic work and career of the next generation, emerging, and established researchers in South African HEIs; and
iii. propose practical recommendations on the coordination and management of the KIC programme for value addition and return on investment.

1.7 Main research question

The main research question for this study is:

To what extent can the KIC programme be used to advance the academic career of researchers based at South African HEIs?

Throughout the literature, as indicated in Chapter 2, it is argued that an academic career and international exposure are interlinked (Laakso, 2021; Blankvoort *et al.*, 2019; Nguyen, 2017; Wohlert *et al.*, 2016) and that international networks are actually a means to strengthening the quality of research for any HEI. In the literature, this statement is mostly confirmed through the analysis of long-term and short-term mobility

(of minimum one month). The unique intervention of this research study is in its focus and analysis of the international mobility programmes that are a minimum of three days and maximum of four weeks in order to determine the value addition of these programmes.

1.8 Hypotheses

The study tested a few hypotheses as a way of responding to the above-mentioned research question. According to Sarwono (2022) and Supriadi and Pheng (2018) a hypothesis is a prediction or an educated guess that is made based on what the researcher reads in the literature. This is a preliminary conclusion made by a researcher before beginning to conduct an investigation. The hypothesis may be rejected, confirmed or refined at the end of the investigation, and the researcher may make new recommendations as a result. The following hypotheses were tested during the data collection and analysis process:

i. There is a difference in the number of research outputs produced by researchers at South African HEIs between the types of shorter-term international mobility and networking programmes.
ii. There is a difference in the quality of research outputs produced by researchers at South African HEIs between the types of shorter-term international mobility and networking programmes.
iii. There is a difference in the opportunities for postgraduate students at South African HEIs to get international exposure between the types of shorter-term international mobility and networking programmes.
iv. There is a difference in the amount of additional funding that researchers at South African HEIs manage to leverage between the types of shorter-term international mobility and networking programmes.
v. There is an association between the types of shorter-term international mobility and networking programmes and the extent of collaboration between researchers in South African HEIs and their international counterparts.
vi. There is a link between the rating categories of researchers at South African HEIs and shorter-term international mobility and networking programmes.

1.9 Scope of the study

This research study focused on the analysis of the STiM programme managed and administered by the NRF, known as the KIC programme. The study investigated the contribution of the KIC programme on the academic career of researchers based at South African HEIs. The KIC programme was selected for the study because it currently serves as South Africa's largest mobility programme, supporting South Africa-based researchers to increase and expand their international networks. There are four categories of support within the KIC programme, all of which are interrogated in this study:

i. Travel Grants for Individual Researchers: Supporting next generation, emerging and established researchers visiting their international counterparts and/or institutions outside the African continent.
ii. Africa Interaction: Supporting next generation, emerging and established researchers travelling to or from other African countries.
iii. Visiting Foreign Researcher: Supporting emerging and established researchers to host their international counterparts in their home institutions for research-related activities.
iv. Local Scientific Events: Supporting emerging and established researchers to host international events in partnership with scholars from outside the country.

Through these four categories, the NRF supports all levels and different numbers of researchers, depending on the availability of funds in any given financial year. Between 200 and 500 applications are supported annually, with an average of R10-R15 million per annum, of which approximately 40% are focused on the African continent. Only researchers who have been beneficiaries under these four categories of the KIC programme during 2017 to 2019 (inclusive) formed part of this research study. Therefore, researchers who were awarded a KIC grant prior to 2017 and post 2019 were excluded from this study.

1.10 Research philosophy, epistemology, ontology and methodology

Epistemology refers to the study or theory of knowledge and its justifications and ontology refers to the nature of reality (Sarwono, 2022; Akpan, Atakpa and Nsit, *undated*, Levers, 2013; Tuli, 2010). Epistemology therefore explains how people come to know what they know, and it is about the means, conditions and methods used to acquire knowledge (Sarwono, 2022). Ontology refers to the nature of being; i.e. what is true/ real or what exists. According to Sarwono (2022), epistemology is directly linked to both ontology and methodology. While ontology describes the nature of reality, epistemology explains how we acquire knowledge, and methodology outlines how we proceed to achieve knowledge (Sarwono, 2022; Akpan *et al., undated*; Levers, 2013; Tuli, 2010; Neuman, 2014). It is therefore critical to outline the epistemological, ontological, and methodological paradigms grounding this research study, because, as indicated in Sarwono (2022), theories (epistemology) and beliefs (ontology) shape our choice of research design (methodology). These three paradigms are interlinked and describing them here allows the reader to fully comprehend, appreciate, and understand the logic behind the general research strategy, the approach to research design, and the primary data collection methods used.

At the time of this research study, the researcher was an employee of the NRF, working as a Director responsible for managing all overseas collaborative research grants. The primary focus of the researcher's portfolio in this regard was to facilitate, promote, and support South Africa's science, technology and innovation engagements overseas, in close collaboration with the National Department of Science and Innovation (DSI). These initiatives included the implementation of inter-governmental and inter-agency bilateral and multilateral agreements through funding joint research projects, with an emphasis on capacity development in key strategic areas.

In addition, this role enabled the researcher to facilitate South African participation in global scientific and research engagements. The NRF, at the time of this study, was administering and investing in approximately 45 (overseas and African) bilateral science and technology agreements, 30 international scientific unions, and 10 strategic and multilateral engagements. A traditional approach to implementing these

agreements, especially for supporting the international mobility of researchers, was through the provision of funds to a single researcher to participate in conferences, undertake a short research stay abroad, host international experts, or provide international exposure to his/her postgraduate students. Therefore, one of the main interests for the researcher was to find ways of quantifying whether the resources invested to support international mobility within all these agreements were of benefit; not only to the individual researcher but to the research community at large, in order to stimulate long lasting activities for effective return on investment.

Given the importance of this study, it became crucial for the researcher to be aware of, and acknowledge, her own views and experiences gained through managing these international mobility programmes and not to allow her role to intervene with the process of unbiased research. This study therefore required the researcher to adopt an objectivist stance in order to ensure a research methodology that is objective and detached. To ensure this objectivity, the researcher retained independence from the research itself by maintaining no interaction with the research participants.

Because this research study based its knowledge solely on observable facts, the study took a positivist approach to theory. According to Kelly (2018), Akpan *et al.* (*undated*) and Neuman (2014) positivists use both deductive reasoning and empirical data to examine social science in order to uncover a cause and effect relationship between variables for purposes of establishing patterns. In this approach therefore, the objective of the study is independent, knowledge is gained through theory, confirmed through observations or measurements, and facts are established by probing the different parts of the phenomenon. According to the positivists, reality exists outside of our minds and is entirely determined by the laws of cause and effect (Sarwono, 2022; Kelly, 2018; Akpan *et al., undated;* Neuman, 2014).

Working according to this paradigm, quantitative research methodologies were used to analyse the interaction between the different variables and the effect these interactions have on a specific outcome. Adopting a positivist approach ensures that the researcher's role is confined to data collection and interpretation using objective methods, thereby making allowance for research findings that are observable and

quantifiable. It was important for the researcher to remain detached and independent from the subjects of her investigation, considering her role within the NRF at the time this research study was conducted.

Using quantitative research methods, travel reports submitted to the NRF by the KIC beneficiaries were analysed as the main source of data for the study. To supplement this data, a survey instrument (i.e. online questionnaire) was developed and submitted to the beneficiaries. Bivariate analysis was used to determine the extent to which the value for one variable (i.e. dependent variable) could be predicted if the value of the other variable was known (i.e. independent variable). To scientifically determine the relationship between these two variables, a correlation coefficient was tested in some of the hypotheses. In stances whereby correlation coefficient could not be used, descriptive methodologies (such as graphs, clustered bar charts, stacked bar charts, and cross tables) were utilised for the descriptive statistics.

1.11 Structure of the study

This chapter (i.e. Chapter 1) provides the overall context, aim, objectives and rationale for this research study. Moreover, the chapter describes both the philosophical and theoretical approaches underpinning this study, the scope, main research question, and the different hypotheses that were tested. Chapter 2 includes an elaboration on the identified research problem and defines the main concepts and terms. Further to this, the chapter outlines the review of the relevant literature whereby the views of other scholars on the research topic are presented in a logical manner. The hypotheses that were tested in this study were extracted from this literature review.

Chapter 3 outlines the research design, method, and data collection tools selected for this study. It further explains the population and the sampling aspect, including the ethical issues that were considered. Chapter 4 presents an analysis of the profile of the beneficiaries of the KIC grant during the three year period under review. This analysis cover demographics such as race, gender, citizenship, amounts awarded, institutional types, etc.

The findings from the data extracted from the KIC travel reports and online questionnaire are presented, analysed and discussed in Chapter 5. Analysis is done using a combination of correlation coefficient, graphs, clustered bar charts, stacked bar charts, and cross tables. This chapter also links the findings to the literature reviewed in Chapter 2.

Chapter 6 offers recommendations in a form of an operational framework that can be utilised for better coordination and management of STiM programmes for value addition and ensuring return on investment. Chapter 7 concludes the research work by acknowledging the limitations of the study and highlighting the scope for future studies within this research area.

CHAPTER 2: LITERATURE REVIEW

2.1 Approach to theory development

This research study followed a deductive approach to theory development whereby, in line with Neuman's (2014) description, the researcher began by interpreting abstract concepts and theoretical relationships and progressed towards concrete empirical evidence. The researcher therefore argued and reasoned from the general to the particular. This approach allowed the researcher to extract assumptions from the theory and develop new hypotheses to test in the field in order to determine the correlation between an independent and dependent variables. As is generally the case with many studies using a deductive approach, the following steps, in line with Neuman's deductive theory approach (Neuman, 2014), were followed:

i. Consulted existing literature on the topic (Chapter 2).
ii. Made use of the literature to *deduce* and *formulate* hypotheses (Chapter 3).
iii. Used the hypotheses to *test* the correlation coefficient (see Chapters 4 and 5).
iv. Results of the test were *analysed* to determine the relationship between the independent and the dependent variables (see Chapters 4 and 5).
v. Based on the analysis, *recommendations* are provided and *decisions are made* to generate new frameworks (see Chapters 6 and 7).

In alignment with the deductive approach, this chapter presents the views of other scholars on the research topic. The chapter starts by providing definitions and examining the status quo of the internationalisation of higher education as a key concept for this research study. From this in-depth discussion, the chapter analyses short-term international mobility as one of the key instruments used for internationalising both the researchers and their institutions of higher learning. The discussion focuses mainly on the different ways in which short-term international mobility impacts the academic careers of researchers. It is through the discussion on short-term international mobility that the knowledge this study is trying to address is highlighted. The analysis in this chapter was also used to formulate the hypotheses listed in Chapter 3.

2.2 Definition and meaning of internationalisation

Attempts to fully understand internationalisation in higher education has led to the use of various conceptual frameworks by different scholars to develop empirical studies (Uzhegova and Baik, 2022; Jayasekara, 2020; Schuessler, 2019; Robertson, Harris and Baldassar, 2018). According to de Wit, Deca and Hunter (2015), earlier studies provide extensive research and practices on the international dimensions of higher education; using different terms that reflected some kind of international activity. These different terms were related to either mobility, such as study abroad, student exchanges, or academic mobility, or they were related to curriculum development, which included aspects such as multicultural education or international studies. These terms were historically used to describe different elements of international education (de Wit *et al.*, 2015).

de Wit *et al.* (2015) further point out that the use of the concept 'internationalisation' of higher education started appearing in publications in the 1970s but became dominant in the 1990s describing the different ways in which the international dimensions of higher education were taking shape. It is also argued that most of the earlier debates on internationalisation focused on its meaning, definition, rationale, and strategies, rather than the practical implementation and mainstreaming within HEIs and among researchers (de Wit and Altbach, 2021; Marinoni, 2019; Crăciun, 2018; Ilieva *et al.*, 2017; Gao *et al.*, 2015). Its focus and scope have evolved over the years and varies from one country to another, and has shifted from a reactive to being a pro-active strategic issue.

Scholars define and view internationalisation in different ways, depending on the context and the issues being interrogated. The complex and multifaceted nature of this phenomenon has defied scholars' attempts at arriving at a common definition. In the earlier years (around the 1990s) internationalisation was understood to signify a revolution towards a truly global society. Giddens (1990: 64) contends that it is 'the intensification of worldwide social relations that ties distant locations together so that local events are influenced by those far away. Arum and van de Water (1992) define

internationalisation in terms of multiple activities, programmes, and services that are a part of international studies, international educational exchanges, and cooperation.

Since the 1990s, different scholars have defined the internationalisation of higher education in many different ways; for example, Arum and van de Water (1992) defined it in terms of various activities, projects, and programmes taking place at HEIs. Knight's (1994) earlier definition describes internationalisation as an action that takes into account the university's international and intercultural aspects of teaching, research, and community service'. This definition recognises internationalisation as a process. In 2012 however, Knight expanded her definition by making a distinction between '*internationalisation at home*', focusing on the internationalisation of the curriculum, open access education, and international students and '*cross border education*' or '*internationalisation abroad'* which emphasises mobility in its different forms; e.g. mobility of people, mobility of programmes, and mobility of providers. This extended definition, in particular the '*internationalisation abroad*' aspect as it relates to mobility of researchers, is the main focus of this research study.

These earlier definitions view the internationalisation of higher education as a combination of activities and strategies mainly emphasising three elements; content of the curriculum, mobility of researchers, and international cooperation programmes. These definitions were later challenged by de Wit (1995) who argues that Arum and van de Water's definition was too narrow, whereas Knight's (1993) process-orientated definition was too broad providing a space for any activity to be defined as internationalisation. Indeed, a fundamental challenge for many has been with the variety of concepts used over the years in relation to the internationalisation of higher education. According to de Wit (2010), these concepts, which are either curriculum-related (e.g. international or global studies), or mobility-related (e.g. study abroad or academic mobility), points to the fact that the terminology for the internationalisation of higher education keeps on evolving.

In 2012, Knight introduced a distinction between 'internationalisation at home', which deals with the internationalisation of the curriculum and open access education, and 'cross border education' or 'internationalisation abroad'. The latter emphasises mobility

in its different forms; for instance, mobility of people, programmes, and providers (Knight, 2012). From this perspective, de Wit (2015) presented another aspect arguing that internationalisation must be considered in a broader context of the changing role and position of higher education, and should be defined as an intentional process that integrates the international, intercultural and global dimension into the purpose, functions and delivery of post-secondary education. He argued for internationalisation that enhances the quality of education and research (de Wit, 2015). Recently Knight supported this definition and agreed that with all the changes that have happened in higher education over the years, it would be limiting to define internationalisation in terms of activities and strategies alone. For Knight, internationalisation today, should be viewed as a process of change and a way of transforming higher education (de Souza *et al.*, 2020).

This definition of internationalisation is considered to be more inclusive and relevant as it presents a shift from the earlier definitions that were quite Eurocentric. This definition makes allowance for countries like South Africa to rethink internationalisation in line with critical national debates such as decolonisation, which heightened in 2015 in the aftermath of the #RhodesMustFall and #FeesMustFall university student protests of 2015 and 2016 (Heleta, 2022). These protests were mainly against the continued acceptance of the Eurocentric knowledge and worldviews at South African universities, came as a shock to the country's higher education system (Heleta, 2022; Chasi, 2021; Jabosung, Fomunyam, Walters and Fru, 2019). This current definition, allows countries to imagine internationalisation that is contextually relevant and that allows for partnerships within a decolonised higher education where plurality of knowledges could potentially be respected. This was further supported by Teferra (2020) in his article: "*from 'dumb' decolonization to 'smart' internationalisation*", in which he argue that for internationalisation to work it ought to be "locally grounded and internationally flavoured".

Instead of striving to standardise internationalisation, it is now prudent to make use of it in relation to all aspects of higher education. The definition and meaning of this concept therefore, should rely on the context under which it is promoted, and should

be understood as a means to achieving a particular end and not as an end in itself (de Wit, 2019).

2.3 Rationale for the internationalisation of higher education

Just as there are different ways of defining and describing internationalisation, there are also different motivations or reasons why institutions or government agencies pursue it. These motivations have also changed and evolved over time. In earlier years, Aigner, Nelson and Stimpfl (1992) provide three main reasons for internationalisation; namely, ensuring international security, ensuring economic competitiveness, and ensuring human understanding between different nations. Scott (1992), on the other hand, identifies a number of reasons for the internationalisation of higher education, such as economic competitiveness, working for foreign-owned companies, influence of international trade on small enterprises, supervision of graduates by people from different racial and ethnic groups, and national security.

Warner (1992) proposes three different models (i.e. the competitive model, the liberal model, and the social transformation model) when rationalising internationalisation. An economic rationale to internationalisation, as outlined in Klasek, Garavalia, Kellerman, and Marx (1992) links internationalisation to financial and entrepreneurialism, reflecting the financial crisis experienced by HEIs. This view is supported by Johnston and Edelstein (1993) when they argue that internationalisation is useful for ensuring the economic competitiveness of countries. Knight, in her 1997 study, clustered all these viewpoints into four groups (summarised in Table 2.3) to try and rationalise the divergent opinions, and as an attempt to establish a framework for the internationalisation of higher education. Qiang (2003) provides a simplified and useful summary of Knight's (1997) four groups of rationales, as summarised in Table 2.1 below:

Table 2-1: Four groups of rationale for internationalisation of HE (Qiang, 2003)

Rationale	Description
Political	Promote national security and peace among nations and preserve and promote national culture and identity.
Economic	Enhance economic, scientific and technological competitiveness and promote marketing/income generation from educational products and services.
Academic	Achieve international standards in teaching and research, ensure that research addresses international and national issues, address global interdependence through scholarship and research, and prepare graduates to be national and international citizens.
Cultural and social	Recognise and support cultural and ethnic diversity, contribute to individual social and professional development, and enhance intercultural relations and understanding.

Stier (2004) identifies three dominant ideologies for engaging in the internationalisation of higher education; i.e. idealism, instrumentalism, and educationalism. While idealism considers the belief that internationalisation can contribute to the creation of a democratic and socially just world thus promoting national or global solidarity (morality), instrumentalism is based on economics and strives to meet the demands of capitalism by describing higher education as essential for creating national wealth (global markets). The educationalist approach to internationalisation emphasises the value of learning for individual researchers going beyond the aspirations of HEIs and policy-makers. Whatever the earlier motivations were, there was always this single common thread amongst scholars, whether advocates or critiques, that is, the acceptance of the importance of internationalisation of higher education, without denying the unintended consequences that comes with it (Jibeen and Khan, 2015).

With today's definition of internationalisation, which emphasises the importance of a local context, a wide range of rationales have emerged, different across countries and within and between HEIs (de Souza *et al.*, 2020). Different countries and HEIs embrace and prioritise internationalisation for many different reasons. For example, while some may focus purely on its economic and commercial benefits, others foregrounds geopolitical influence (Teferra, 2020; de Souza *et al.*, 2020).

Notwithstanding the above, when analysing recent trends in the internationalisation of higher education four key rationales emerge at the top, i.e. student and academic mobility, collaborative research, curriculum and language of instruction and publishing

(Teferra, 2020). It is on this basis that this study zooms into academic mobility as it finds itself at the epicentre of the internationalisation Agenda. Teferra (2020) outlined the three forms of internationalisation currently recognised in mobility: individual physical mobility (which is the focus of this study), institutional mobility, and programme mobility. In this era of the knowledge economy, skilled human resources have become a valuable prerequisite in the quest for economic growth and development. Therefore, from the perspective of internationalisation, the goal of mobility is to acquire diverse perspectives, develop global languages and skills, become global citizens, and be better prepared for the global labour force (Streitwieser, 2014).

2.4 Internationalisation of higher education: a brief history

It is reported that most universities in Europe originated in the 18th and the 19th centuries with a clear national focus. Universities, especially with the emergence of the nation states, de-Europeanised and started nationalising (de Wit and Hunter, 2015; Sehoole, 2006). During these times, study abroad was often prohibited, and Latin, as the universal language of instruction, was replaced by local languages. However, in the 20th century (and in particular between the two World Wars) there was an increased focus on the internationalisation of higher education, illustrated through the creation of the Institute of International Education (IIE) in 1919 in the USA, the DAAD in 1925 in Germany, and the British Council in the United Kingdom (UK) in 1934 (de Wit and Hunter, 2015).

The push for internationalisation became even stronger in the USA following the Second World War through the establishment of programmes such as the Fulbright Programme. During these times, national security and foreign policy were the main driving forces behind the expansion of the internationalisation of higher education. With this came the development and growth of international student recruitment and government support for internationalisation through funding and regulations (Tight, 2022; Dunnett, 2013; De Wit, 2013; Sehoole, 2006).

During the 1970s and up until the early 1980s, internationalisation in many countries was primarily focused on the development cooperation or Official Development

Assistance (ODA); i.e. aid. It was only in the second half of the 1980s that most European countries shifted their attention from ODA to the exchange of students and academics as well as curriculum development. It is argued that this shift in focus was mainly brought about by the development of scholarship programmes and mobility schemes; however, in some European countries such as the UK and Australia, the shift was predominantly from ODA to trade (Gao *et al.*, 2015; Dunnett, 2013; de Wit, 2013).

Instead of offering international scholarships, universities in these countries were forced by their governments to charge the full cost of study fees to international students. This, as de Wit (2013) argues, did not result in a decrease of international students in these countries but a substantial increase, making the UK the number two (number one being the USA) and Australia the number five country (coming closely behind Germany and France) in receiving international students who want to pursue a full degree abroad.

The majority of international students in the UK and Australia emanate from Asia, and in the 1990s both the UK and Australia were forced by the economic crisis in Asia to redirect and take a lead with a new dimension of internationalisation. This new dimension included an emphasis in activities such as 'transnational education, cross-border delivery of education, or offshore education' (Gao *et al.*, 2015; de Wit, 2013; Dunnett, 2013). In so doing, universities in both the UK and Australia started establishing branch campuses and franchise operations in countries like Singapore, Malaysia, Vietnam, and South Africa; shifting the focus from the movement of people to the movement of programmes and universities. Today, the USA, Australia and the UK are the leading countries in international higher education due to their robust international student exchange programmes and their offshore activities (de Wit, 2013).

Alemu (2014) reports that the internationalisation of higher education for the African continent dates back to the period of colonialism, when colonial systems and models replaced the traditional and indigenous HEIs in Africa. Teferra and Greljn (2010) analyse the challenges and scenario under which developing countries have joined the

phenomena of internationalisation, arguing that despite being one of the most marginalised high education systems in the world, the African higher education systems are among the most internationalised. Through the colonial bond established by the Europeans in the 18th century, African higher education has been linked to Western universities, including the export of higher education systems, research dissemination, and the individual mobility of students and scholars (Alemu, 2014).

According to de Wit (2002) and Huang (2007), the internationalisation of higher education in Africa in modern times passed through two phases. Firstly, colonies hosted branch campuses of the principal colonial universities in African countries. Most universities in Africa form part of this model of internationalisation. de Wit (2002) labels this phase a primitive 'academic colonialism' and 'academic imperialism'. The second phase of internationalisation in Africa included research and dissemination of information through seminars, conferences, and publications. In this phase, internationalisation underwent a shift towards a more international cooperation and exchange in higher education. The ideas and worldviews that came from the Global North through these phases started shaping knowledge within many African universities. Africa started experiencing the dominance of European and American scholarship, scholars and worldviews, which became universal overtime (Heleta, 2022; Mbembe, 2016). To date, curriculum and knowledge in the majority of the African universities has remained Eurocentric/ Euro-American (Heleta, 2022) while African knowledge has been relegated and denounced as local cultures (Leal *et al.*, 2022).

Tight (2022) conducted a review of recent academic writing to shed light on the current status quo of the internationalisation of higher education. Through a search carried out using Scopus, Tight's study investigated the question of whether the internationalisation of higher education can be considered as a truly global phenomenon. The findings of this study indicates that the most prolific authors on this subject were Teichler, Knight, Yemini, Huang, Mok, Yonezawa, Lo, Whitsed, Altbach, and Horta. Further to this, and from this analysis, the top ten domiciles of first authors are: UK (484 authors), USA (395 authors), Australia (330 authors), China (239 authors), Germany (141 authors), Spain (141 authors), Canada (139 authors), Russia (128 authors), Hong Kong (118 authors), and Japan (110 authors). This is a clear

indication that very little research has geared towards the understanding of internationalisation within the context of postcolonial Africa. As de Wit (2019) puts it, in order to appreciate and understand the full extent of internationalisation there is a need for the world to also learn from the Global South.

One of the possible solutions for this is what Teferra (2020) raised in his "*From 'Dumb' Decolonisation to 'Smart' Internationalisation*". In this paper, Teferra argues that smart internationalisation should be locally grounded with an international flavour. This, for Teferra, means that for internationalisation to be equally beneficial its activities ought to be as local as they are international. For example, research in higher education institutions should address both national and regional realities at the same time keep us with international perspectives. International partnerships should be relevant to local needs which ought to be strategically articulated and framed within appropriate international regimes (Teferra, 2020).

2.5 Internationalisation of the South African higher education system

In the literature, it is indicated that prior to 1948, South African higher education was mainly shaped by universities in the United Kingdom and The Netherlands, following the original occupation of South Africa by the Dutch East India Company in 1652 and then by the UK in 1806. The first HEIs established in 1874 to 1916 were founded in line with similar institutions in Europe; however, South Africa's higher education system did not develop as a consequence of colonial rule, but rather as a consequence of migration from Europe and the UK (Jooste, 2015; Sehoole, 2006), meaning that most of South Africa's early institutional development was strongly influenced by its European associations. Internationalisation was not part of these institutions during this period, although the majority of their academic staff was either educated in Europe or had emigrated from Europe (Jooste, 2015; Sehoole, 2006).

Higher education in South Africa was shaped by apartheid ideals between 1948 and 1994, with universities being developed along the lines of ethnic and racial separation. The established universities became exclusively white, while other universities became exclusively black. Further to this, Afrikaans and English were established as the two

official languages of the South African higher education system. Therefore, from 1948 to 1994 there was no intentional internationalisation of the South African higher education system. International mobility during this period was mainly due to the mobility of students and scholars leaving South Africa to study abroad as a result of the country's political system (Jooste, 2015; Rensburg, Motala and David, 2015; Sehoole, 2006).

Following the end of apartheid in 1994, the country underwent a rapid and radical transformation and new challenges emerged, including redressing racial inequalities of the past and delivering development benefits to the country's black majority. This political change led to the changes in the size and shape of the higher education landscape in the country (IEASA, 2008). The political change also meant that South African HEIs needed to internationalise and prepare students and academics for the competitive, knowledge-driven world. After the fall of apartheid, scholars were eager to establish contacts and links with colleagues around the globe, attend international conferences, engage in collaborative research, have their work published internationally, and contribute to global knowledge production (IEASA, 2008).

Redefining the South African higher education system after 1994 is discussed by the National Commission on Higher Education (NCHE) and the 1997 White Paper on higher education. Both these documents maintain that South Africa needed to simultaneously address the nation's reconstruction and developmental needs, as well as its positioning in order to respond to the challenges of globalisation. However, no specific vision, principles, goals, plans, or strategies for the internationalisation of higher education were outlined or proposed (CHE, 2004).

Internationalisation offers many benefits to South African HEIs, as described in the previous sections. This desire to internationalise encouraged some progressive South African HEIs to either overtly enhance existing international links or to forge novel ones. This was evident in the establishment of International Offices by a number of universities before the 1994 'liberation' elections. These offices were created and expanded to facilitate a host of activities involving students and academics from around the world. As part of internationalisation, the offices began marketing university

courses and assisting foreign students, as well as creating study opportunities abroad and international exchange programs (IEASA, 2008).

The isolation of South Africa's HEIs had a profound effect on the HE sector's ability to deal with the different challenges relating to internationalisation. As early as 1992, Dr Derek Swemmer and Dr Roshen Kishun, the then two deputy registrars at the University of the Witwatersrand (Wits) and the University of Kwa Zulu-Natal (UKZN) respectively started engaging with matters related to internationalisation. At that stage (around 1992 to 1995), the internationalisation of higher education was not a priority for the Committee of University Principals (CUP).

CUP had other pressing challenges to address, such as the divisions between historically Afrikaans, English, and black (disadvantaged) universities (Jooste, 2007). It was, understandably, more important to focus on dismantling apartheid structures than dealing with ‘new’ phenomena such as internationalisation. This mandate was left to individuals like Kishun and Swemmer to shape the internationalisation agenda for the country.

Following a sector-wide consultation with a view to establishing an organisation that would support institutions to create structures that could adequately deal with matters related to internationalisation, the International Education Association of South Africa (IEASA) was launched in January 1997 (Jooste, 2007). IEASA serves as a non-governmental, non-profit professional association of institutions and individuals with a common interest in the internationalisation of higher education in South Africa. It is an association that promotes international student and staff mobility, and the sharing of knowledge and ideas around the internationalisation of education. It plays a proactive role in supporting policymaking and practices that affect international higher education, and it monitors the impact of government activities on foreign students and staff in South Africa.

IEASA has been expanding its mandate over the years and has become a strong force behind the internationalisation of higher education in South Africa. To this end, in January 2014, IEASA organised an international conference on 'a global dialogue on

the future of higher education internationalisation' held in South Africa. Global institutions from the Americas, Europe, Mexico, Japan, Africa, the Middle East, and Latin America attended the conference, which produced the 'South African Declaration' (IEASA Global Dialogue Declaration, 2014), which commits to 'encouraging decision-making and practices in internationalisation activities that are infused with ethical considerations of inclusion'. The Declaration outlines 10 priority action steps; one of which is directly linked to the international mobility of researchers (IEASA Global Dialogue Declaration, 2014).

Today, South African universities and academics have thousands of links, partnerships, and exchanges with institutions around the world and across the continent. There are many foreign academics working in the country. Several universities are actively pursuing internationalisation policies beyond the areas of mobility and research partnerships. This is despite (until recently) the absence of a clear national policy guideline on internationalisation.

There have always been, however, various official national documents and statements, as well as regional documents and reports released by government. These documents and statements set out the basis for the internationalisation of higher education in South Africa. Currently, according to the Higher Education Management Information System (HEMIS), there are 62 326 international students studying at the 26 South African public HEIs. These international students constitute 6% of the total enrolled, with 72% from the Southern African Development Community (SADC) region, 18% from other African countries, and 10% from the rest of the world (DHET, 2019).

Also, international students in South African private HEIs (mostly from the SADC countries) constitute 8.8% of the total number of students enrolled in the sector (DHET, 2018). The high number of SADC students in South African institutions is as a result of the endorsement of the SADC Protocol on Education and Training signed in 1997. This protocol mainly facilitates both academic and student mobility within SADC for purposes of study, research, and teaching.

Some of the key stipulations in this regard are that HEIs should reserve at least 5% of admissions for students coming from SADC countries, Member States should treat students from the SADC countries as home students for purposes of tuition fees and accommodation, universities should harmonise the academic year in order to facilitate staff and student mobility, and Member States should work towards the gradual relaxation and eventual elimination of immigration barriers that hinder the mobility of staff and students (SADC, 1997:11).

The SADC Protocol was ratified by the South African Government in 2000. It was thus an early position on the internationalisation of higher education by the South African government. In line with the Protocol, students from SADC countries are subsidised by the South African government in the same manner as local students. Further to the SADC protocol, the Education White Paper 3, in its vision statement, calls for a higher education system that should 'contribute to the advancement of all forms of knowledge and scholarship, and in particular address the diverse problems and demands of the local, national, southern African and African contexts, and 'uphold rigorous standards of academic quality' (DoE, 1997:6). The statement is evidence of an outward-looking approach, explicitly prioritising the African continent.

Further to the above, the 2004 Council on Higher Education (CHE) advice to the Minister of Education provided the policy guidance that led to South Africa's specific stance on the General Agreement on Trade in Services (GATS) and Transnational Education. The significance of this report is that it represented the first time that a formal government body in South Africa expressed its views on internationalisation. In this report, CHE defined internationalisation for South African circumstances by stating that the 'international exchange of students and staff and international collaboration in the production of knowledge, are central to the life-world of the modern nation-state university' (CHE, 2004:213).

This explicit pronouncement by government on internationalisation focused specifically on GATS, and clearly formulated a South African higher education response that emphasised higher education as a 'public good' and not a commodity to be bought and sold (Asmal, 2003). From this response, it became clear that at the government policy

level, South Africa disapproved of transnational higher education activities that are profit-driven, and after this pronouncement, in 2012, the first national strategy inclusive of the South African government aspirations on internationalisation of higher education was published.

In Chapter 9 of this National Development Plan (2012), the targets and goals for higher education are set out, which are also relevant to the internationalisation agenda, such as pursuing and encouraging international exchange partnerships and establishing South Africa as a hub for higher education and training in the region, capable of attracting a significant number of international students (NDP, 2012:319, 327; Cloete, Sheppard and Bailey, 2015).

The second national policy to support the internationalisation agenda in South Africa was DHET's White Paper for Post School Education and Training (2013), which emphasised the importance of internationalising South African higher education for advancing cross-cultural learning, developing global citizenships, strengthening the South African historically disadvantaged institutions which do not have extensive international networks, and exposing South African local or indigenous knowledge to the global community (White Paper for PSET, 2013).

Further to this, in 2019 the DSI published a White Paper on Science Innovation and Technology (STI) which also underlined the importance of internationalisation in the development of STI capacities, not only in South Africa but for Africa as a whole through the implementation of the AU's STI Strategy for Africa and initiatives within SADC. The policy further emphasised the use of science diplomacy in advancing South Africa's aspirations, as outlined in Chapter 7 of the NDP; i.e. improving the NSI's innovation performance and ensuring greater strategic focus and efficiency in international STI cooperation (DSI White Paper, 2019).

South African universities themselves have also joined forces to actively advance their internationalisation agenda. Universities South Africa (USAF) coordinates their internationalisation efforts beyond IEASA. USAF, through its strategic framework, identifies six goals to be pursued by South African universities; one of which (i.e. goal

6) focuses on supporting the internationalisation agenda of South African higher education (USAF, 2014).

In addition to the IEASA strategies and efforts, the 1997 SADC Protocol, the 1997 Education White Paper 3, the CHE advice on GATS, the 2012 National Development Plan, the 2013 White Paper for PSET, the 2019 STI White Paper, and the 2015 USAF Strategic Framework as outlined above, there have also been a number of other policies by other South African government departments relevant to the internationalisation of higher education, such as:

i. White Paper on Science and Technology (1996).
ii. White Paper on International Migration (1999).
iii. Higher Education Qualification Sub-Framework (2013).
iv. Immigration Regulations (2014).
v. White Paper on International Migration for South Africa (2017).

From the discussions above, it is clear that due to the lack of a coherent government policy on the internationalisation of higher education, it was left to the South African HEIs themselves to develop the process. Through the combined efforts of IEASA and individual institutions, the system and its institutions implemented internationalisation initiatives at an institutional level.

The growing number of international activities, the sporadic inferences of internationalisation in many different government policies, the call by IEASA and the South African HEIs necessitated a clear national policy or strategy to support, facilitate, and regulate internationalisation of the South African higher education sector. It is against this background that on 28 April 2017, the DHET published, for public comment, a draft policy framework for the internationalisation of higher education in South Africa. This policy framework aimed to provide high-level principles and guidelines, set broad parameters, and provide a national framework for the internationalisation of higher education within which HEIs can develop and align their institutional internationalisation policies and strategies.

The policy framework sets out to provide legitimacy for, and guidance on, activities related to the internationalisation of higher education in South Africa. Some of the issues covered by this policy framework include attracting talented and highly qualified academics to South African HEIs in order to enhance the country's research capacity; opening South African higher education institutions to novice and experienced researchers alike, as well as support researchers with their professional development and knowledge gain; and developing strategic alliances aimed at enhanced bi- and multi-lateral and regional cooperation in higher education (DHET, 2019).

According to this policy framework, the higher education fraternity in South Africa (encompassing government departments, public and private HEIs, students, staff, national authorities and councils, and professional and voluntary associations) must collectively commit to a coordinated process that seeks to align and integrate policies, programmes, and initiatives to position higher education to meet its responsibility to strengthen the country's enterprises, services, and infrastructure. This policy framework was approved and published by the Minister of Higher Education, Science and Technology on 6 November 2020. It is anticipated that the implementation plan for this policy framework, still to be drafted and released by the DHET, will provide direction to South African researchers and HEIs (including national funding agencies) on how internationalisation is to be managed for maximum impact.

As illustrated above, South African HEIs started a more formalised approach to internationalising immediately after the fall of apartheid in 1994, despite the lack of national strategies and policies for guidance. One of the activities that South African institutions embarked on was supporting the inbound and outbound mobility of their students and academics. Since then, this activity has been used to drive the internationalisation agenda of many South African institutions.

The release of the DHET policy framework on the internationalisation of the South African higher education sector has ignited debates on decolonisation. Jabosung *et al* (2019) defined decolonisation as a move away from the global to the local in order to advance national development and enhance higher education responsiveness. The policy framework was released in the aftermath of the #RhodesMustFall and

#FeesMustFall university student protests of 2015 and 2016 (Heleta, 2022). These protests which were mainly against the continued acceptance of the Eurocentric knowledge and worldviews at South African universities came as a shock to the country's higher education system (Heleta, 2022; Chasi, 2021; Jabosung *et al*, 2019). The protests spread quickly across the nation with a national call for decolonisation. As a result, when the DHET published the policy framework there was an expectation that this would serve as government's response to the call for decolonisation.

There was however, disappointments as many people felt that the policy framework completely ignored the call and that in its current format, represents yet another vehicle to promoting Euro-American worldviews (Heleta, 2022; Chasi, 2021; Jabosung *et al*, 2019). To some, the manner in which the policy framework is written is an illustration of the government's failure to rethink and re-imagine the internationalisation agenda (Heleta, 2022), and that the government's preoccupation with academic mobility and international partnerships for the increase of research outputs directly contradicts the call made by South African students to deepen the redress and equity goals of universities (Majee and Ress, 2018). The implementation of this policy framework might prove to be difficult since genuine internationalisation cannot be fully realised without firstly decolonising knowledge (Ndlovu-Gatsheni, 2021). Perhaps the hope lies with each higher education fraternity in South Africa to ensure that their individual internationalisation strategies are contextually relevant and respects plurality of knowledges.

2.6 Risk and benefits of internationalising higher education

Irrespective of contextual differences within and between countries, nearly all HEIs worldwide are engaged in international activities and seek to expand them. Engaging with the world is now considered part of the very definition of quality in higher education and research. The long-term benefits of internationalisation are well documented and widely recognised as critical and progressive. However, as this phenomenon evolves in importance, a number of adverse consequences of this process are beginning to emerge. The discussion below focuses on the academic benefits and the potential risks of internationalising higher education.

2.6.1 Potential risks

The International Association of Universities (IAU) (2013) and the European Association for International Education (EAIE) (2014) conducted two large scale surveys on the internationalisation of higher education. The IAU (2013) survey was completed by the Head of Institution and/or Head of Internationalisation in 1 336 HEIs in 131 different countries, including 608 institutions in 44 countries in Europe. The EAIE (2014) survey, on the other hand, was completed by 2 093 individual respondents from approximately 1 500 HEIs in 33 countries in the European Higher Education Area (EHEA).

The EAIE (2014) survey sought perceptions from individuals allowing for multiple responses per institution, while the IAU (2013) survey focused on institutions. The participants in these two surveys were requested to respond to questions about five main themes; i.e. internationalisation policy/strategy, benefits, drivers and values of internationalisation, risks and challenges of internationalisation, geographic priorities for internationalisation, and internationalisation activities and funding (Egron-Polak *et al.*, 2015).

Respondents in the IAU (2013) global survey identified the following three institutional risks of internationalisation; excessive competition among HEIs, international opportunities being accessible only to students with financial resources, and difficulty regulating locally the quality of foreign programmes. A comprehensive overview on the responses to the IAU (2013) global survey is summarised in Figure 2.1.

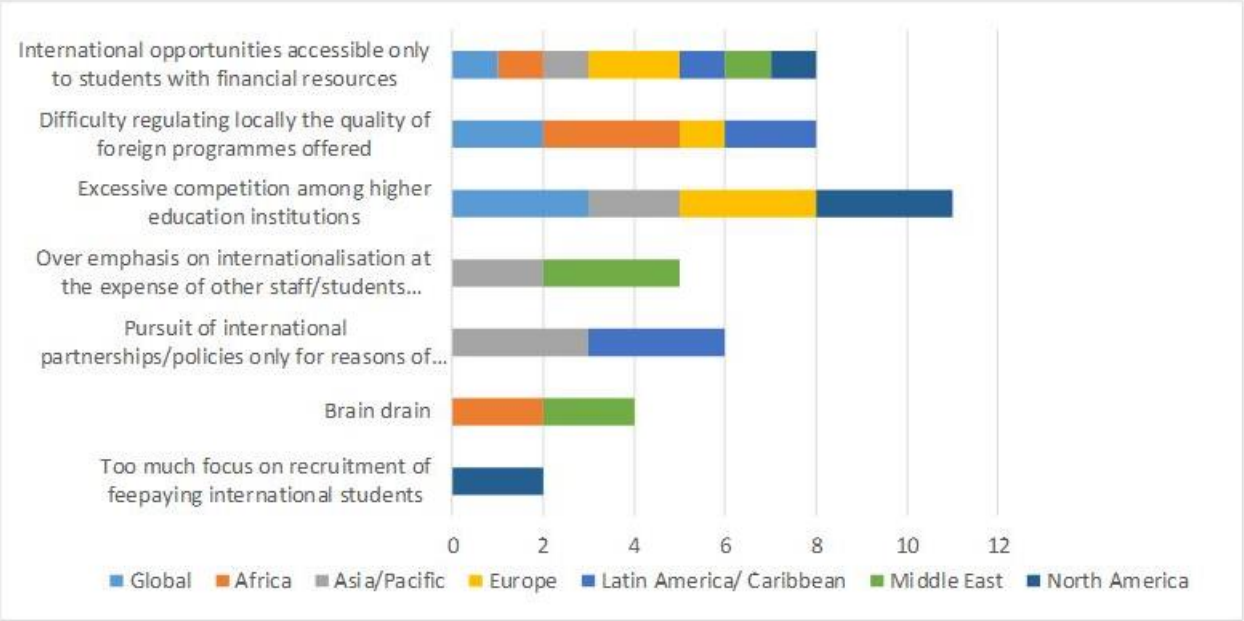


Figure 2-1: Institutional risks of internationalisation, IAU (Egron-Polak *et al*., 2015)

In the EAIE (2014) study, the respondents were not requested to identify institutional risks; instead they were asked a personal question about the key challenges they faced in their daily work with regards to the internationalisation of higher education. The results showed that the respondents' main challenge was with 'improving international strategic partnerships', followed by 'increasing outgoing student mobility' (Egron-Polak *et al.*, 2015:71). Given that respondents in the IAU (2013) survey indicated 'international opportunities accessible only to students with financial resources' as a high risk, it is clear that those individuals working within the internationalisation field are required to devote a great deal of effort and resources to overcome the financial barriers to international mobility. This is particularly important as it remains a key priority activity of institutional, national, and regional internationalisation strategies/policies all over the world.

Universities in Africa have a strong desire to internationalise in order to strengthen and consolidate their potential in teaching, research, scholarship, and innovation. As seen in the above, internationalisation is characterised by many activities, such as bilateral partnerships, access to expertise around the world, sharing of best practices, and student and academic mobility, amongst others. In the majority of cases, as Damtew

and Greljn (2010) argue, these collaborative partnerships are driven by international agents or aid providers, are condition-laden, and have a strong impact on national strategies, policies, and systems, as well as on academics themselves. According to Damtew and Greljn (2010), the position of Africa is such that it is not able to apply the principle of 'scan globally and reinvent locally'.

Based on this argument, the main problem with the internationalisation of higher education mostly relates to its failure in contributing to a situation where knowledge creation in institutions is based on Africa's research needs and priorities. This, according to Alemu (2014), has forced African universities to start exploring ways in which academic programmes can be aligned to support 'local and regional economic development and eradication of poverty, as well as promote the sustainable use of natural resources' (2014:29). African universities are therefore trying to find innovative ways in which the internationalisation of higher education could assist in increasing the visibility of African universities in areas such as research and development, and increase the universities' contribution to Africa's development.

Moreover, Teichler (2004) and Knight (2013) argue that the internationalisation of higher education has caused the destruction of cultural heritage, diminishing language diversity, reducing variety in academic cultures and structures, compromising quality, and even supporting imperialist takeovers. As indicated earlier, the first phase of internationalisation in Africa was through the opening of branch campuses by the colonial powers. This colonial strategy, as argued by Alemu (2014), has ensured the offering of colonial curricula disciplines in African universities instead of scientific-related subjects. It further made European languages (e.g. English, French, Portuguese, etc.) more dominant in African HEIs, preventing the use of vernacular languages as the medium of instruction in many African universities.

In addition, Krstic (2012) points out that the process of internationalisation has produced disproportionate mobility flows that have resulted in a 'brain drain' from the south. This is despite the brain circulation phenomenon being generally highlighted as a critical aspect of international mobility (Kone and Özden, 2017; Shin and Moon, 2018; Shimmi, 2014). Although, for Africa, mobility is mostly used as an academic capacity

building strategy, it has in many cases led to brain drain as many of these researchers remain in their foreign destinations (Alemu, 2014).

In order to minimise the brain drain effects of mobility, activities should contribute to the longer term prosperity of local economies. To achieve optimum internationalisation, Alemu (2014) suggests a consideration of the broader needs and developments of local and regional employment opportunities and the country's socioeconomic development. However, Kishun (2007) argues that although South Africa has tried to develop strategies to make it easier for those academics who wish to return, in this era of unprecedented movement of people and recruitment of skilled personnel worldwide, this may not be sufficient to meet the skills demand here.

2.6.2 Academic benefits and quality

Notwithstanding the above, many scholars have argued for the benefits of internationalisation of higher education as outweighing the challenges and its unintended consequences. It is argued that if properly managed, the internationalisation of higher education can culminate in a seamless web of opportunities for postgraduate students and academic staff combined. Some gains can be explicitly identified as directly benefiting individual researchers, while others enhance the institutional processes of delivering higher education. In addition to supporting science and scholarship through dynamic academic exchanges, the internationalisation of higher education can help developing countries increase their economic and social capacities (Jibeen and Khan, 2015).

Some scholars argue that the internationalisation of higher education enhances the quality of education offered by HEIs through international benchmarking processes. These international benchmarking standards are often decided through the Higher Education Ranking Systems (HERSs). Through these rankings, HEIs are measured according to a global scale, introducing the notion of competition among institutions (de Wit, 2019; Altbach and Hazelkorn, 2017).

Ranking and rating models focus on different aspects of a university, with particular emphasis on their academic quality and productivity at the national, regional, and global levels. They use a variety of criteria such as perceived quality, institutional statistics, research management and administration, websites, and surveys of students, scholars or employers to make comparisons between institutions (IEASA, 2007; HESA, 2011; ACU, 2018).

Although they are different in their definitions, purposes, scope and methods, they all assume that there is a 'brand effect' for the university as a whole. Despite the great debate about their validity and reliability, rankings have become relevant tools for institutions to internationally compete to achieve a specific position globally and are used by staff and students to inform decisions about universities (de Wit, 2019; Scott, 2012; Pouris, 2007). These global rankings have therefore forced universities to strive to offer the best quality education in order to be the best internationally.

European programmes for research and education (in particular the Erasmus programme established in the second half of the 1980s and the Fulbright programme in the USA established after the Second World War) were the main drivers for a stronger strategic approach to the internationalisation of higher education. An Impact Study of the Erasmus programme conducted in 2014 confirmed the success of the programme in relation to employability. According to the study, those who study or undertake a placement abroad not only gain knowledge in specific disciplines, but they also strengthen their interpersonal skills valued by employers (de Wit, 2015). The study shows that graduates with international experience fare much better on the job market. These graduates are unlikely to experience long-term unemployment compared with those who have not studied or trained abroad.

This has, over the years, led to the establishment of targeted postgraduate abroad programmes by many national governments or development agencies as a way of enhancing the quality of their Doctoral and postdoctoral researchers. International programmes such as the continent-wide Doctoral programme by the Association of Commonwealth Universities (ACU), the Austrian Partnership Programme in Higher Education and Research for Development, the Danish International Development

Agency (Danida) PhD scholarships, the NUFFIC Netherlands Fellowship programme, the Swedish International Development Agency (SIDA) scholarships, the New Zealand Commonwealth Scholarships, the former Canadian International Development Agency's (CIDA) Francophone Scholarship Programme, and the DAAD Inter-University Partnerships (DAAD, 2018: 20) were established not only to grow the number of the postgraduate researchers but to also enhance the quality of the PhDs produced.

Over and above this, scholars have also argued that internationalisation improves and increases the research productivity/outputs by researchers. A considerable part of the increase in research outputs by African universities 'comes in the form of academic publications produced together with scholars from outside the Continent' (Maassen, 2020:13). This was indicated clearly by the study of Pouris and Ho (2014) who analysed the scientific papers produced by African academics. According to their study, the scientific papers published by African scholars in collaboration with international partners grew dramatically by 66% over a five-year period, whilst the single author articles had significantly declined (Pouris and Ho, 2014). The study, which analysed a total of 111,877 articles published by authors in African countries in journals indexed by the Thomson Reuters Web of Science between 2007 and 2011 shows that African countries generally exhibit substantially higher collaboration patterns than other countries in the world, with 29 countries publishing more than 90% of their articles in collaboration with others (Pouris and Ho, 2014).

Mouton *et al.* (2019) support Pouris and Ho's 2014 study, indicating a significant increase in international collaborative research from 34% in 2000 to 52% in 2016 between South African scholars and their international counterparts, leading to a significant decline in national collaboration and single-authored articles. International collaboration is therefore used to increase the research outputs of universities. Although co-authorship can sometimes bring about unintended consequences, such as confusion on authorship between partnering researchers (Forero, Lopez-Leon and Patrinos, 2017), it remains crucial for HEIs as publications generate revenue through the subsidy that institutions receive from DHET for every publication produced by researchers (ASSAf, 2019).

Related to the above is the quality of the research produced. It is implied that collaborating with international partners assists researchers not only to produce a high number of research outputs but to also produce quality outputs. There is always a measure of subjectivity in measuring the quality of the research however, and the scientific praxis for scholars, government, and HEIs themselves is the use of 'peer review' in determining the quality of the research outputs (Mouton *et al.*, 2019; DHET, 2015). A peer review process is therefore widely accepted as a prerequisite for all research outputs and a means to ensure and improve the quality of research.

In addition, the results of the IAU 2013 Global Survey highlight the following benefits of internationalisation as identified by HEIs; 'improved quality of teaching and learning', 'increased international awareness of/deeper engagement with global issues by students', and 'enhanced international cooperation and capacity building'. Over and above these three benefits, the respondents also mentioned the following three benefits as somewhat important; 'strengthened institutional research and knowledge production capacity', 'enhanced internationalisation of the curriculum', and 'increased international networking by faculty and researchers' (Egron-Polak *et al.*, 2015). These findings are presented in Figure 2.2 below.

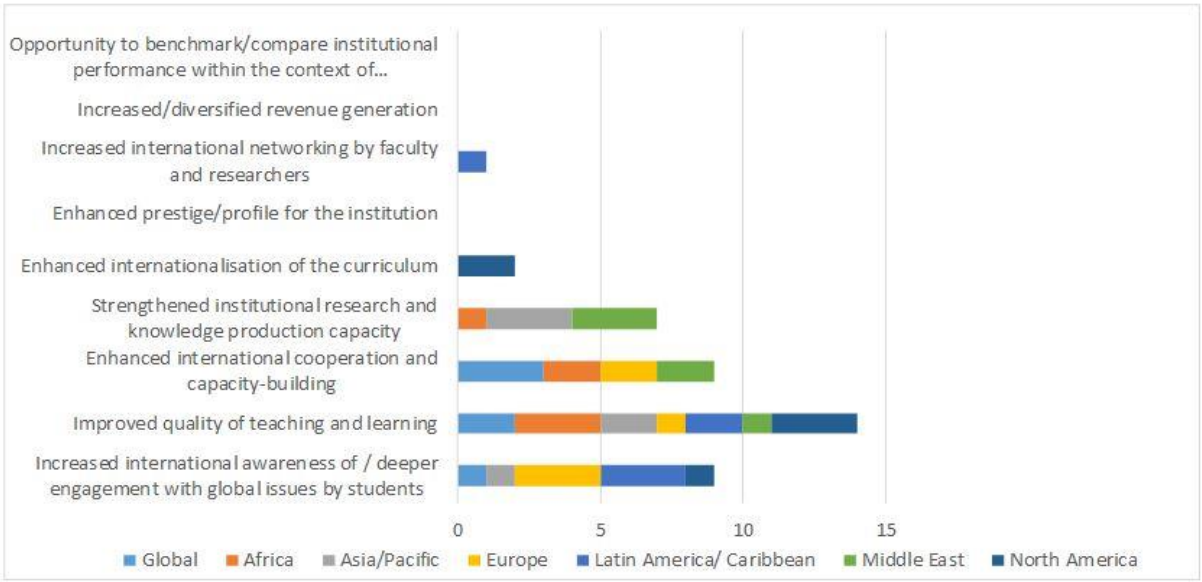


Figure 2-2: Benefits of internationalisation of HE, IAU (Egron-Polak *et al.*, 2015)

Respondents to the EAIE (2014) survey placed more emphasis on quality and on student learning. These respondents identified 'improve the overall quality of education at our institution' and 'prepare students for a global world' as the two most important benefits to be derived from the internationalisation of higher education. An illustration of responses based on the outcomes of the EAIE (2014) survey is presented in Figure 2.3.

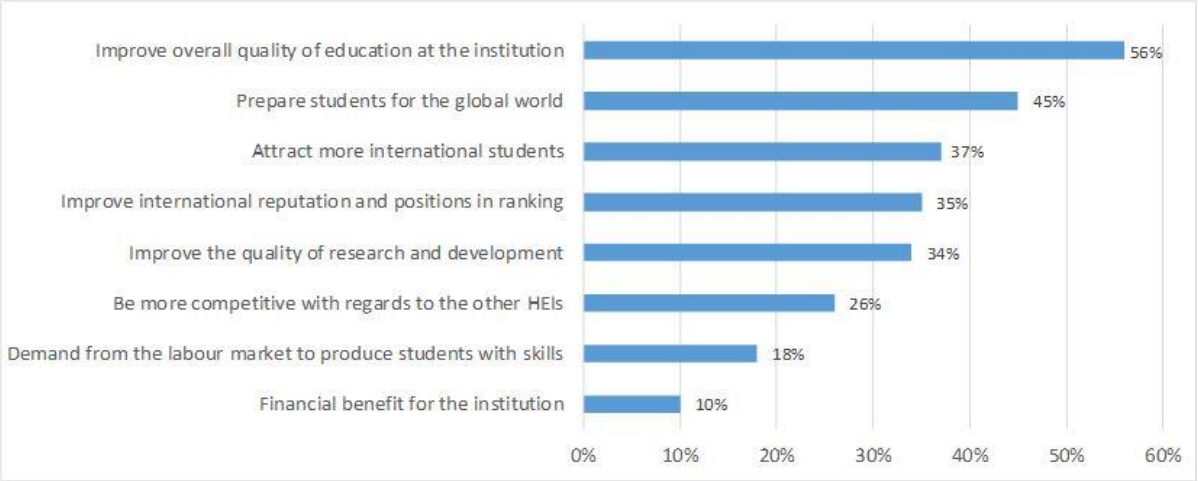


Figure 2-3: Benefits of internationalisation of HE, EAIE (Egron-Polak *et al.*, 2015)

These findings validate the work of Anderson and Maharasoa (2002:18) who emphasise issues such as increased financial profitability leading to the reduction of tuition fees, quality education through international benchmarking, improved international exposure, employability of graduates, cross fertilisation of ideas, and improved institutional reputation as shared benefits that can be accrued from the internationalisation of higher education.

Further to the above, in South Africa, the NRF's rating system is one of the means of building South Africa as a globally competitive science system. This rating system has historically been used as a valuable tool for benchmarking the quality of South African researchers against the best in the world. The rating is allocated based on a researcher's recent research outputs and impact as perceived by international peer reviewers (NRF, 2021). Although the NRF rating is sometimes viewed with controversy and has been susceptible to abuse by universities (Cherry and Gibson, 2007; Barnard, Cowan and Müller, 2012; Vaughan, 2015; Callaghan, 2018) it still remains a critical

tool for encouraging cutting-edge and high quality research outputs in high impact journals and nudging researchers to engage with the international science community, especially if they would like to advance from a lower to a higher rating (Wingfield, 2014:1).

Discussions in the sub-sections above have clearly indicated that among the reasons for the values that should underpin the internationalisation of higher education are the persistent identification of significant risks and expressions of concern about some aspects of the global trends which have been voiced by institutions and academics themselves. The potential risks do not in any way diminish or question the inherent value of the internationalisation of higher education. The main purpose of highlighting these potential risks is to raise awareness and encourage institutions to take action in avoiding them. HEIs should perhaps make some effort to mitigate these potential risks. For internationalisation to be effective, or to obtain the above-mentioned benefits, a mutual exchange should take place on at least three levels; students and academic staff members, institutional collaboration and policies, and the curriculum – foreign subjects, themes, topics and languages (as cited by Neale-Shutte and Fourie, 2006).

Further to this, Knight (1999) provides two strategies that are usually utilised in internationalising a HEI; i.e. the programme strategies and organisational strategies. According to Knight (1999), both types of strategies are needed in order to successfully internationalise a HEI. While the two strategies are very different in orientation, they need to complement and reinforce each other. Knight (1999) defines programme strategies as academic initiatives relating to teaching, learning, and research at home institutions and abroad. These strategies are divided into four main categories; academic programmes, research and scholarly activities, extracurricular activities, and external relations and services both domestically and abroad (see Table 2.2 below).

Table 2-2: Programme strategies for internationalising HEIs (Knight, 1999)

Programme strategies for internationalising	
Academic Programmes	Student exchange programmes, foreign language study, internationalised curricula, area of thematic studies, work/study abroad, international students, teaching/learning process, joint and double degree programmes, cross-cultural training, faculty/staff mobility programmes, visiting lecturers and scholars, link between academic programmes and research, training and development assistance.
Research and scholarly collaboration	Area and theme centres, joint research projects, international conferences and seminars, published articles and papers, international research agreements, researcher and graduate student exchange programmes, international research partners in academic and other sectors, and link between research, curriculum and teaching.
External relations and services (domestic and abroad)	Community-based partnerships and projects with non-government groups or private sector, international development assistance projects, customised/contract training programmes off-shore, link between development projects and training activities with teaching, research, community service work, off-shore teaching sites and distance education, participation in international networks, and alumni development programmes abroad.
Extra-curricular activities	Student clubs and associations, international and intercultural campus events, liaison with community based cultural groups, peer groups and programmes, and social, cultural and academic support systems.

For Knight (1999), the organisational strategies include policies, procedures, systems and supporting infrastructure which facilitate and sustain the international dimension of a university. Although each institution develops its own governance systems to inform its strategies, the strategies highlighted in Table 2.3 below are believed to be generic enough to warrant serious consideration.

Table 2-3: Organisational strategies for internationalising HEIs (Knight, 1999)

Organisational strategies for internationalising HEIs	
Governance	Expressed commitment by senior leaders, active involvement of faculty and staff, articulated rationale and goals for internationalisation, recognition of an international dimension in mission statement and other policy documents.
Operations	Integrated into institution-wide and department planning, budgeting and quality review systems, appropriate organisational structures, communication systems (formal and informal) for liaison and co-ordinator, balance between centralised and decentralised promotion and management of internationalisation, adequate financial support and resource allocation systems.
Support services	Support from institution-wide service units, i.e. student housing, registration, counselling, fund-raising, etc., involvement of academic support units i.e. language training, curriculum development, library, student support services for international students studying on campus and domestic students going abroad, i.e. orientation programmes, counselling, cross-cultural training, student advisors, etc.
Human resource development	Recruitment and selection procedures which reorganise international and intercultural expertise, reward and promotion policies to reinforce faculty and staff contribution to internationalisation, faculty and staff professional development activities, and support for international assignments and sabbaticals.

2.7 Mobility as a driving force behind internationalisation

For decades, the number of foreign students in HEIs has been used as a proxy to evaluate the internationalisation of higher education systems. According to the Organisation for Economic Cooperation and Development (OECD) 2012 report, the number of globally mobile students doubled in the first decade of the 21st century from 2.1 million (in 2000) to 4.1 million (in 2010); a 99% increase (Caruso and De Wit, 2013). This number reached 5 million in 2014 (University of Oxford, 2015) and 6.1 million in 2019, growing at an average rate of 5.5% per year between 1998 and 2019 (OECD, 2021).

Although OECD countries welcome the majority of international students, the number of foreign students enrolled in non-OECD countries has also steadily increased, growing by 7% per year on average. In 2019, foreign students enrolled in non-OECD countries represented about 31% of the global pool of internationally mobile students, compared with 23% in 1998 (OECD, 2021).

This increasing number of mobile students did not occur by chance. Over the years, governments have come to realise the above-mentioned benefits of internationalisation and have since taken concerted efforts to develop strategies to drive a range of international activities with particular emphasis on the mobility of students and academic staff. For example, in 2012, the Russian government launched a '5/100 initiative' to boost the number of international faculties in Russian universities.

The German government, with its study abroad programmes, has ensured the present state in which roughly a third of all German students spend some time at a university outside Germany during their degree. Through DAAD, the German government is working to increase this to 50%. USA, for example, the IIE launched a programme called the 'Generation Study Abroad', as a way of doubling the number of students obtaining international experience during their degree (University of Oxford, 2015). There are a number of reasons countries would want to export or import foreign students. Caruso and de Wit (2013) analysed both the push and the pull factors for international student mobility, as indicated in Table 2.4 below:

Table 2-4: Push and pull factors of student mobility (Caruso and De Wit, 2013)

Push Factors	
Category	**Reasons**
Educational Factors	Availability of higher education, basic human resource capacity, ranking/status of higher education, enhanced value of national versus foreign degree, selectiveness of domestic higher education, increasing presence of private and/or foreign providers, and experience with international mobility and strategic alliances with foreign partners.
Political/Social/ Cultural Factors	Linguistic isolation, cultural disposition, colonial ties, political instability, regional unity, information isolation, emigration policies, strategic alliances and academic freedom.
Economic Factors	Dependence on world economy, financial capacity, human development index factor, employment opportunities on return and geographic distance.
Pull Factors (are the opposite of the push factors)	
Educational Factors	Higher education opportunities, system compatibility, ranking/ status higher education, enhanced value of national degree, diversity of higher education system, absorptive capacity of higher education, active recruitment policy, cost of study, existing stock of national students, and strategic alliances with home partners.
Political/ Social/ Cultural Factors	Language factor, cultural ties, colonial ties, lure of life, regional unity, stock of citizens of country of origin, immigration policies, and strategic alliances with home country and academic freedom.
Economic Factors	Import/ export levels, level of assistance, human resource development index, employment opportunities during and after study and geographic distance.

As illustrated above, mobility is often regarded as equivalent to internationalisation. However, as de Wit (2013) argues, mobility should be viewed as merely an instrument for promoting internationalisation and not a goal in itself, and that it should be better embedded in the internationalisation of higher education. He further emphasises the need to assess whether or not, through mobility, added value is developed in the students who travel (de Wit, 2013).

For many authors the analysis of international mobility, in most cases, tends to focus on students. While most universities have well established policies in place to promote student mobility/exchanges, there is rarely a structured attempt to promote staff mobility, even though in some instances funding might be available for such. Although many universities might have opportunities for academic exchange, this is very often left up to the individual departments or the individual academics as to whether or not they wish to take advantage of the opportunity.

National programmes available for academic mobility in many countries are mainly a question of short mobility for a few days or weeks and may not lead to having a long-term impact (de Wit and Hunter, 2015). More strategic approaches to academic mobility, with clear advantages for enhancing research and teaching, as well as general professional development, are needed; especially as academic staff with international experience can bring added value to the university and students alike. Academic mobility therefore is in need of strategic direction at both national and institutional levels.

Postiglione and Altbach (2013) emphasise this point by highlighting the importance of, and need for, focusing on supporting academic mobility rather than student mobility. In their view, academics are key to any HEI's internationalisation strategy as they are the people who teach the classes at branch campuses, develop the curricula, engage in collaborative research with overseas colleagues, welcome international students into their classrooms, publish in international journals, and the like (Postiglione and Altbach, 2013). Therefore, without the active engagement of the academics, internationalisation efforts are doomed to fail.

The growing shift is away from student-focused mobility initiatives towards developing the research capacity of academics in partnership with colleagues overseas, with an understanding that research partnerships work for the benefit of the partnering institutions. This has led to the emergence of country-to-country bi-/tri- and multi-lateral agreements that allow for the development of joint initiatives aiming at supporting global collaborations by providing research and mobility grants to international university consortia working on a range of research issues of global significance. These initiatives have established various criteria for researchers to be part of the international networks.

Even regional-based sources of funding, mostly in Europe and Africa, strongly encourage universities to establish linkages with partners in the region and other countries around the world (IEASA, 2008). To this end, the African Research Universities Alliance (ARUA) and The Guild of European Research – Intensive Universities (The Guild) have recently requested the African Union (AU) and the

European Union (EU) to jointly invest one billion euro per annum for the renewed Africa-EU partnership (ARUA-The Guild, 2020).

This governmental support has led to the steady increase in the number of South-South and South-North networks. Networks of this type often involve the exchange of researchers, collaborative Doctoral research training, collaborative joint research projects, expert meetings, conferences, and publications (IEASA, 2008). The increased support for these types of mobility programmes is due to the belief that short-term international mobility increases research collaboration, creates better networks, improves the career prospects of academics, fast tracks the production of high-impact publications, gives researchers access to other sources of funding, and generates ideas through exposure to different methods and skills (van Noorden, 2012; Scellato, Franzoni and Stephan, 2015).

The IAU 2013 global survey indicates that the majority of HEIs around the world today consider the mobility of academics as central to their internationalisation agenda. All regions of the world view the 'outgoing mobility opportunities for students' as a key value for the internationalisation of higher education. Table 2.5 below indicates that African HEIs are now investing in, and significantly increasing, their funding to support the outgoing mobility opportunities for both their students and faculty/staff members. Therefore, Africa considers the mobility of their academic staff members as a key driving force behind the internationalisation of their HEIs.

Table 2-5: Activities with increased funding, IAU (Egron-Polak *et al*., 2015)

	Global	Africa	Asia/ Pacific	Europe	Latin America/ Caribbean	Middle East	North America
Strengthening international/ intercultural content of the curriculum						X	
International research collaboration	X	X	X	X	X	X	
Outgoing mobility opportunities for students	X	X	X	X	X	X	X
Outgoing mobility opportunities for staff		X			X	X	
Bi-/ multi-lateral international student exchanges			X		X	X	
Recruiting fee paying international undergraduate students							X
Recruiting fee paying international postgraduate students							
Marketing and promoting our institutions internationally		X	X			X	
Offshore provision of education							
Delivery of distance, online and/or e-learning education							
Developing joint and double/dual degree programmes							
International development and capacity building projects		X				X	

Chellaraj (2019) summarises the benefits of international mobility for both students and academics combined. In this paper, Chellaraj (2019) describes international mobility as having contributed to the improvement of the performance of Germany and several of the Economic Commission for Africa (ECA) countries in the research and development sector; has led to cultural enrichment in Austria, Belgium, Italy, Norway and Poland for the period 2008-2010; and has increased employability within the Science, Technology, Engineering and Mathematics (STEM) fields. Further to this, through his study, Cowan (2020) finds that short visits abroad improve some aspects

of academic research as spending some time abroad assists researchers to become acquainted with frontier knowledge.

Erdei and Káplár-Kodácsy (2020) reiterate these points when they argue that international mobility for both early career researchers and academic staff enhances the quality of programmes and excellence in research, strengthens the academic and cultural internationalisation of European higher education, boosts personal development and employability, fosters respect for diversity and a capacity to deal with other cultures, encourages linguistic pluralism thus underpinning the multilingual tradition of the EHEA, and increases cooperation and competition between HEIs. It is, however, critical for governments, funding agencies, and HEIs themselves to be prudent and pragmatic about the conceptualisation and design of such mobility initiatives for the desired outcomes or impact.

Although Pouris and Ho (2014) clearly illustrate the positive impact that internationalisation has had on the quantity and quality of research productivity in Africa, Fernández-Zubieta, Geuna and Lawson (2013) find no evidence to support the claims that international mobility increases the academic performance of researchers. The Fernández-Zubieta *et al.* (2013) study analyses the careers of a sample of 171 UK academic researchers between 1957 and 2005. On the basis of a unique ranking of UK institutions, they develop an econometric analysis of the impact of job changes on post international mobility performance over five years. Despite the fact that this paper finds no significant impact of international mobility, from the above analysis it is evident that internationalisation does improve academic quality (Fernández-Zubieta *et al.*, 2013).

2.8 Long-term vs. short-term international mobility

As observed from the sub-sections above, in many ways the movement of researchers has contributed to excellence and competitiveness (Ackers, 2008). The data from the Institute for the International Education of Students Programmes indicate that in the USA during the 1950s and the 1960s, about 72% of students participating in study abroad programmes stayed away for a full academic year. This number declined to

20% in the 1990s, and declined further to 3% in 2015 whereby 35% of the US students studied for a semester and 62% enrolled for short-term programmes (Vanden Berg and Schwander, 2019). This analysis is an indication of how the short-term mobility programmes have come to dominate the full-time study abroad programmes.

The 2020 Wellcome study reiterates that the development of world-leading science requires international collaboration between researchers. The greatest scientific problems cannot be solved by a lone scientist, working in a single laboratory, in one country. To stay on top of the game, researchers need to stay connected globally (Ruth, Brewis, Blasco and Wutich, 2019; Erdei and Káplár-Kodácsy, 2020; UUKi, 2021; Mitchell, 2021). To this end, the Wellcome study (2020) recommends the following two steps as critical that should be undertaken by researchers; firstly, embracing the benefits of outward mobility to strengthen the institution's international networks by, for example, setting up a research alumni network; and secondly, encouraging the exchange of research talent with strategic partners around the world within the parameters of the science and innovation agreements (Wellcome, 2020).

In 2005, the EC adopted and published the European Charter for Researchers and the Code of Conduct for the Recruitment of Researchers, which describes generic principles for the roles, responsibilities, and entitlements of researchers, their employers, and the funders of research. Both the Charter and the Code of Conduct identifies mobility as an important means of enhancing the professional development of researchers. Both reports contend that employers and/or funders must acknowledge the value of different forms of mobility as important ways to enhance scientific knowledge and the professional development of researchers. Consequently, career development strategies should incorporate such options, and any mobility experience should be fully recognised and valued within the career progression/appraisal process (EC, 2005).

In 2007, the EC funded a study on key issues for the EHEA – Social Dimension and Mobility. The report, compiled by the Bologna Process Working Group, promotes high levels of mobility between individual researchers, institutions, disciplines, sectors, and countries. One of the recommendations is a call on countries to remove obstacles to,

and promote the benefits of, both staff and student mobility; including measures to assess their impact (MER, 2007). It is argued in this recommendation that promoting mobility readily encourages personal development, fosters international cooperation and understanding between individuals and institutions, enhances the quality of higher education and research, responds to the needs of European societies, and reinforces the European dimension (MER, 2007).

However, researcher mobility has traditionally been defined as an extended stay abroad, usually lasting three-years, and implying a period of employment or fellowship during Doctoral studies or postdoctoral studies (Ackers, 2010). There is a subtle shift from this form of long-term mobility towards the medium-term (i.e. 6-12 months) or a more focused short-term model (3-6 months). There are studies that have interrogated mobility that is shorter than three months. For example, Blankvoort *et al.* (2019) conducted a study analysing the short-term mobility week-long programme of healthcare professional students at three universities: the Amsterdam University of Applied Sciences (AUAS), the Karolinska Institute (KI) and the Zurich University of Applied Sciences (ZHAW). In this mobility programme health professional students are afforded an opportunity to spend one week at each university every year (total of three weeks) per study year.

Scholars on the internationalisation of higher education therefore are beginning to consider the extent to which short-term mobility serves as an effective substitute for long-term stays. These scholars are beginning to probe more deeply into the quality of short-term mobility and how they shape the exchange of knowledge and the internationalisation processes in general. As a general proposition, they state that short-term mobility may improve knowledge transfer and internationalisation more so than long-term, once-off stays (Ackers, 2010; Ruth *et al.*, 2019; Erdei and Káplár-Kodácsy, 2020; UUKi, 2021; Mitchell, 2021).

Due to the lack of systematic research on short-term mobility, Scott (2015) argues that some of the key questions on academic mobility remain unanswered. According to Scott (2015), one of the main reasons for this is the lack of consistent definitions of what constitutes an academic staff. As a result, this research study chose to use the

term 'researcher' mobility rather than 'academic' mobility. A more comprehensive, all-encompassing definition can be conveyed by using the term 'researcher', referring to next-generation, emerging, and established researchers. Shen, Xu and Wang (2022) also agreed that that there is a need for more focused research on this topic especially in relation to establishing a link between international academic mobility and knowledge production through rigorous analysis of the causal mechanism. .

There are, however, a group of scholars who are sceptical of short-term mobility to such an extent that they dismiss it completely, referring to it as 'academic tourism' (Selby, 2018). Even so, more and more HEIs and researchers alike are opting for short-term international mobility in advancing their internationalisation agenda. This is evident from the 2008 EC impact assessment study of the mobility scheme within the Marie Skłodowska-Curie Actions (MSCA) fellowship programme, which requires the fellowship holders to locate to another country during the fellowship. Within this programme, many researchers opt for short-term mobility support rather than a long-term stay abroad, as per Table 2.6 below. The results of this impact assessment study indicate that more than 50% of the MSCA beneficiaries under the fellowship programme opt for short stays abroad, while about 35% undertake visits that were three months or longer. It is also noteworthy that close to 80% of the beneficiaries participate in international conferences within the programme.

Table 2-6: Mobility patterns within MSCA fellowship programme (Ackers, 2010)

Category of fellow	Stays abroad of 3-mnths or more	Stays abroad of 1-3 months	Short says abroad, academic visits	Conferences	No national national/ foreign travel/ stays
Former FP6 fellows	865 (38.8%)	339 (15.2%)	932 (41.8%)	1412 (63.4%)	85 (3.8%)
Current FP fellows	541 (35.7%)	344 (22.7%)	879 (58%)	1195 (78.9%)	40 (2.6%)

Researchers who were interviewed in the above-mentioned MSCA impact assessment study indicated the importance of travelling abroad and career progression (Ackers, 2010). Researchers were of the opinion that travel abroad is crucial to gathering the necessary data and presenting papers at conferences and networking; all of which are

crucial to achieving publication (Ackers, 2010). This view is supported in the Franzoni, Scellato and Stephan GlobSci (2011) survey that studies scientists working in 16 'core' countries: Australia, Belgium, Brazil, Canada, Denmark, France, Germany, Italy, India, Japan, Netherlands, Spain, Sweden, Switzerland, UK, USA by. In this survey, approximately 24% of published research articles are found to have involved an international collaborator (Franzoni *et al*., 2012).

The 2016 research study investigating international mobility and networks within Danish universities conducted by Wohlert, Norn, Seidelin, and Klöcker-Gatzwiller, and partly funded by the Danish Agency for Science, Technology and Innovation, finds that short-term mobility is critical for establishing academic networks for long-term partnerships. According to this study, strong international networks are found to be crucial for young and emerging researchers in particular (Wohlert *et al*., 2016). The study concludes that international networks assist young and emerging researchers to get their research off the ground, create professional relations that will nurture a research career, strengthen the possibility for high quality research through working with and learning from the best researchers, and provide access to the best facilities in the world (Wohlert *et al.,* 2016).

It is also found that international mobility and networks are important for attracting international funding and publications in leading scientific journals (Wohlert *et al.*, 2016). The short-term mobility of emerging researchers is also highlighted by many respondents as an important means of establishing their research career early on, and also for revitalizing their research throughout their academic careers (Wohlert *et al.*, 2016).

The 2014 study by CFE Research, articulates the benefits of research mobility in terms of the development of intercultural skills such as foreign language acquisition, communication and interpersonal skills, self-directed learning, and contributing to social cohesion (CFE Research, 2014). Similarly, Farrugia and Sanger's 2017 study that utilises a mixed methods approach, finds a strong correlation between mobility programmes and the development of skills that contribute to career development. The main outcome of their study is that long-term mobility has a high impact on subsequent

job offers, while short-term programmes are effective in developing other skills such as cognitive, intrapersonal, or interpersonal (Farrugia and Sanger, 2017). There is no doubt that Fernández-Zubieta *et al.*'s (2013) study, which finds that international mobility does not impact the quality of research outputs, is in contrast to all the other studies discussed here.

Galipeau-Konate (2015), the Director of International Programmes at Shenandoah University in Winchester, indicates the importance of not discounting short-term mobility programmes, arguing that 'they can be very transformative'. Based on the outcomes of the quantitative cross-sectional study, she conducts an analysis of the benefits of a short-term international mobility flagship programme of the Shenandoah University in Winchester (which sends close to 50 participants each year to five foreign countries for a maximum period of 10-days to investigate a pre-selected theme) (Galipeau-Konate, 2015). Ultimately, Galipeau-Konate (2015) concludes that short-term mobility programmes are more effective if used for capacity building as they prepare students for more immersive exchanges that could lead to long-term impact through intercultural development.

It has, however, proven difficult to link the professional prestige of academics to mobility. Some authors argue that the success of researchers has to do with intrinsic differences in the characteristics of the researchers and not the mobility itself. Very few studies have tried to establish a causal link between academic prestige and researcher mobility, and the results have been mixed, with some showing that the positive outcomes are a result of mobility, and others suggesting that they can be explained by differences in the characteristics of researchers.

The 2017 survey conducted by Guthrie, Lichten, Harte, Parks and Wooding which aimed at developing a better understanding of patterns, barriers, and benefits of international mobility for researchers moving to and from the UK, indicates that researchers preferred long-term mobility for career development but opted for short-term mobility as a way of focusing their research work with specific groups or topics. In their study, respondents who had undertaken international mobility report more positive effects on their career development than those who had not. Their study also

mentions funding and access to accommodation as the main barriers for short-term mobility (Guthrie *et al*., 2017).

These two main barriers are also highlighted in earlier studies by the EC (Ivancheva and Gourova, 2011). The general conclusion of the Guthrie *et al.* (2017) study is that career development is a key driver of researchers' mobility. This is an old argument, picked up by Morano-Foadi in 2005 when arguing that researchers undertake short-term mobility in order to acquire new skills and techniques to secure a position in science, advance postgraduate education, and to access research grants abroad.

2.9 Intricacies of shorter-term international mobility (STiM)

The analysis above indicates the significant increase, growing interest, high demand, and extreme importance placed on short-term international mobility in recent years. Until recently, studies never focused on mobility of less than a month in duration. There are hardly any reports detailing the workings of STiM, which is the core of this research study, and its impact on the career path of researchers. For the purpose of this study, STiM is defined as mobility that is less than one month in duration. This type of mobility can range from international visits as short as three days and as long as four weeks in duration. In the limited literature that exists on this topic, scholars have defined it as either 'very short', 'irregular' or 'shorter' term mobility. This type of mobility has been selected for analysis in this research study not only because of its recent popularity but also because of the increased investments currently being made by HEIs and government alike in support of this type of mobility. As Allinson and Stevenson (2021) state, STiM can provide intensive international experience compared with other more traditional types of short-term mobility programmes.

Just like with traditional short-term mobility, scholars researching STiM indicate various reasons why researchers today prefer to undertake STiM. It has been reported that this type of mobility can take different forms; from conducting research fieldwork, undertaking a research visit with a particular disciplinary focus led by an academic faculty, group-led visits to industry for particular entrepreneurship themes, visits to laboratories for access to research equipment or infrastructure, or international

summer schools whereby postgraduate students are given an opportunity to network with international students (Allinson and Stevenson, 2021).

Although many authors on the internationalisation of higher education have been sceptical about the benefits of STiM, there are studies that were conducted between 2015 and 2021 that provide evidence-based valuable outcomes of STiM. Two such studies are hereby discussed, both of which were produced by Universities UK International (UUKi) in 2019 and 2021. The outcomes of these two studies are highlighted in the sense that they report similar benefits to two earlier studies on STiM entitled: '*Student perspectives on going international*' jointly produced by UUKi and the British Council in 2015, and '*Gaining an employment edge: the impact of study abroad on 21st century skills and career prospects in the United States*' published by the Institute of International Education (IIE) in 2017.

The findings in the UUKi 2019 study are informed by the analysis of two datasets provided by the Higher Education Statistics Agency (HESA) on the student's record containing details of the profiles of students registered across the UK and the Destinations of Leavers from Higher Education (DLHE) survey, which asks graduates about their activities six months after completing their degrees. This study finds that 63.7% of respondents undertake an international short-term mobility programme of 14 weeks or longer, 15.2% of 5-13 weeks, and 21% of less than 4-weeks. Therefore, STiM accounts for just over a fifth (21%) of all reported mobility. Some 7.8% of the 2016-17 graduating cohort takes at least a single short-term mobility programme. Graduates who undertake short-term mobility programmes have an unemployment rate of 2.3% compared with 4.2% of non-mobile graduates. Further to this, 86.7% of students who undertake a short-term mobility programme are in a graduate job six months after graduating, compared with 73.2% of non-mobile graduates (UUKi, 2019).

The UUKi 2021 study serves as the most recent research study produced on this topic. The overall purpose of the study is to outline factors attracting students to STiM, identify existing barriers to participation, and generate ideas to increase participation in this type of mobility. The findings are based on information gathered through an online survey which received 749 responses, 17 focus groups conducted across 14

United Kingdom institutions, and 16 case studies of good practice from project institutions. This study finds that the majority of respondents (80%) travel abroad to experience something new (UUKi, 2021). The focus group respondents feel that university-structured STiM is very attractive, making the visit more impactful in terms of learning new things. The respondents enjoy the shared experience of going abroad in a group. The majority of respondents report that the opportunity to travel is more important than the location. The respondents view the duration of STiM positively, as a hectic schedule allows them to immerse themselves and experience much in a short period. Some respondents argue that STiM allows them to have a good balance between their academic programme and commitments at home, and some feel that STiM makes their experience feel like less of a big commitment (UUKi, 2021).

Funding for STiM is viewed as critical by all respondents (UUKi, 2021). Most respondents report a positive impact of STiM on their academic experience as bringing an international dimension to their subject (78%), increasing their confidence in their academic ability (69%), and broadening their understanding of their research area (66%) (UUKi, 2021). Almost half (44%) of the respondents assert that STiM inspires the topic of their research. There were those that found the STiM experience 'life-changing' and enriching, even when not directly linked to their academic programmes (Allinson and Stevenson, 2021).

In comparison with traditional short-term mobility, these two studies find a different set of benefits (UUKi, 2019, 2021). It is therefore undeniable that a closer investigation of the aims, participation patterns, experiences, outcomes, benefits and general contribution of STiM is needed in order to identify and share good practices across the higher education sector. This research study therefore makes use of both secondary and primary data to present an operational model for the effective management of STiM as a potential conceptual framework for driving the internationalisation agenda. This in-depth analysis is necessary for informing further developments into this type of mobility as an integral part of the overall outward/outbound researcher mobility.

2.10 Short-term mobility for internationalising South African HE

Mouton *et al.* (2019) indicate that in 2001, South Africa spent 0.72% of its Gross Domestic Product (GDP) on research and development. By 2016 the spending was at 0.82% (Mouton *et al*., 2019). They further disclose that by 2001 the biggest funding for research (55.8%) was from the business sector, followed by government at 36.4%. This changed in 2016 when the government became the biggest funder at 46.0% followed by business at 39.4%, and international agencies at 11.7% (Mouton *et al.,* 2019).

There are different funding streams for higher education and research in South Africa. This research study focuses on the DSI funding as expensed through the NRF, the country's largest funding agency for competitive research and postgraduate student support. The difference between the NRF and other South African funding agencies is through its mandate within the NSI. The NRF provides funding across all broad scientific fields, and a major objective is to provide research funding to public HEIs and research councils, whereas other agencies are theme-specific and also have a mandate of conducting research.

Funding research in South Africa through a national agency is one of the oldest modes of supporting research. Luruli (2014) describes the early history of agency funding of research in South Africa, detailing it from 1911 until 1999 when the NRF was formed. Informed by this work, the following timeline can be deduced.

Table 2-7: SA history of research funding by a national agency (self-generated)

1911	Royal Society of South Africa
Research funding for HEIs through the agency called the Royal Society of South Africa.	
1918	Research Grant Board (RGB)
Establishment of the RGB in the Union of South Africa for a better coordination of research funds for HEIs.	
1929	Council for Education and Social Research
Establishment of the Council for Educational and Social Research to provide research funding for HEIs within the social sciences.	
1945	Centre for Scientific and Industrial Research (CSIR)
CSIR becomes the main national agency responsible for funding research at HEIs within the natural sciences.	
1956 – 1969	Human Sciences Research Council (HSRC)
Funding for the human sciences transferred to the National Council for Social Research and eventually to the Human Sciences Research Council (HSRC) in 1969.	
1984	Foundation for Research Development (FRD)
CSIR established the FRD to specifically deal with research funding for HEIs within the natural sciences while the CSIR retained its mandate as a research performing agency.	
1990	The Centre for Scientific Development (CSD)
HSRC established the CSD to specifically deal with research funding for HEIs within the social sciences while the HSRC retained its mandate as a research performing agency.	
1999	National Research Foundation (NRF)
The FRD and CSD are merged to form the NRF, a single national agency with the sole mandate to provide research funding to public HEIs and research councils across all broad scientific fields of study.	

The NRF was therefore established as an independent government agency, through the National Research Foundation Act (Act No, 23 of 1998, as amended). According to Section 3 of the Act, the objectives of the NRF are to contribute to national development by:

i. Supporting, promoting and advancing research and human capacity development through funding, and the provision of the necessary research infrastructure, in order to facilitate the creation of knowledge, innovation and development in all fields of science and technology, including humanities, social sciences and indigenous knowledge.
ii. Developing, supporting and maintaining national research facilities.

iii. Supporting and promoting public awareness of, and engagement with, science.
iv. Promoting the development and maintenance of the national science system and support of Government priorities.

Internationalisation underpins and supports the accomplishment of these objectives. As a way of advancing the internationalisation of higher education agenda, South Africa, through the DSI, concluded bilateral STI agreements (administered by the NRF) with a number of countries around the world. By 2022, the NRF was responsible for administering and funding a number of overseas and Africa bilateral STI agreements, international scientific unions and strategic and multilateral engagements. The aims of these agreements are primarily to support and promote quality research, address the skills shortage, and accelerate the STI development within the country. These agreements had, over a number of years, enabled collaborative research, inclusive capacity development, research networks, and institutional strengthening (NRF, 2020).

International partnerships have therefore played a significant role in achieving the NRF's mandate. In its Vision 2030, the NRF states that in order to successfully enable excellent science, 'researchers need access to unique research equipment, infrastructure, capabilities, materials, locations, and information to conduct their research, whether in South Africa or through global partnerships'. This Vision identifies international partnerships as a critical pathway for leveraging resources for research excellence. To this end, in 2017 the NRF established the Strategic Partnerships (SP) Directorate within its Strategy, Planning and Partnerships (SPP) Business Unit in order to effectively contribute to the creation of networks and partnerships, unlock other international research and innovation funding opportunities, contribute to policy and institutional transformations, and support and facilitate South Africa's engagement in the global science system.

Through this SP Directorate, the NRF produced a Strategic Partnership Strategy (2019) outlining its renewed partnership approach for national and international partners. The strategy steers the organisation away from *ad hoc* partnerships to targeted agreements that enable effective interventions where both partners will benefit. The strategy is meant to guide the NRF's engagement with national, pan-

African, and global partners (NRF Strategic Partnership Strategy, 2019). Of value for this study is that the NRF's Strategic Partnership Strategy (2019) has foregrounded support for international networks as one of the key instruments to be used in leveraging international collaboration. This is a clear indication that international mobility and networking programmes will remain central to the organisation's internationalisation agenda.

The NRF manages and coordinates a number of government-sponsored international programmes to promote and support STiM, and both short-term and long-term mobility of individual researchers as a way of increasing the global competitiveness of the South African NSI. However, the real impact of these NRF government-sponsored mobility programmes has not been fully examined. These mobility programmes are multi-faceted and involve activities such as the exchange of postgraduate students and researchers, collaborative Doctoral research training, joint publications, organisation of joint research projects, expert meetings and conferences, lecture presentations, access to research infrastructure, and short course training, amongst others.

Below is a list of the STiM and short-term mobility programmes managed by the NRF as of 2022:

i. Knowledge, Interchange and Collaboration (KIC) programme.
ii. International Council for Science (ICSU) travel and events grants.
iii. Southern African Systems Analysis Centre (SASAC) for capacity building.
iv. Joint Institute for Nuclear Research infrastructure mobility support (SA-JINR).
v. International Centre for Theoretical Physics infrastructure mobility support.
vi. Equipment related training and travel grants.
vii. Research Development Grants (RDG) for Y-rated researchers.
viii. SA Network for Coastal and Oceanic Research (SANCOR) travel awards.
ix. Conference Fund.
x. European Research Council grants for research visits (NRF-ERC).

Not all of these mobility programmes are analysed for this study. The study focused exclusively on the Knowledge Interchange and Collaboration (KIC) programme because at the time of this research study, KIC served as:

i. South Africa's largest mobility programme.
ii. Its structure and support mechanism fitted neatly within the shorter-term mobility concept, which is the basis for this research study (i.e. travel abroad or the hosting of international experts for visits not longer than one month in duration).
iii. Supported all of the different categories of researchers; i.e. next generation (currently completing their Doctoral studies), emerging researchers (PhD holders doing their postdoctoral research or employed at HEIs), and established researchers (professors who are also experienced supervisors).
iv. Served as the only national programme whereby the travel grants were not necessarily linked to existing bigger research projects, and therefore not awarded on the basis of, or as part of, a research grant or postgraduate scholarship support (making it a pure mobility programme).
v. Lastly, the programme was administered independently of any of the government-to-government international bi- or multi-lateral agreements.

Therefore, the aim of the KIC Programme is to facilitate international collaboration and build and maintain research excellence in South Africa by providing travel grants to researchers. The objectives, as stated in the 2020 KIC Framework, are to:

i. Promote international collaboration through the support of travel opportunities and participation in scientific events.
ii. Foster collaboration in order to improve the quality of research output by researchers.
iii. Allow all collaborating scientists to learn from the experience of their colleagues.
iv. Build research capacity within the emerging researchers.
v. Support the development of specialised skills required to sustainably manage state-of-the-art research.
vi. Contribute to the production of the next generation of researchers that are internationally recognised and competitive.

vii. Provide access to specialised equipment that is not available at any of the South African institutions.
viii. Build and maintain excellence in South African research.
ix. Enhance networking within the global science system, in particular the African science system.

There are four categories of support within the KIC programme, all of which are interrogated in this study:

i. Travel Grants for Individual Researchers: Supporting next generation, emerging and established researchers visiting their international counterparts and/or institutions outside the African continent.
ii. Africa Interaction: Supporting next generation, emerging and established researchers travelling to or from other African countries.
iii. Visiting Foreign Researcher: Supporting emerging and established researchers to host their international counterparts in their home institutions for research-related activities.
iv. Local Scientific Events: Supporting emerging and established researchers to host international events in partnership with scholars from outside the country.

The details on the activities supported within each of these categories, the duration, and the maximum level of funding provided per category, are summarised in Table 2.8 below.

Table 2-8: Categories of support within the KIC programme (NRF, 2020)

Category	Description	Amount of support
Travel Grants for Individual Researchers	The applicants in this category are the individual South Africa-based researchers (young, emerging or established) travelling either locally or internationally. Support is mainly for local and international travel related to research activities such as the presentation of posters and oral presentations/invited speakers and presentations in seminars, symposia and workshops.	The maximum value for this category as of 2020: 50 000.00 (ZAR)
Africa Interaction	The applicants in this category are South Africa-based researchers (young, emerging or established) intending to visit universities/ research organisations/ researchers in other African countries in order to build capacity and to promote future collaboration, and/or to strengthen existing collaborations OR host experts from other African countries. Further to this, joint events with researchers from other African countries may receive additional funding on request, based on merit. Applications in this category are mostly prioritised over and above applicants in the above-mentioned category.	The maximum value for this category as of 2020: 75 000.00 (ZAR)
Visiting Foreign Researcher	The applicants in this category are South Africa-based researchers requesting funding to host research leaders from abroad for a short period (up to three weeks) in South Africa in order to enrich local expertise in their field.	The maximum value for this category as of 2020: 50 000.00 (ZAR)
Local Scientific Events	The applicants in this category are South Africa-based researchers requesting financial support to organise or host scientific events with minimum of 30 participants.	The maximum value for this category as of 2020: 150 000.00 (ZAR)

The sub-section below examines some of the international mobility programmes offered by other national funding agencies from elsewhere in the world. The overall aim of this sub-section is to understand how other funding agencies in other countries have structured their international mobility programmes. Are these programmes designed in such a manner that they benefit their researchers? How different are these programmes from the KIC programme of the NRF? Are there lessons to be learned from the manner in which other funding agencies support the mobility of their researchers?

2.11 Short-term international mobility: a global perspective

Governments across the world have invested in structured STiM programmes as a way of advancing their national research capabilities. Even at regional levels there has been an increase in the investment towards short-term international mobility programmes. In this sub-section, mobility programmes offered by three countries from

three different regions are analysed; i.e. Germany for Europe, Japan for Asia, and the USA for the Americas. These examples are utilised for a comparative analysis for best practices in order to inform the conceptual framework.

These countries have been selected based on their long history of scientific collaboration with South Africa. South Africa's bilateral agreement on science and technology cooperation with Germany was signed in 1996, in December 1995 with the USA, and August 2003 with Japan. Subsequent to the signing of these agreements, all countries committed financial resources in order to promote cooperation in the fields of research and development. These agreements are jointly implemented and administrated by the national funding agencies in the respective countries and have, over the years, provided funding support for joint research projects, including international mobility, between their respective researchers. Further to the mobility programmes offered by the above-mentioned countries, one regional mobility programme offered by the European Commission, i.e. the MSCA, is also analysed in this sub-section.

2.11.1 Europe: Germany

As indicated in previous sections, around 6.1 million students are enrolled for studies outside their home country (Heublein, Kercher, Knüttgen and Prencke, 2022). The United States is the key host country at 16% of all international students, followed by Australia, the United Kingdom (8% each), then Germany and Russia, at 5% each (Heublein *et al.,* 2022). International students account for 11% of all students in Germany and by 2019, around 138,000 Germans were studying abroad. In 2020, around 55,200 academic and artistic staff with foreign citizenship were employed at German universities (Heublein *et al.,* 2022).

Generally, the internationalisation of higher education in Germany is a far more coordinated system than in some of the other European countries. This is due to the leadership of the Federal Ministry of Education and Research (BMBF) which takes responsibility for supporting innovative projects and ideas in research through targeted funding programmes. The BMBF research funds are channelled through four different

specialist funding institutions, as outlined below (BMBF, 2016). In February 2017, the Federal Cabinet adopted the new Strategy of the Federal Government for the Internationalisation of Education, Science and Research (BMBF, 2017). The Strategy was developed under the leadership of the BMBF and the Ministry implements it through the following four largest German organisations that provide financial support to individuals and their research projects (BMBF, 2017):

i. The Deutsche Forschungsgemeinschaft (DFG): The central research funding organisation in Germany supporting research projects by funding cooperation between researchers and at the international level. DFG funds research based in Germany in all disciplines using a bottom-up approach, implying that any researcher holding a PhD or higher qualification can submit an application without any subject restrictions.
ii. The German Academic Exchange Service (DAAD): The world's largest funding organisation for the international exchange of students and researchers. It is an organisation of German universities and their student bodies devoted to internationalising the academic and scientific research system. It mainly provides postgraduate scholarship programmes that enable students, researchers, and teaching staff to take advantage of the best study and research opportunities available.
iii. The Alexander von Humboldt (AvH) Foundation: An intermediary organisation of German foreign cultural and education policies that aim to promote international cultural dialogue and academic exchange. The AvH Foundation offers flexible sponsorship programmes for researchers at all stages of their careers. Its research fellowships and awards enable outstanding scientists and scholars from abroad to complete short- and long-term research stays in Germany, and for the German researchers to do the same abroad.
iv. The German Federation of Industrial Research Associations (AiF): Supports application-oriented research and development for small and medium-sized enterprises (SMEs). It primarily promotes interchanges between industry and science in order to swiftly put new research findings into practice.

For the purposes of this research study, only the international mobility programmes offered by the AvH Foundation are analysed as some of them have the same features as the NRF KIC programme.

2.11.1.1 Alexander von Humboldt (AvH) Foundation

The AvH Foundation is a funding agency in Germany established in 1953 by the Federal Republic of Germany. This foundation sponsors academic collaboration between foreign and German researchers by granting research fellowships and awards which are tailored to the researchers' individual career situations. The support for researchers is at different levels of their research careers (e.g. young postdoctoral researchers, experienced/established researchers, or world authority researchers in different disciplines).

To date, the Foundation has supported about 30,000 Humboldtians from different countries and disciplines. What is unique with this foundation is that membership of the Humboldt Network begins at the point of selection and continues throughout the individual researcher's entire active academic life, in accordance with the motto '*once a Humboldtian, always a Humboldtian*'.

In its strategy 2019-2023, the AvH Foundation committed itself to utilising individual sponsorship to identify and support future leaders from science-related fields with the aim of creating a 'world-spanning collaborative network of excellence' (AvH Foundation Strategy, 2019). Through this strategy, the foundation plans to make membership of the Humboldt Network as rewarding as possible for all participants. The benefits for the individuals in the network are designed in such a manner that they are more clearly recognisable at an earlier stage and with longer lasting effects (AvH Foundation Strategy, 2019).

There are 25 fellowship programmes offered by the AvH Foundation supporting different collaborative activities with a focus on international mobility. A total of 24 of their 25 fellowship programs include research stays ranging from three to 24 months.

There is only one programme which offers STiM support; i.e. the Frontiers of Research Symposia (AvH Foundation Strategy, 2019).

The AvH Foundation holds the bi- and tri-national Frontiers of Research Symposia in cooperation with its partner organisations in USA, Japan, UK, China, India, Israel, Brazil and Turkey. As indicated in the AvH Foundation Strategy (2019), these symposia are designed to provide outstanding young researchers from the partner countries with a platform for the international and interdisciplinary exchange of knowledge. In addition, they offer the attending researchers the opportunity to establish or strengthen connections with other future leading researchers. Further to this, they challenge researchers to question and expand the boundaries of their respective disciplines; for example, through cross-disciplinary discussions of current advancements, innovative research, and emerging opportunities (AvH Foundation Strategy, 2019).

The AvH Foundation and the respective partner organisations identify and invite participating researchers. There is no option for researchers themselves to apply to attend. The three-to-four-day symposia take place alternatingly in Germany and in the partner country at regular intervals. The symposia are theme-based, meaning each symposium is designed within a specific thematic focus and outcome. For example, the symposium between Germany and India, the Indo-German Frontiers of Engineering Symposium (INDOGFOE), focuses on research within the engineering field (AvH Foundation Strategy, 2019).

With the NRF's KIC programme, the support for mobility is not dependent on a pre-existing bi-/tri-/multi-lateral agreement with a foreign country. Researchers can apply to visit any foreign research institution based anywhere in the world. Also, there are no pre-set thematic areas of focus within the KIC programme. Researchers from any discipline are eligible to apply. The support is for different activities, such as attending a conference, poster presentations, guest lecturing, hosting foreign experts, and organising international events locally. Unlike the Frontiers of Research Symposia, the KIC programme uses a bottom-up approach whereby researchers determine where and why they would like to undertake an international engagement. The AvH

Foundation's mobility grants are therefore much more directed as compared with the NRF's KIC programme (AvH Foundation Strategy, 2019).

Further to the above, the coordination and management of the AvH Frontiers of Research Symposia is quite unique in that it involves a well-established tracking scheme of their alumni (AvH Foundation Strategy, 2019). To allow attendees to maintain the necessary contact after the symposia, the AvH Foundation introduced a follow-up contact scheme called CONNECT (AvH Foundation Strategy, 2019). The CONNECT scheme allows the Frontiers of Research Symposia to enable young scholars and scientists to establish a long-term bi-national cooperation in order to strengthen the scientific relationship between Germany and the respective partnering country (AvH Foundation Strategy, 2019).

Through the CONNECT scheme, every participant is given the opportunity to keep in contact with other participants of the partner country after the conferences have taken place. The follow-up scheme allocates participants allowances for working visits in the partner country for up to 30 days per conference. Grants are provided for working visits to prepare joint research articles or joint research projects (AvH Foundation Strategy, 2019). Therefore the AvH Foundation does not only focus on the tracking system, but also supports follow-up activities by researchers.

Over and above this CONNECT scheme, the AvH Foundation has designed a generic Alumni Support Programme for all their beneficiaries (AvH Foundation Strategy, 2019). This allows the Foundation to keep in touch with their supported fellows and ensure long-term international networks between partners (AvH Foundation Strategy, 2019). This tracking scheme is a dimension that the NRF's KIC programme does not have, and should possibly integrate in order to ensure the long-term sustainability of researcher networks established through the KIC grants.

2.11.2 Asia: Japan

The Japanese HEIs have undergone a number of reforms since the 1980s in response to their government's comprehensive internationalisation agenda. According to Horie (2015), the comprehensive internationalisation agenda began when the Japanese government announced a policy where the aim was to increase the number of international students from 10 000 to 100 000 by the year 2000. This, in a way, mandated the Japanese HEIs to expand their capacity through the development of international student services, accommodation services, and Japanese language training programmes, etc. (Horie, 2015).

Further to this, the policy earmarked funding to curb tuition fees for international students. Since 2000, the Japanese government has announced a series of multi-layered internationalisation policies which are aimed at improving the quality of Japanese HEIs. Key projects emerged as a result of these policies:

i. The 'Top Global University Project': Launched in 2014 to intensify the internationalisation process through fundamental university reform over a 10-year period. Its objectives include strengthening the role of higher education in national development, fostering global human resources, and increasing the visibility of Japanese universities in the global higher education market.
ii. The 'Re-inventing Japan Project': Aims at promoting bi- and multi-lateral mobility by establishing creative programmes with partner institutions in specific target countries and regions.
iii. The 'TOBITATE! Leap for Tomorrow Study Abroad Campaign': Aimed at increasing the number of Japanese students studying overseas from around 60 000 in 2014 to 120 000 in 2020 (Kuroda, Sugimura, Kitamura, & Asada, 2019 and Horie, 2015).

The largest part of the Japanese government expenditure on research and development is provided by the Ministry of Education, Culture, Sports, Science and Technology (MEXT), which transfers funds to the following five main national

independent institutions, that run their own research or coordinate programmes for the support of researchers in Japan or in cooperation with partner countries:

i. Japanese Science and Technology Agency (JST): Responsible for promoting research and development from basic research to commercialisation, and upgrading the infrastructure for the promotion of science and technology, including the dissemination of scientific and technological information.
ii. Japanese Society for the Promotion of Science (JSPS): Coordinates and develops a number of scientific and academic exchange programmes, both domestic and international. The functions of JSPS also include awarding Grants-in-Aid for scientific research, supporting young researchers, promoting international scientific cooperation, supporting scientific cooperation between the academic community and industry, and collecting and distributing information on scientific research activities.
iii. New Energy and Industrial Technology Development Organisation (NEDO): Pursues the research and development of industrial technology with the goal aim of the commercialisation of advanced new technology. Drawing on the combined efforts of industry, academia, and government, NEDO carries out projects to explore future technology outputs as well as mid- to long-term national projects that form the basis of industrial competitiveness.
iv. Institute for Physical and Chemical Research (RIKEN): A large natural sciences research institute in Japan. It carries out high level experimental and research work in a wide range of fields, including physics, chemistry, medical science, biology and engineering, covering the entire range from basic research to practical application.
v. National Institute of Advanced Industrial Science and Technology (AIST): Created by integrating various institutions affiliated to the former Agency of Industrial Science and Technology and others, and operates as Japan's largest, and one of the world's leading, research institutes. AIST explores next-generation key technologies through advanced research in leading-edge industries such as electronics, information technology, machinery, environment and biotechnology, and through cross-sector research projects.

For the purposes of this research study, only the international programmes offered by JSPS are analysed as some of them have the same features as the NRF KIC programme.

2.11.2.1 Japanese Society for the Promotion of Science (JSPS)

JSPS was originally established as a non-profit foundation in 1932. In September 1967, the Act on the Japan Society for the Promotion of Science was enacted, making JSPS a quasi-governmental organisation (JSPS, 2019). Over the course of 70 years from its initial establishment, JSPS has developed a wide range of programmes which contributed to making it Japan's core science-promotion agency. It was re-established as an independent administrative institution in October 2003 for the purpose of enhancing the services it provides to researchers and research institutions by strengthening and streamlining its administrative capacities (JSPS, 2019). Since its founding, JSPS's mission has been to advance science. This mission is carried out through a diversity of programmes that include funding scientific research, development of young researchers, and promoting international scientific exchange, etc. (JSPS, 2019).

JSPS's strategy is to build research platforms that place all participants on an equal footing by supporting joint research projects and seminars for researchers of Japan and other countries in cooperation with counterpart funding agencies. There are four main categories of international programmes offered and supported by JSPS, as follows (JSPS, 2019):

i. Category I: Promoting international joint research.
ii. Category II: Forming international research-support networks.
iii. Category III: Providing international training to young researchers.
iv. Category IV: Inviting excellent researchers from other countries to Japan.

For the purposes of this research study, the focus is on Category III, i.e. providing international training opportunities to young researchers. This category shares similar

features with most of the provisions within the NRF's KIC programme. There are two main programmes within this category that are hereby analysed, i.e.:

i. The Academic Workshops and Seminars for Young Researchers.
ii. The Frontiers of Science Symposia.

2.11.2.2 Academic Workshops and Seminars for Young Researchers

Based on agreements with overseas partner research organisations, JSPS carries out academic workshops and seminars to promote bilateral research collaboration in all research fields, including the humanities and social sciences, while developing young researchers and supporting scientific research based on the researchers' own free ideas (JSPS, 2019). By sharing knowledge and ideas in these meetings, the young researchers who attend the meetings acquire pointers as to the direction of their future careers.

At the same time, the meetings afford an opportunity for the participants to form collegial networks among their affiliated institutions, through which joint research that pioneers new domains can be advanced (JSPS, 2019).

JSPS does not have a tracking mechanism for this specific programme, but has established the JSPS Researchers' Network (JSPS-Net), which is an online tool designed to support a circle of active researchers in countries around the world and networking among researchers and research-support personnel interested in creating collegial communities (JSPS, 2019). While helping to expand such activities, the site works to promote and facilitate international research exchange. Therefore groups of researchers, supported through the academic workshops and seminars for the young researchers programme, can make use of this online tool to maintain contacts and continue networking beyond the workshops. The tool allows researchers to create a 'group' for continuous discussions and long-term networks (JSPS, 2019).

2.11.2.3 Frontiers of Science Symposia

Further to the above, the JSPS supports Frontiers of Science Symposia that provide a platform for talented young researchers (up to 45 years of age) to engage in cross-disciplinary discussions on leading edge scientific topics (JSPS, 2019). The symposia aim to contribute to the development of new academic disciplines and the fostering of future generations of leaders. The participants lodge together over the 3-day period and attend all of the sessions (JSPS, 2019). This is the same programme as the one carried out by the AvH Foundation, as discussed above.

The JSPS has partnered with the AvH Foundation to offer the symposia to German and Japanese researchers. Further to the Germans, the JSPS partners on this programme include the National Academy of Sciences in the USA, the Royal Society in the UK, The Royal Society of Canada and the Canadian Institute for Advanced Research (Canada), the French Ministry of National Education, Higher Education and Research, the French Ministry of Foreign and International Development, and the Centre National de la Recherché Scientifique (France) (JSPS, 2019). The programme follows the same *modus operandi* as outlined under the AvH Foundation.

From this analysis, of particular interest is the JSPS online tool for researcher networks. This tool is unique in the sense that it provides researchers with an opportunity to maintain contacts with their research groups and continue networking beyond the workshops. With the NRF KIC programme, the submission of a travel report to the NRF by the KIC beneficiaries on return of their international trips serves as the last contact between the NRF and the funded researchers. Therefore, the NRF does not track whether the funded researchers continue to maintain the networks established during their international visits.

The manner in which the KIC programme is currently managed makes it difficult for the NRF to determine the extent of impact it has, or continues to make, on researchers. The JSPS model therefore, does not leave the networking of researchers to chance (JSPS, 2019), and this model seems to be the best in ensuring that researchers are

continuously engaged and continue to partner beyond the initial support provided by JSPS.

2.11.3 Americas: USA

There is no national system of higher education in the USA because the USA Constitution grants responsibility to the individual states for education (from primary to tertiary). The states vary substantially in how much control they exert over public HEIs within their jurisdictions. While education is principally funded through state/local appropriations and private funding (tuition and private gifts), the federal government provides scholarship aid, supports an extensive student loan programme, and is a principal source of research funds. Hudzik (2015) reports that the internationalisation of the USA HEIs is significantly shaped by both systems and institutional attributes.

The USA higher education system is large, expensive, diverse, politically and institutionally decentralised, and is recognised as high quality. It is within this framework of decentralisation, diversity, accreditation, and federal government influence, rather than authoritative control that American HEIs engage in internationalisation (Hudzik, 2015). Internationalisation priorities are shaped by the higher education community, its disciplines and professions, the expectations of students, the public, the business community, and the 'carrot' of federal funding (Hudzik, 2015).

The main national research funding agency in the USA is known as the National Science Foundation (NSF) (Hudzik, 2015). It is an independent federal agency created in 1950 to support fundamental research across virtually all fields of science, engineering, and education. The agency is governed by the National Science Foundation Act of 1950 (Public Law 81-507) and its mission, amongst others, is to promote the progress of science (NSF, 2018). Internationalisation in the NSF, as outlined in its 2018-2022 Strategic Plan, is driven through its Strategic Objective 2.1 on Societal Impact, which states that the NSF aims to 'support research and promote partnerships to accelerate innovation and to provide new capabilities to meet pressing societal needs' (NSF, 2018:47).

Through this Strategic Objective, the NSF aims to exploit partnerships with other government agencies, academia, and private and international entities in order to leverage the NSF's resources, promote efficiency, and ensure that fundamental research outcomes are translated into benefits to society (NSF, 2018). The NSF delivers on this Strategic Objective through the Office of International Science and Engineering (OISE), which was established to promote an integrated strategy for international science that complements and enhances the NSF's broader research and education goals and facilitates international collaboration (NSF, 2018). OISE is the NSF focal point for international science activities both inside and outside the NSF and manages internationally-focused programmes of the NSF. Its focus is on three main strategies, one of which is to facilitate and support international partnerships and networks. The following programmes are developed and implemented through OISE (NSF, 2018):

i. NSF MULTIPLIER (MULTIPlying Impact Leveraging International Expertise in Research Missions).
ii. Partnerships for International Research and Education (PIRE).
iii. International Research Experiences for Students (IRES).
iv. Accelerating Research through International Networks (AccelNet).

For the purposes of this research study, the focus is on the IRES and the AccelNet Programmes as they have similar objectives as the NRF's KIC programme.

2.11.3.1 International Research Experiences for Students (IRES)

The IRES programme is student-centred and supports international research and research-related activities for USA science and engineering students (NSF, 2018). The IRES programme contributes to the development of a diverse, globally engaged workforce with world-class skills. IRES focuses on active research participation by under-graduate and postgraduate students in high quality international research, education, and professional development experiences in NSF-funded research areas (NSF, 2018). The overarching, long-term goal of the IRES programme is to enhance USA leadership in science and engineering research and education, and to strengthen

economic competitiveness through training the next generation of research leaders (NSF, 2018).

According to the guidelines of this programme, students are not allowed to apply directly to the NSF to participate in IRES activities. Student applications are channelled through the NSF-funded Principal Investigators (PIs) who receive IRES awards. Students are expected to make use of the directory of the IRES awards published regularly to identify appropriate IRES projects to apply for. This means that students would form part of the main research project by Leading Scholars. This is similar to the NRF KIC programme whereby postgraduate students are not allowed to directly apply for a KIC grant. With the KIC programme, supervisors apply on behalf of the students.

For the IRES programme, students can apply for either IRES Track I or IRES Track II. Firstly, the IRES Track I, also known as the IRES Sites, focuses on the development of world-class research skills in international cohort experiences. With this Track, projects engage a group of students in active high-quality collaborative research, in principle at an international site with mentorship from researchers at a host lab. IRES Sites are organised around a coherent intellectual theme that may involve a single discipline or multiple disciplines funded by the NSF (NSF, 2020). This Track differs from the NRF KIC programme in that it does not focus on individual students, but a cohort consisting of a mixture of students and their mentors (or supervisors), thereby making the students part of a larger research project for sustainability purposes. This model therefore ensures that students are part of a larger programme and that there is some level of responsibility and accountability by supervisors.

With the NRF KIC programme, support is for an individual student/researcher, even though supervisors are expected to apply on behalf of their students. The challenge with the NRF KIC programme is that the NRF has no direct way to determine the extent to which the supervisor is involved in the activities to be undertaken by their students through the KIC support. The supervisor can simply apply for a travel grant for his/her student to attend a conference in a foreign country without any follow-up plans. This type of engagement might not yield any long-term results.

Secondly, the IRES Track II – also known as Advanced Studies Institutes – is dedicated to targeted, intensive learning and training opportunities that leverage international knowledge at the frontiers of research. This Track includes intensive short courses with related activities that engage advanced postgraduate students in active learning and research at the frontiers of knowledge. These short courses range in length (from 10 to 21 days), and in principle are held outside the USA. They have a compelling rationale for their international location and involve distinguished active researchers in the target field from the USA and abroad. Further to this, they enable students to develop skills and broaden professional networks, leveraging international participation and complementary resources for mutual benefit (NSF, 2020).

Similar to the IRES Track I, this Track also emphasises the importance of establishing a network that includes both students and experienced supervisors working together for a particular end. Although the support is only for a couple of days, the impact is long-term as the activities supported (e.g. short courses) are fairly structured with follow-up plans.

2.11.3.2 Accelerating Research through International Networks (AccelNet)

The goals of the Accelerating Research, through International Network-to-Network Collaborations (AccelNet) programme, are to accelerate the process of scientific discovery and prepare the next generation of USA researchers for multi-team international collaboration (NSF, 2019). The AccelNet programme supports strategic linkages among USA research networks and complementary networks abroad that will leverage research and educational resources to tackle grand scientific challenges that require significant coordinated international efforts (NSF, 2019).

The programme seeks to foster high-impact science and engineering by providing opportunities to create new collaborations and new combinations of resources and ideas among linked global networks. Each network is expected to engage in innovative collaborative activities that promote a synergy of effort across the networks and provide professional development for students, postdoctoral scholars, and early-career researchers (NSF, 2019).

The supported networks go beyond existing research networks and strive to forge new linkages or enhance existing connections among other networks to create novel connections and leverage expertise, data, facilities, and/or other resources (NSF, 2019). This type of engagement has the potential to last a lifetime since the network is not dependent on a single researcher or student. This approach serves as a prime example of how the NRF's KIC programme can be expanded by incorporating elements of this programme.

2.11.4 Regional: EU – Marie Skłodowska-Curie Actions

The MSCA under the EC's Horizon 2020 research and innovation framework programme is named after the double Nobel Prize winner Marie Skłodowska-Curie and aims to advance the research networks, promote staff exchanges, and fund mobility schemes between European researchers and the rest of the world (EC, 2020). Established in 1994, the MSCA grants support to all levels of researchers (i.e. young, emerging, and established), encourages collaboration and the sharing of ideas between different industrial sectors (breaking the barriers between academia, industry and business), and funds research within all research disciplines (EC, 2020). For H2020, the EC was able to set aside 6.16 billion Euros to be spent on MSCA activities by the end of 2020 (EC, 2020). Since its establishment, the programme has supported over 120 000 researchers, 80 000 before 2014, and more than 40 000 in the years of H2020, among them nine Nobel laureates and an Oscar winner (EC, 2020).

The interim evaluation report of H2020 (EC, 2020) finds that the MSCA programme accounts for more than half of all Third Country[1] participation in H2020, and one in four MSCA fellows are researchers attracted to Europe from countries outside the EU

[1] The EC define a Third Country as a country that is not a member of the European Union and a country or territory whose citizens do not enjoy the European Union 'right to free movement' (as defined in Art. 2 (5) of the Regulation (EU) 2016/399 (Schengen Borders Code).

Member States. The report further indicates strong evidence of longer-term scientific value and societal impact of the programme. For example, a total of 1 114 publications were produced from the MSCA projects, of which 740 were in peer-reviewed journals, with over 6 100 organisations from more than 100 countries having participated in the programme (EC, 2020).

The EC has approved the continuation of this programme under the new research and innovation programme 2021-2027, i.e. Horizon Europe, in order to build on this 20-year success (EC, 2020). To this end, the EC has proposed a budget of 6.8 billion Euros for MSCA actions under Horizon Europe (EC, 2020). There are currently five types of MSCA actions; i.e. Innovative Training Networks, Individual Fellowships, Research and Innovation Staff Exchange, Co-Funding of National, Regional and International Programmes, and the European Researchers' Night (EC, 2020). These five actions support all levels of researchers (i.e. young/next generation, emerging, and established) and equip them with the necessary skills and international experience for a successful career in both the public and the private sectors. For the purposes of this research study, only the Research and Innovation Staff Exchange (RISE) action is analysed in detail for best practice.

2.11.4.1 Research and Innovation Staff Exchange (RISE)

Support under the RISE programme is for organisations from the academic and non-academic sectors based in Europe and outside Europe (Third countries) (EC, 2020). Support is provided for the development of partnerships in the form of a joint research and innovation project. This is aimed at knowledge-sharing through international and inter-sectoral mobility, based on secondments and exchanges of research and innovation staff with an in-built return mechanism. Partnering organisations implement the joint research and innovation projects by seconding and/or hosting eligible staff members (EC, 2020).

The exchanges are conducted through networking activities, such as the organisation of workshops and conferences to facilitate sharing of knowledge, new skills acquisition, and career development for research and innovation staff members. Mobility support

can either be inter-sectoral or international, or a combination of both. Exchanges are for researchers at any stage of their careers, from administrative, managerial or technical staff involved in the research and innovation project (EC, 2020).

The RISE action is expected to assist individual staff members to increase their set of skills, both research-related and transferable ones, leading to improved employability and career prospects both in and outside academia. The programme is also expected to increase high impact research and innovation outputs; and generate more knowledge, ideas converted into products and services, and generally contribute to the knowledge-based economy and society (EC, 2020).

One of the major differences between the NRF KIC programme and the RISE action is the fact that the support for RISE is based on an existing, well established research project. Therefore, mobility support is within the bigger project. Of prominence are the follow-up activities that are organised for the long-term sustainability of the activities. As follow-up activities, the EC established Introductory Training for all MSCA fellows (EC, 2020). This training is organised through online modules, with the aim to empower the fellows to become leaders of the new generation of researchers and provide them with useful information regarding their careers (EC, 2020).

Secondly, the Commission organises several conferences and workshops for MSCA fellows to showcase their work and to connect the funded projects with the general public. Lastly, as a way of increasing impact, Alumni Services have been established to further network the current and past MSCA fellows and their supervisors (EC, 2020).

Table 2.9 provides a summarised comparison, highlighting the main similarities and differences between the NRF KIC programme and STiM programmes offered by other countries as described above. From this analysis it is clear that various countries do see value in investing in STiM for the advancement of their national research and innovation systems. Of note are the similarities between these STiM programmes in their design and implementation, but vastly different from the NRF KIC programme. For example, all the programmes have a long-term perspective embedded in them.

Further to this, three of the five analysed programmes have established tracking systems, well-structured activities ensuring that their alumni are consistently engaged, and they invest both human and financial resources to support the follow-up activities. These important ingredients, currently not considered in the NRF KIC programme, are essential for the efficacy and sustainability of these types of STiM programmes, and for ensuring a return on investment. The only similarities between the NRF KIC programme and the other five programmes is the fact that they are all researcher-focused and they all provide support, directly or indirectly, through established networks to all the different levels of researchers.

The information in this table, together with the data analysis in Chapter 5, were used to construct, at an operation level, a conceptual framework of using STiM to internationalise researchers at South African HEIs.

Table 2-9: Comparison: NRF KIC and mobility in other countries (self-generated)

Country and funding agency	**South Africa** NRF	**Germany** AvH Foundation	**Japan** JSPS	**United States of America** NSF		**Regional (EC)** MSCA
Name of the programme	**Knowledge, Interchange and Collaboration (KIC)**	**Frontiers of Research Symposia**	**Workshops and Seminars for Young Researchers**	**Accelerating Research through International Networks (AccelNet)**	**International Research Experiences for Students (IRES)**	**Research and Innovation Staff Exchange (RISE)**
Duration of support: All these programmes support short-term mobility however, the duration of support differ from one programme to another.	3 days – 4 weeks	Less than 4 weeks	Less than 4 weeks	3 – 5 years	1 – 10 weeks per year	1 – 12 months
Country specific agreements: The support for mobility in some of these programmes dependent on a pre-existing government agreement.	No	Yes	Yes	No	No	No
Thematic area of focus: Some of the programmes are theme-based while others follow a bottom-up approach in supporting mobility of researchers.	Bottom-up approach – open to all themes	Theme-based – as aligned to a signed agreement	Theme-based – as aligned to a signed agreement	Theme-based	Theme-based	Bottom-up approach – open to all themes
Level of researchers: Some of the programmes are student centred and others provide mobility support to all levels of researchers.	Young, emerging and established	Young, emerging and established	Young, emerging and established	Young, emerging and established	Student centred – supported with networks	Young, emerging and established
Nature of support: Some programmes provide mobility support to individual researchers while others support researchers within bigger networks.	Individual researchers	Individual researchers	Individual researchers	Networks of researchers	Individual researchers within a network	Individual researchers
Tracking system: Some programmes established systems for researchers to maintain contact and continue networking post mobility support.	No	Yes – *'once a fellow always a fellow'*	Yes, but can be used by all JSPS researchers	No	No	Yes
Follow-up activities: Some programmes have well-structured activities for researchers to participate in post mobility support and other don't.	No	Yes – *'once a fellow always a fellow'*	Yes	No	No	Yes
Alumni support: Some programmes have designed activities to keep their alumni engaged, other don't.	No	Yes – *'once a fellow always a fellow'*	Yes	No	No	Yes
Long-term perspective: All programmes, except for the NRF KIC, are long-term in their approach to supporting short-term mobility.	No	Yes – *'once a fellow always a fellow'*	Yes	Yes	Yes	Yes
	Cells shaded this colour indicate similarities between the NRF KIC programme and the other short-term mobility programmes.					

2.12 Conclusion

The value of internationalisation on the career development of researchers and HEIs themselves is widely acknowledged by various scholars. To this end, researchers are under pressure to expand their international networks and establish international partnerships. From the literature, there is little doubt that internationalisation exposes researchers to various opportunities they otherwise would not have been exposed to. This often enhances and strengthens the profile of individual researchers in terms of increased publication profile, increased opportunities to publish in internationally accredited journals, access to the best research infrastructure, and access to other sources of research funding. For the HEIs, internationalisation is mostly used to improve the institution's international rankings.

International mobility is viewed by many as a useful instrument for advancing the internationalisation agenda. However, the analysis of international mobility and the benefits thereof have previously focused largely on long-term, medium-term, and to some extent short-term mobility. Very little definitive research has been conducted on STiM and its contribution to the internationalisation agenda. This research study views this as problematic given the high number of mobility programmes currently being classified as STiM. Moreover, higher education stakeholders, including governments, are beginning to allocate more resources in support of STiM to the extent that these types of visits are now starting to replace the longer-term visits.

The studies referred to in this chapter have presented significant findings on how short-term mobility can provide opportunities to those researchers for whom longer-term stays are either not possible or desirable. The uniqueness and value of this research study is in the type of mobility analysed.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the methodology and procedures undertaken in conducting this research study, and provides details on the research strategy, setting and plan, the target population and its sample size, the data collection techniques, and analytical methods used. The chapter concludes by outlining the ethical concerns that were considered and addressed prior, during, and after the study was undertaken.

3.2 Research design

A research design is an overall strategy that coherently and logically integrates the different components of a study to effectively answer the research questions or test hypotheses. It is a protocol or procedure followed for the collection, measurement, and analysis of data (Dul and Hak, 2007). To investigate the research aim, this research study opted for a conclusive research design which is a structured and formalised approach to research for testing hypotheses and relationships (Neuman, 2014; Kumar 2011). This design is suited for this study as the researcher requires the information to discover or establish the existence of a relationship/ association/ interdependence between two or more variables in order to make certain conclusions to inform the design of the STiM framework.

Through this approach, a correlation between two variables is analysed as a way of understanding the extent to which these variables are associated with each other (Sarwono, 2022; Kumar, 2011) – making this a correlational study. The intent therefore, was not to test causality (i.e. cause and effect) as this is a non-experimental study. The study therefore, examines patterns of relationships between the independent variable (i.e. STiM) and the dependent variables in order to determine whether the relationship is positive (i.e. an increase in one variable leads to a rise in another or a decrease in one variable leads to a decline in another), negative (i.e. an increase in one variable leads to a decline in the other and vice versa) or non-existent (i.e. change in one variable makes no difference in another) (Sarwono, 2022; Kumar

2011; Tuli, 2010). Quantitative tools, explained in the sub-section below, were used for collecting data, as is the norm when making use of a conclusive research design.

3.3 Research methodology

In investigating the research question, the study started by interrogating the views of other scholars on the research topic. This review of the relevant literature allowed the researcher to mine conclusions and generate hypotheses to test in the field. Identified hypotheses were therefore analysed making use of quantitative research methods which relies on numerical data that can be used to support, reject, or modify the theoretical conclusions (Williams, 2007). Quantitative research methods were viewed as highly appropriate for this research study, mainly because they 'exhibit the view of relationship between theory and research as deductive' and they have 'an objectivist conception of social reality' (Bryman and Bell, 2007:154). The quantitative approach to research therefore aims to build upon existing theories, and its methodology maintains an empiricist paradigm whereby 'the research itself is independent of the researcher [and] ... as a result, data are used to objectively measure reality … and create meaning through objectivity uncovered in the collected data' (Williams, 2007:66). In a quantitative approach:

i. Researchers analyse hypotheses stated at the start.
ii. Concepts are in the form of separate variables.
iii. Measures are systematically created and standardised before data collection.
iv. Data are in the form of numbers based on measurement.
v. Theory is largely causal and is deductive.
vi. Procedures are standard, and replication is frequent.
vii. Analysis uses statistics, tables, or charts.
viii. Conclusions are reached by confirming, rejecting, or modifying the hypotheses (Neuman, 2014: 176).

In this study six hypotheses informed by the literature were analysed and are summarised in Table 3.1 below. All these hypotheses have at least two variables (i.e. independent and dependent), can be expressed as a prediction or an expected

outcome, are logically linked to the overall research question and the theory, and can be tested against empirical data (and can be true or false).

Table 3-1: Six hypotheses of the research study

No.	Hypotheses	Variables
1	There is a difference in the number of research outputs produced by researchers at South African HEIs between the types of shorter-term international mobility and networking programmes.	**Independent variable**: grant type. **Dependent variable:** number of research outputs.
2	There is a difference in the quality of research outputs produced by researchers at South African HEIs between the types of shorter-term international mobility and networking programmes.	**Independent variable:** grant type. **Dependent variable:** number of peer reviewed outputs.
3	There is a difference in the opportunities for postgraduate students at South African HEIs to get international exposure between the types of shorter-term international mobility and networking programmes.	**Independent variable:** grant type. **Dependent variable:** number of postgraduate students exposed to international activities.
4	There is a difference in the amount of additional funding that researchers at South African HEIs manage to leverage between the types of shorter-term international mobility and networking programmes.	**Independent variable:** grant type. **Dependent variable:** total amount of additional funding attracted.
5	There is an association between the type of shorter-term international mobility and networking programmes and the extent of collaboration between researchers in South African HEIs and their international counterparts.	**Independent variable:** grant type. **Dependent variable:** did collaboration take place or not?
6	There is a link between the rating categories of researchers at South African HEIs and shorter-term international mobility and networking programmes.	**Independent variable:** grant type. **Dependent variable:** rating category of researchers.

3.4 Justification of the research design

As elaborated above, quantitative data collection and analysis methods are based on statistical calculations in different formats (Williams, 2007; Creswell, 2014; Neuman, 2014; Bryman and Bell, 2007). Neuman (2014) reports that quantitative data can be collected through experimental research methods, survey research, or non-reactive research. Both the experimental and survey research methods are categorised under the 'reactive' umbrella, meaning that subjects are aware that they are being studied, while non-reactive research means the reverse, i.e. subjects are not aware they are being studied. This research study used both methods whereby data collected by the

NRF were analysed for the non-reactive part, and a survey by means of an online questionnaire was administered for the reactive part of the research.

The secondary data analysis, as Sarwono (2022) and Neuman (2014) points out, finds information in primary sources to produce new information. Both the qualitative and quantitative researchers use secondary sources as a method of collecting data (Ruggiano and Perry, 2017; Hochbein and Smeaton, 2018). This technique allows the researcher to make use of existing data and re-analyse it in order to test the hypotheses (Sarwono, 2022). This is a useful technique for comparisons, replication, and longitudinal studies (Neuman, 2014). Daas and Arends-Tóth (2012) believe that a secondary data analysis does not differ much from those methods used for primary data since they are in principle primary data collected by someone else for a different purpose. Usually secondary data include sources such as official statistics, administrative records, or reports kept routinely by organisations (Sarwono, 2022). Secondary data analysis is 'an empirical exercise that applies the same basic research principles as studies utilising primary data' (Johnston, 2014: 619).

Therefore, the main source of data for this study was the secondary data in addition to developing an online questionnaire to supplement the information collected from the secondary data, as Sarwono (2022) advised, for meaningful results, secondary data should not be used as the only source of information. For this questionnaire, the researcher used closed ended questions because they are relatively easier and quicker for respondents to complete, and the answers from different respondents are easier to collate, code, compare, and statistically analyse (Cobern, 2020). Both of these techniques rely on positivist principles. Adopting a positivist approach for this study ensured that the researcher's role was limited to data collection and interpretation using objective methods, and that the research findings were observable and quantifiable. It was important for the researcher to remain detached and independent from the subjects of the investigation considering the researcher's role as an employee of the NRF at the time when this study was conducted.

The fact that at the time of this research study there were no mechanisms within the NRF for tracking the beneficiaries of some of the short-term mobility programmes,

invites a purposeful methodology to assess their achievements and motivate for their continuation. What made the situation even more complex was the fact that most of these short-term mobility programmes were awarded as a once-off support, whereby eligible researchers submitted applications for funding, and if approved, travelled to attend international events and submit a travel report to the NRF on return. The submission of this travel report served as the final contact between the funded researchers and the NRF.

Therefore, at the time of this study, the NRF had no mechanism of quantifying the contribution of these programmes on funded researchers and their postgraduate students or institutions in general. The submitted travel reports were therefore collected as secondary data and analysed, and the information was used to test the research hypotheses and answer the main research question of this study. When analysing these travel reports, the researcher realised that some of the sections of the report were overlooked by the beneficiaries. These sections were either incomplete or the researchers simply did not complete them. This led to the decision to sample few respondents and administer an online questionnaire in order to supplement the information from the submitted travel reports.

3.5 Research setting, target population and sampling

This research study was conducted in South Africa at the NRF. Annually, the NRF supports between 200 and 500 STiM applications, of which approximately 40% are focused on Africa. The NRF call for applications is published twice every year. The number of supported researchers per annum is highly dependent on the available budget in any given financial year. KIC supports all levels of researchers (next generation, emerging and established). The NRF keeps a record of all its past and current beneficiaries. All the NRF researchers that have been awarded international travel grants are required to complete a travel report on the NRF online submission system upon return from their international visit as part of their reporting on overall achievements. As elaborated in the sub-section above, these travel reports were collected and used as secondary data. Completed and submitted travel reports by

researchers who were awarded a KIC grant from 2017 to 2019 (inclusive), a total of 1 230 travel reports, were collected and analysed for this study.

Those who were awarded KIC grants prior to 2017 and post 2019 were excluded from this study. Reports submitted prior to 2017 were excluded because in 2017 the NRF changed its system for online submissions, which also meant a change in the reporting template. The analysis did not go beyond 2019 as all NRF travel grants were negatively affected by the COVID-19 global pandemic post 2019. Table 3.2 below indicates the total number of KIC travel reports submitted to the NRF for each year analysed:

Table 3-2: Number of KIC travel reports submitted to the NRF, 2017 – 2019

Year	Number of reports
KIC travel reports submitted in 2019	279
KIC travel reports submitted in 2018	526
KIC travel reports submitted in 2017	425
Total of KIC submitted travel reports over the three-year period	**1 230**

As indicated above, to supplement the main data for the study, a section of the reports were sampled for the online questionnaire. This step was taken as part of the gap-filling process. For example, the KIC report template did not contain information on the rating categories of beneficiaries therefore, the researcher made use of the questionnaire to respond to such questions and enhance responses on others. For this questionnaire, a sample was drawn from a pool of the 1 230 travel reports that were analysed. A probability sampling technique was used whereby the principle of randomisation was followed for a fair representation of the total number of the reports. According to Creswell (2014), randomisation ensures that all members of the sampling frame have an equal opportunity of being selected for the study.

Of the five different variations of probability sampling techniques, i.e. random, stratified, systematic, cluster and multi-stage (Neuman 2014; Creswell 2014; Bryman and Bell 2007), a systematic random sampling technique was used for this study. In this technique, 'a researcher selects every n^{th} case in the sampling frame using a

sampling interval' (Neuman, 2014: 258). For the purposes of this research study, a sampling interval of 10 was followed. Therefore, the sampling ratio for conducting the survey was 1/10. In this regard, every 10th report on the list of all submitted reports between 2017 and 2019 was selected for the questionnaire. According to Sarwono (2022), Conroy (2018) and Kumar (2011) a good maximum sample size is usually around 10% of the population, for as long as the sample does not exceed a 1000. For this study, the 10% of the maximum number of reports (1 230) came up to 123. Therefore to determine the width of the sampling interval the total number of reports were divided by the sample size:

$$(k) = \frac{\text{Total no. of reports (1230)}}{\text{Sample size (123)}}$$

$$(k) = 10$$

From this a total of 123 reports were selected and the email addresses of the beneficiaries who submitted these 123 reports were drawn to be used for forwarding the online questionnaire. See Annexure I for a sampling frame. Only 75 of the 123 email addresses were found to be active and these beneficiaries were contacted to respond to the questionnaire (Google Survey®). Some 48 responses were received, and these were used to supplement the main data from the reports.

The last two questions in the questionnaire were open-ended (qualitative). These questions were meant to solicit [1] the researchers' opinion on what they believe has been the impact of the KIC programme on their career development and [2] recommendations for the improvement of the KIC programme for impact and value add. Data collected through these open ended questions was coded, related concepts were grouped together into categories and themes were drawn for analysis and linkages with the literature. Through this method, the researcher was able to condense lengthy data into manageable information (Locke, Feldman and Golden-Biddle, 2022). This type of process enables ease of analysis and saves the researcher the possibility of being overwhelmed by lengthy qualitative data (Linneberg and Korsgaard, 2019).

3.6 Data integrity

It has been argued that in order to accept results from quantitative research, several key issues must be considered and addressed as part of the design and analysis. These include the validity, reliability and generalisability of the research results (Sarwono, 2022; Neuman, 2014; Kumar, 2011), these three factors are part of ensuring the integrity of data. Neuman (2014:287-289) defines validity in quantitative research as the strength of the conclusions that are drawn from the results. In other words, do the results measure what was intended to be measured?

Neuman (2014) continues to define reliability as the consistency of the measurement; i.e. to what level will the instrument produce the similar results under the similar conditions each time it is used? Reliability adds to the trustworthiness of the results, and refers to the extent to which the research findings and conclusions are generalisable to the larger population or other similar situations. The ability to generalise results allows researchers to interpret and apply findings in a broader context, making the finding relevant and meaningful (Neuman, 2014). The sub-sections below describe the integrity of both the secondary and primary data analysed for this research study.

As the KIC report template contained questions aligned to the selected hypotheses, the researcher was able to use the completed reports to analyse the hypotheses. The NRF travel report template for international travel grants is attached for reference (see Annexure II). Analysing these reports provided insight into the overall research question. Further to this, the KIC travel report template used in 2017 was the same template that was used in 2018 and 2019. This means that the data from the three different time periods were compatible.

As already indicated, the KIC travel report template did not contain information relating to the beneficiaries' rating status. This therefore, meant that for the hypothesis on rating, the researcher had to rely on the primary data from the questionnaire. Over and above this, the primary data were also used to supplement information collated

through the analysis of the KIC reports and to solicit beneficiaries' opinions and perceptions about the KIC programme.

The questions in the questionnaire were grouped into themes aligned to the issues highlighted in the hypotheses. In any questionnaire, face validity is important in order to ensure that the instrument will be able to test what it aims to (Salkind, 2010). In this regard, a 'common-sense' assessment, as reported in the literature, was conducted by distributing the questionnaire to two industry experts for assessment of the validity of the instrument. As Gunawan, Marzilli and Aungsuroch (2021) indicated, testing a questionnaire can be done in one of the following four ways, by either generating an item pool with an interview sample ranging from 1-50, or testing content validity with a sample range of 2-20, or pretesting with a sample range of 15-30, or by performing construct validity with factor analyses ranging from 50-1000. Content validity proved appropriate for this study. The process resulted in useful and important modifications of the instrument based on the feedback received. After this process, the questionnaire was administered to the sampled beneficiaries through an online platform, Google Survey©, which is used for data collection and management. See Annexure III for a copy of this online questionnaire.

3.7 Data analysis

Bivariate analysis, examining two variables for the sole purpose of determining the empirical relationship between them, was used in this research study. As Sandilands (2014) points out, this analytic method assists to determine the extent to which one can know and predict the value of one variable (i.e. dependent variable) if one already knows the value of the other variable (i.e. independent variable).

For some of the identified hypotheses, a correlation coefficient was used to scientifically test the relationship between these two variables and quantify the strength or weakness of the linear relationship between them. In the analytic report the coefficient is symbolised with the '*r*' (Schober, Boer and Schwarte, 2018). The closer the correlation coefficient is to 1, the stronger the relationship. There are of course documented limitations with relying solely on correlation coefficients (Ratner,

2009; Schober *et al.*, 2018); hence the researcher also made use of graphs, clustered bar charts, stacked bar charts, or cross tables for the descriptive statistics. For those hypotheses where a correlation coefficient was used, the research study followed conventional descriptors that have been widely accepted for interpreting the correlation coefficient (Schober *et al*., 2018; Ratner, 2009):

0.00 – 0.10	Negligible correlation, no linear relationship.
0.10 – 0.39	Weak correlation, negative linear relationship (as one variable increases in its value the other decreases).
0.40 – 0.69	Moderate correlation.
0.70 – 0.89	Strong correlation.
0.90 – 1.00	Very strong correlation, a strong positive linear relationship through a firm linear rule.

A correlation coefficient was not used for all the hypotheses as some of the hypotheses included categorical variables and therefore required descriptive methodologies for examining the relationships between two variables, such as graphs, clustered bar charts, stacked bar charts, or cross tables for the descriptive statistics.

The findings from the data are presented, analysed, and discussed in Chapter 5. This chapter also links the literature review to the main findings of the study and determine whether or not the study achieved its intended objectives. Chapter 6 provides recommendations in the form of an operational framework that could be utilised for the effective coordination and management of STiM programmes. Chapter 7 concludes the research work by acknowledging the limitations of the study and highlighting the scope for future studies within this research area.

3.8 Ethical considerations

It is critical to consider ethics when conducting research. Neuman (2014) and Bryman and Bell (2007) define ethics as codes of conduct that distinguish right from wrong. Ethics assist researchers to distinguish between acceptable and unacceptable behaviour in conducting research. Also, as asserted by Neuman (2014), the integrity, reliability, and validity of the research findings depends on the ethical principles followed. It is important for readers (and the general public) to be assured that the researcher followed the right procedures and guidelines with regards to human rights, conflicts of interest, safety, etc.

Ethical concerns are usually not at the forefront of most non-reactive research due to the fact that the respondents in these studies are not directly involved in the study. The primary ethical concern with non-reactive research is mainly the 'privacy and confidentiality of using information that someone else gathers' (Neuman, 2014:390). It was therefore important to ensure an ethical code of conduct for this study since it utilised both the reactive and non-reactive research methods. The following steps were followed in ensuring that this research study was conducted in an ethical manner.

Prior to undertaking the fieldwork, the researcher gained permission and approval from the NRF to make use of, and analyse, its primary data on international mobility, i.e. the KIC programme. This permission was granted in November 2020 and the Memorandum of Agreement between the NRF and the researcher regarding the responsibilities of the two parties in the usage of this data was signed on 30 November 2020. A copy of this Agreement is contained in Annexure IV. Further to this, in December 2020, the researcher received ethical clearance for conducting this research study from the Da Vinci Institute Ethics Committee. The Da Vinci Institute's ethical approval was granted for the period started 2020/12/14 and ending 2023/10/09. A copy of this approval is contained in Annexure V.

The researcher used both the reactive and non-reactive research methods, relying on both the secondary data and a questionnaire and ensured that (1) the reporting to the NRF by the KIC beneficiaries was done making use of the same template throughout

the three-year period under review for data consistency; (2) the systematic sampling technique for the questionnaire ensured representivity of the sample; (3) the questionnaire was tested and piloted prior to being administered to ensure that the questions asked would provide the required responses; and (4) a correlation coefficient was used and for those hypotheses with categorical variables descriptive methodologies were employed.

For the questionnaire, an information leaflet and consent form were circulated together with the online questionnaire. These documents ensured that the respondents were properly informed of the study and that consent was formally received. Through this process the privacy, confidentiality, and anonymity of the respondents were ensured and secured as the respondents' real names (and other personal information such as ID numbers or contact details) were not, and will not be used, published, or shared with third parties. The information leaflet and consent form is contained in Annexure VI.

The works of other authors used in this study are acknowledged with the use of the Harvard referencing style, in line with the Da Vinci Institute Dissertation/Thesis Guideline. To this end, the Turnitin Report indicated an overall similarity index of less than 10%. The dissertation was also submitted to a professional editor to ensure that appropriate academic language was used consistently throughout the thesis in order to safeguard the quality of the thesis. The Language Editing Certificate is contained in Annexure VII.

3.9 Conclusion

As indicated in the sub-sections above, this research study followed a conclusive research design with a positivist approach to theory. A quantitative research methodology was used to analyse the interaction between different variables and the effect these interactions have for a specific outcome. Both a reactive and non-reactive research techniques were utilised. For the non-reactive part, the study used data from secondary sources whereby 1 230 travel reports, completed and submitted by NRF beneficiaries between 2017 and 2019, were collected and analysed. Further to this,

the study conducted a questionnaire to supplement data analysed from secondary sources. Findings are presented and analysed in Chapters 5.

The selected research design, methodology, and techniques for data collection and analysis assisted the researcher to retain independence from the research itself by maintaining no interaction with research participants.

CHAPTER 4: DEMOGRAPHICS

4.1 Introduction

This chapter presents the demographics of the 1 230 NRF beneficiaries who were awarded international travel grants between 2017 and 2019. The chapter cross-examines the characteristics of these beneficiaries such as race, gender, citizenship, institutional type, and amounts awarded to provide a clear profile of the beneficiaries whose reports were analysed for this study.

4.2 Profile of the KIC grant recipients

The majority of the KIC grants were awarded in 2018, with 43% of all grants (a total of 526) made during this period. Both 2017 and 2019 had fewer grants at 34% (425) and 23% (279) respectively informed by other funding opportunities afforded by the NRF. The number of grants included all the international networking activities funded within the KIC programme; i.e. travel grants for individual researchers, grants for visiting of foreign scientists, and grants for hosting international scientific events.

For purposes of this study, researchers were regarded as one homogenous group and were therefore not divided into next generation, emerging or established researchers. Therefore, the 1 230 represent the total number of South Africa-based researchers who were awarded KIC grants between 2017 and 2019. See Figure 4.1 below for the number of grants awarded to researchers within each of the three categories of international networking activities supported through the KIC programme.

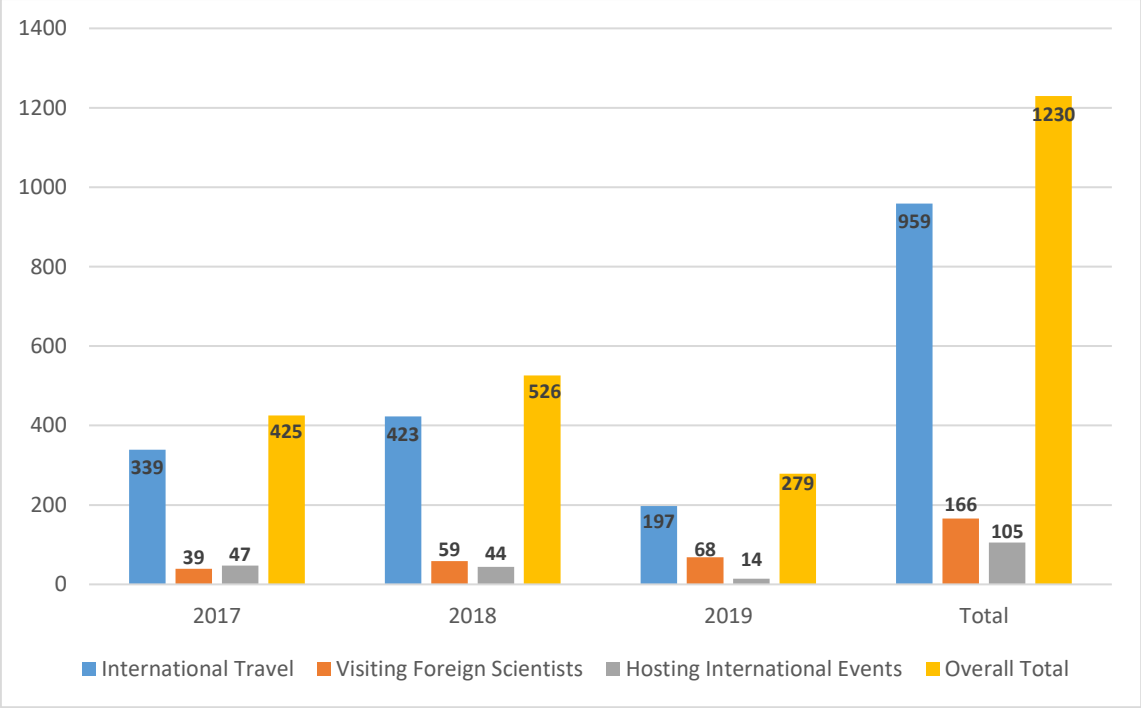


Figure 4-1: Number of KIC grantees per international networking activity

Figure 4.1 above clearly indicates that researchers were more interested in traveling abroad than hosting their colleagues at home institutions. Of the 1 230 KIC grants awarded within the three-year period under review, 78% (959) of the grants were awarded to support STiM of individual researchers, while 13% (166) of all grants supported the visit of foreign scientists/experts to South Africa, and only 9% (105) of the overall grants were used to support international events hosted at South African universities. These numbers are a clear indication that researchers based at South African HEIs prefer and value traveling internationally for their network building.

This is more so given the fact that the maximum KIC value for international travel is exactly the same amount as that awarded for hosting foreign scientists (i.e. R50 000 per grant). The maximum grant value for hosting international scientific events is three times the value of undertaking STiM (at R150 000 per grant), and yet researchers still prefer to either travel themselves or receive one or two foreign scientists instead of organising an all-inclusive event at their home institutions. It was only in 2017 that more researchers organised scientific events at home institutions rather than just hosting individual foreign scientists.

The number of grants and the overall amounts awarded per category of the networking activities for each of the three-years under review are summarised in Table 4.1. It is important to note that these numbers might have been affected by the fact that, at the time of this research study, the NRF had another networking instrument which was launched during the same time as the KIC but focused solely on conferencing. Therefore, researchers interested in hosting global conferences of more than 500 participants were encouraged to apply for the NRF Conference Fund. This funding opportunity provided a minimum of R350 000 and maximum of R2 million for hosting global conferences (NRF, 2020). KIC was therefore used mainly for smaller scientific events attended by a minimum of 50 participants at a maximum value of R150 000. As a result, some of the researchers might have opted to apply for STiM support through KIC and made use of the conference fund for their international conferences.

Table 4-1: Number of grantees and amount awarded per networking activity

	2017		2018		2019	
International Travel	339	R7 361 327,01	423	R9 239 328,59	197	R6 423 400,00
Visiting Foreign Scientists	39	R815 863,51	59	R1 370 827,18	68	R2 984 188,00
Hosting International Events	47	R4 050 076,05	44	R1 265 138,42	14	R1 154 070,00
Overall Total	**425**	**R12 227 266,57**	**526**	**R11 875 294,19**	**279**	**R10 561 658,00**

The NRF invested R34 million in supporting international networking activities within the KIC programme for the three-year period under review. Of the total amount of R34 664 218 that the NRF invested in KIC between 2017 and 2019, 66% (i.e. R23 024 055) was used solely for STiM. Funds for international travel were mostly used to cover costs relating to return air tickets, ground transport, travel insurance, accommodation, visa costs, and conference registration/participation fees. The trips were all less than one month in duration, with the majority being not more than one week, hence the concept 'shorter-term'. See Figure 4.2 below for the overall amount awarded in each of the three categories of the international networking activities within the KIC programme.

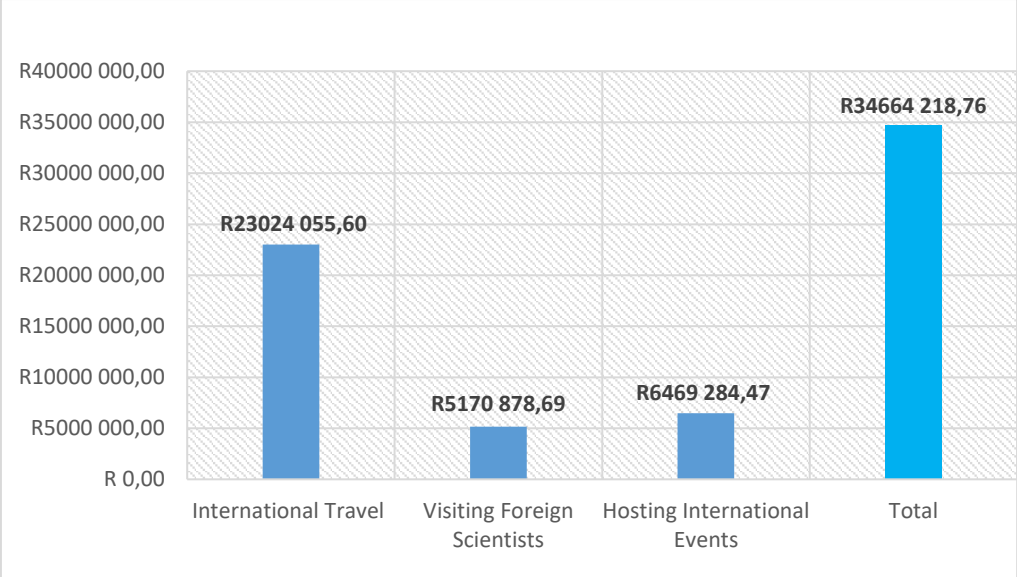


Figure 4-2: Amount awarded per international networking activity, 2017-2019

The sub-sections below examine the demographics of the 1 230 beneficiaries who received the KIC grant during the three-year period under review. These sub-sections focus in particular on the researchers' race, gender, citizenship, and their home institution at the time of receiving the KIC grant.

It was not possible to evaluate criteria such as the NRF rating standing of the KIC grantees and the countries that the KIC grantees visited when undertaking international trips as the KIC report template did not request such information. It is because of these types of gaps that a questionnaire was conducted as a way of supplementing the information from the secondary data. Race categories of funded researchers

Approximately 50% of the KIC grants were awarded to black African researchers (42% of all grants), followed by white researchers (at 39%). Only 11% of Indian and 7% of coloured researchers received the KIC grant during the three-year period under review, as summarised in Figure 4.3 below.

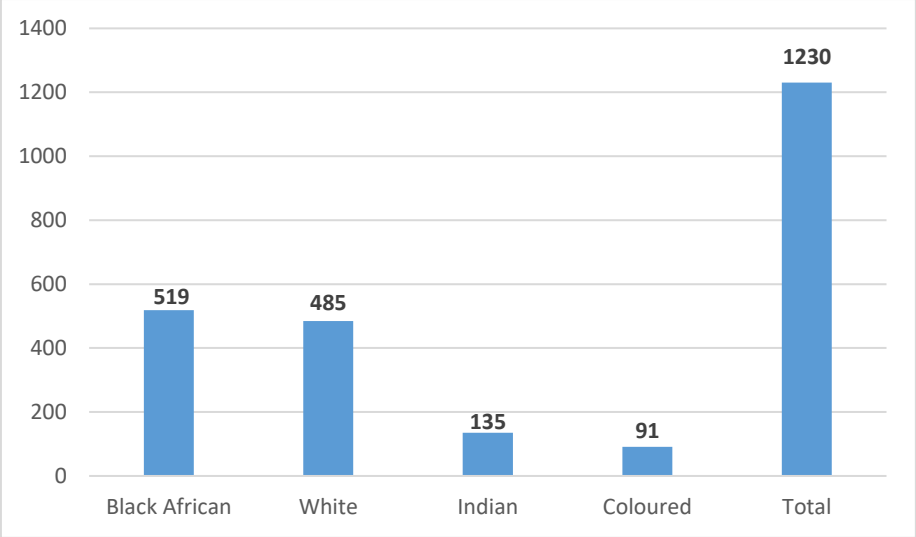


Figure 4-3: Distribution of KIC grantees by race, 2017-2019

It was only in 2019 when more white researchers (49%) than black African researchers (37%) were awarded KIC grants. The number of awarded grants for coloured and Indian researchers remained relatively low throughout the three-year period under review. This also meant that a significant amount of funds for international networking activities were allocated to both the black African (R15 404 171) and white researchers (R13 507 032). These funds were mostly awarded for STiM. See Figure 4.4 below for a distribution of KIC grants by race and international networking activity.

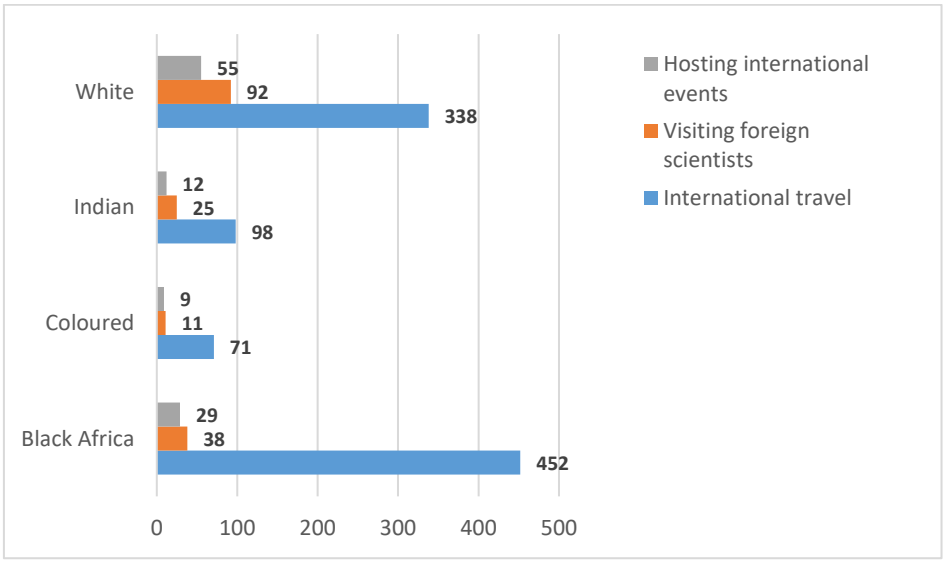


Figure 4-4: KIC grantees by race and international networking activity

These numbers do not necessarily mean that black African researchers were more interested in STiM than their coloured or Indian counterparts. This finding might have been influenced by a number of factors, such as the following:

4.2.1 The design of the KIC programme

As was indicated in Chapter 2, KIC applicants promoting collaboration with other African countries were given priority by the NRF. Applications by South Africa-based researchers intending to visit or host universities, research organisations, or researchers from other African countries in order to establish new or strengthen existing collaborations were prioritised and awarded a slightly higher grant value. Further to this, joint networking events with researchers from other African countries that have bilateral agreements with South Africa received additional funding on request and merit. Therefore, this bias towards promoting partnership within the African continent might have had an impact on the high number of black African researchers receiving KIC grants.

4.2.2 Government equity targets

The numbers might have also been influenced by the fact that the NRF, as a government entity, is required to contribute towards addressing the national imperative of transforming the equity profiles of the South African research workforce and facilitate the growth of a cohort of South African researchers and technical expertise that is internationally competitive, intergenerational, and reflects an equitable representation of designated groups; viz. black, female, and persons living with disabilities. In this regard, at the time of this research, all NRF grants had to be allocated in line with the following government equity targets:

i. 95% of all NRF grants were to be awarded to South African citizens and permanent residents.
ii. 5% of all NRF grants were to be awarded to postgraduate students from the SADC countries and the rest of the world.
iii. 55% of grants to women of all races.

The South African citizens' and permanent residents' targets were further disaggregated in terms of race and disability as follows:

i. 90% of all NRF grants were to be awarded to black researchers (African, coloured and Indian combined).
ii. 10% of all NRF grants were to be awarded to white researchers.
iii. 1% of grants to postgraduate students living with a disability.

With the implementation of these government equity parameters, there is a higher number of black African researchers undertaking shorter trips abroad compared with the other racial groups in this instrument. These government equity targets are necessary given the impact that apartheid had on the South African higher education system from 1948 to 1994, as detailed in the literature review chapter. Even with the assistance of the government equity targets, there is still a high number of white researchers taking up international networking opportunities offered by the KIC programme. However, white researchers have been more successful in securing KIC grants for hosting foreign scientists and organising joint networking events at home institutions. A total of 147 white researchers, and only 67 black African researchers, were awarded KIC grants for hosting foreign scientists and organising international networking events during the three-year period under review (as indicated in Figure 4.4 above).

This success by white researchers might be partly due to the long-term support they received during apartheid years. White researchers have had research partnerships with researchers from other countries long before black African researchers joined the world stage. Hence in most cases, their applications for KIC opportunities are geared towards strengthening and growing already existing partnerships. To black African researchers, the KIC grant might be more important for inspiring and creating new partnerships. The situation for black African researchers is similar to that of coloured and Indian researchers in that the government equity targets for awarding grants to 90% of black researchers is inclusive of both coloureds and Indians. Just like with black African researchers, STiM was also much more popular amongst both coloured

and Indian researchers. However, due to their population size, their numbers remained relatively low at 8% and 10% respectively.

4.3 Gender profile of funded researchers

Slightly more than half of the overall KIC grants (57%) with the funding amounting to R18 585 422 were awarded to male researchers. See Figures 4.5 and 4.6 below.

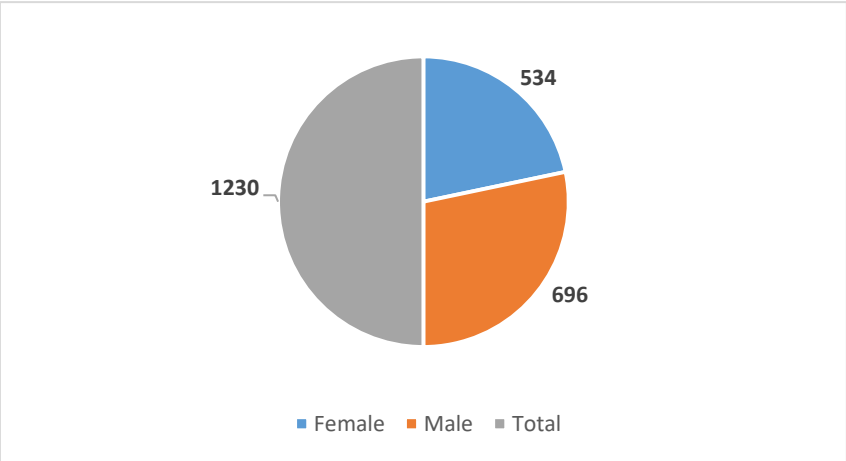


Figure 4-5: KIC grantees by gender, 2017-2019

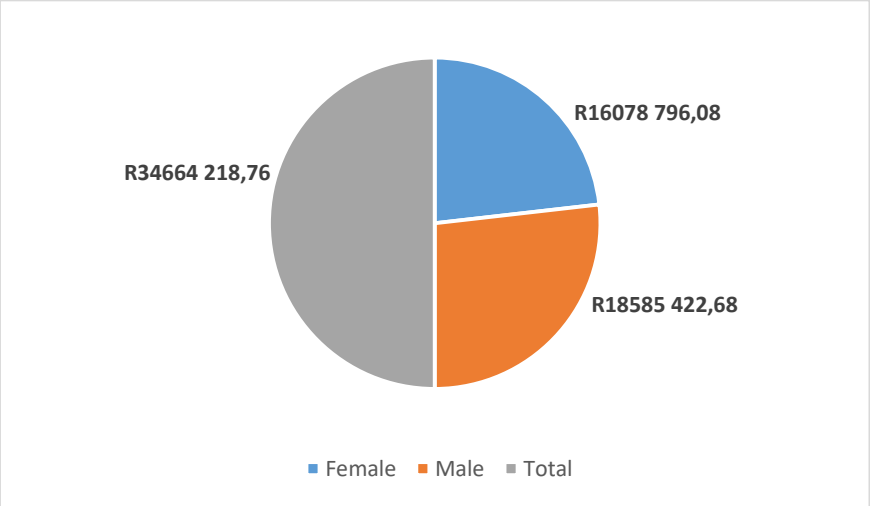


Figure 4-6: Amount awarded by gender

This was a consistent scenario in each year under review (see Table 4.2 below):

i. In 2017, 58% male and 42% female researchers were awarded KIC grants.
ii. In 2018, 56% male and 44% female researchers were awarded KIC grants.
iii. In 2019, 55% male and 45% female researchers were awarded KIC grants.

Table 4-2: Number of KIC grantees and amount awarded by gender

	2017		2018		2019		Total	
Female	178	R6 315 218,69	231	R5 057 108,39	125	R4 706 469,00	534	R16 078 796,08
Male	247	R5 912 047,88	295	R6 818 185,80	154	R5 855 189,00	696	R18 585 422,68
Total	**425**	**R12 227 266,57**	**526**	**R11 875 294,19**	**279**	**R10 561 658,00**	**1230**	**R34 664 218,76**

Although the majority of the grants for both male and female researchers were awarded for STiM, it was mostly male researchers who undertook these international trips, compared with female researchers. Of the 696 male researchers who utilised the international networking opportunities offered by the KIC programme, 556 of them (i.e. 80%) undertook STiM to foreign countries. Therefore, only 140 (20%) opted for hosting scientists at home institutions or organising networking events locally.

In so much as the NRF is required to award grants in line with government equity targets as illustrated above, this becomes difficult if very few female researchers apply for these opportunities, especially the mobility grants, despite active encouragement and promotion programmes. Most of the female researchers indicated interest in either hosting researchers from other countries or organising international networking events at home institutions, rather than undertaking STiM.

These findings are in line with some of the arguments presented in the literature review chapter that for most female researchers, especially those with partners and children, the decision to travel internationally is not an easy one. As was indicated in the research study conducted by Nikunen and Lempiäinen (2020), one of the gender strategies female researchers use is to try to internationalise through means other than undertaking short-term international trips (Nikunen and Lempiäinen, 2020). As it

is evident in Figure 4.7 below, there was a minor difference between the number of female (131) and male (140) researchers who hosted foreign scientists and/or organised international networking events (a difference of 6%), compared with the number of female (403) and male (556) researchers who undertook international trips (difference of 28%). Similarly, the study conducted by Guthrie *et al.* (2017) indicates that 28% of men were mobile versus 21% of women, with the gender gap widening for more advanced career stages. Although the difference is not that significant it is important for the NRF to still consider this since the organisation is required to fund in accordance with the government equity targets.

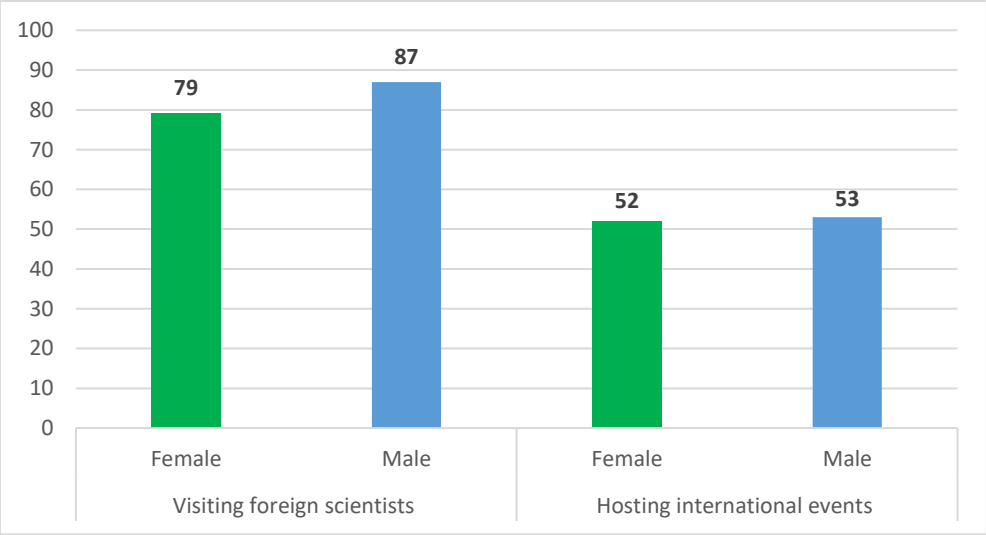


Figure 4-7: KIC awards: hosting international scientists and events by gender

4.4 Funded researchers by citizenship

The analysis of funded researchers was also done in relation to the citizenship status of the grantees. Citizenship was divided into three main categories as follows:

- South African citizens
- South African permanent residents
- Foreign researchers.

Some 64% of all KIC grants (i.e. total of 786 grants) were awarded to South African citizens. The remaining 36% (444 grants) were awarded to foreign researchers working at South African HEIs, with 53% (235) of those awarded to those foreign researchers who were also South African permanent residents.

The result is commensurate with the NRF's policy of responding to, and aligning with, the government equity targets which state that 95% of all grants should be awarded to South African citizens and permanent residents. However, with 83% of all KIC grants being awarded to South African citizens and permanent residents, the KIC programme fell short of achieving the prescribed equity targets by 12% for the three-year period under review, as illustrated in Table 4.3 below.

Table 4-3: Number of KIC grantees and amount awarded by citizenship

	2017		2018		2019		Total	
South African citizens	277	R8 657 627,89	324	R7 245 350,43	185	R6 835 148,00	786	R22 738 126,32
South African permanent residents	73	R1 673 143,17	107	R2 344 903,82	55	R2 198 675,00	235	R6 216 721,99
Foreign researchers	75	R1 896 495,51	95	R2 285 039,94	39	R1 527 835,00	209	R5 709 370,45
Total	**425**	**R12 227 266,57**	**526**	**R11 875 294,19**	**279**	**R10 561 658,00**	**1230**	**R34 664 218,76**

Further to this, as highlighted in Table 4.3 above, having both South African citizens and permanent residents receiving the majority of the KIC grants also meant that 84% of the total funds were awarded to these groups of researchers, at R28 954 848 of the total investment for the three-year period under review. The majority of these grants were used for STiM. A total of 790 (77%) South African citizens and permanent residents undertook STiM during the three-year period under review, as compared with 144 (14%) who hosted scientists from other countries and 87 (9%) who organised international networking events at home institutions, as per Figure 4.8 below. Even though very few foreign researchers working in South African institutions were awarded KIC grants (209 in total), it should be noted that 81% of them (169) opted for STiM, rather than hosting researchers from other countries or organising international networking events at home institutions.

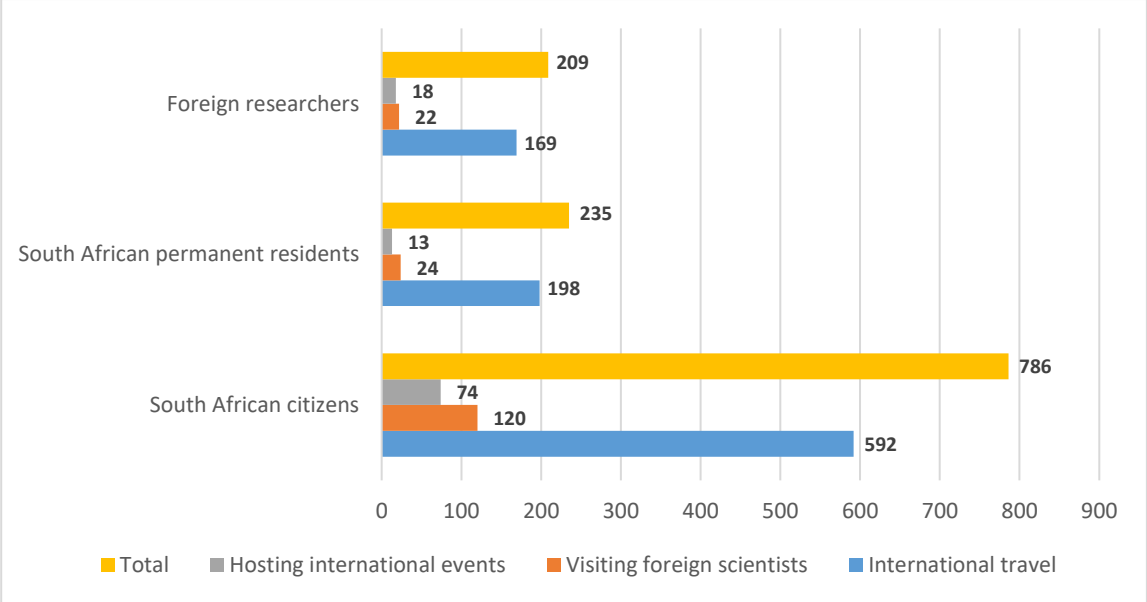


Figure 4-8: Number of KIC grantees by citizenship and type of networking activity

It was important to interrogate the countries of origin of the foreign researchers working at South African institutions as the KIC programme tends to be biased towards advancing South Africa's interaction with other African countries, to such an extent that those researchers undertaking visits to other African countries, or hosting their African counterparts at home institutions, were awarded a higher amount (maximum of R75 000), compared with those visiting and hosting researchers from outside the continent (maximum of R50 000). It was therefore expected that the majority of the foreign researchers supported were mostly originally from other African countries and not necessarily from outside the continent.

A total of 133 grants, which made up 64% of the total awards to foreign researchers, were for those researchers who were originally from African countries, and only 76 (36%) were for researchers coming from countries outside of Africa. See Table 4.4 below for a comprehensive list of the countries of origin for supported foreign researchers, including the number and amount awarded per country.

Table 4-4: Number and amount of KIC grants by countries of origin

Countries outside Africa	Number of researchers	Amount awarded	African country	Number of researchers	Amount awarded
Australia	1	R9 522,52	Benin	1	R25 000,00
Brazil	1	R25 000,00	Cameroon	10	R256 000,00
Canada	3	R127 593,60	Democratic Republic of Congo	5	R175 000,00
China	8	R177 800,00	Eritrea	1	R20 000,00
Finland	1	R20 000,00	Egypt	1	R50 000,00
France	3	R100 000,00	Ethiopia	7	R205 000,00
Germany	3	R119 422,85	Ghana	4	R98 000,00
Greece	2	R50 000,00	Kenya	12	R330 000,00
Hungary	1	R25 000,00	Lesotho	1	R13 700,00
India	18	R428 000,00	Malawi	9	R478 000,00
Iran	1	R23 000,00	Mauritius	4	R90 000,00
Italy	7	R144 000,00	Mozambique	1	R25 000,00
Netherlands	2	R55 000,00	Nigeria	46	R1 233 809,94
New Zealand	1	R70 000,00	Swaziland	1	R25 000,00
Pakistan	1	R16 000,00	Uganda	3	R65 000,00
Philippines	1	R25 000,00	Zambia	3	R75 000,00
Portugal	1	R25 000,00	Zimbabwe	24	R617 283,00
Russia	1	R8 000,00	**Total**	**133**	**R3 781 792,94**
Singapore	1	R25 000,00			
Slovak Republic	1	R20 000,00			
Spain	4	R83 000,00			
Ukraine	1	R25 000,00			
UK	4	R105 636,52			
USA	9	R245 602,00			
Total	**76**	**R1 952 577,49**			

As indicated above, a limitation was that these findings could not be compared with the countries that these researchers visited when undertaking their international trips as the KIC report template did not request this information. It could be postulated that some of these foreign researchers were enhancing partnerships with researchers based in their countries of origin. For instance, a total of 39 foreign researchers were awarded a KIC grant in 2019 alone. Some 67% of these researchers were black African, and 96% of them were originally from African countries. Even the 5% of Indian foreign researchers who received the KIC grant in 2019 were originally from India. It could be suggested that perhaps it is preferable for these researchers to kick-start their research networks with researchers from their home countries prior to engaging globally. Regrettably, there is no data that can be used to inform or confirm this claim.

This data, and for the NRF in particular, is critical as it could assist the NRF to monitor the mobility pattern of the researchers for planning purposes. If, for example, the majority of the researchers are visiting East African countries or Nordic countries, the NRF can proactively plan for future bilateral programmes with these countries in mind. Furthermore, this data might also be useful for monitoring the mobility patterns against the organisation's Strategic Partnership Strategy, the DHET internationalisation policy framework and the country's foreign policy in general. Lastly, planning around such data might eventually do away with sporadic mobility and ensure that the support for STiM is strategic and targeted for value addition and return on investment.

Further to the above, having a high number of KIC grants awarded to black African foreign researchers is aligned with the outcomes of the literature review. The DHET HEMIS Data of 2018 shows that the majority of foreign postgraduate students at South African universities are from the continent, with 72% coming from the SADC region and 18% from other African countries (DHET, 2018). Only 10% of the foreign students are from other parts of the world. Since the NRF KIC grants are awarded to all groups of researchers, including the next generation and emerging researchers (i.e. researchers busy with either their Doctoral or postdoctoral studies), it therefore is logical to have a high number of foreign researchers originally coming from other African countries who receive these grants.

It should also be considered that 14 of the 23 countries of origin of the awarded foreign researchers coming from outside Africa had, at the time of this research study, government-to-government bilateral agreements with South Africa, including active inter-agency agreements with the NRF. These awarded foreign researchers were therefore from countries in which the NRF facilitates and co-funds bilateral research projects in partnership with counterpart funding agencies in their countries, and include Brazil, Canada, China, Finland, France, Germany, India, Iran, Italy, The Netherlands, Portugal, Russia, United Kingdom, and the United States of America.

4.5 Institutional profile of funded researchers

Data from the KIC reports indicated that a total of 40 South African higher education and research institutions (25 universities and 15 research and science councils) benefitted from the KIC programme during the three-year period under review. Figure 4.9 below indicates that 91% of the overall grants were awarded to universities, while the remaining 9% were shared amongst the other South African research and science councils.

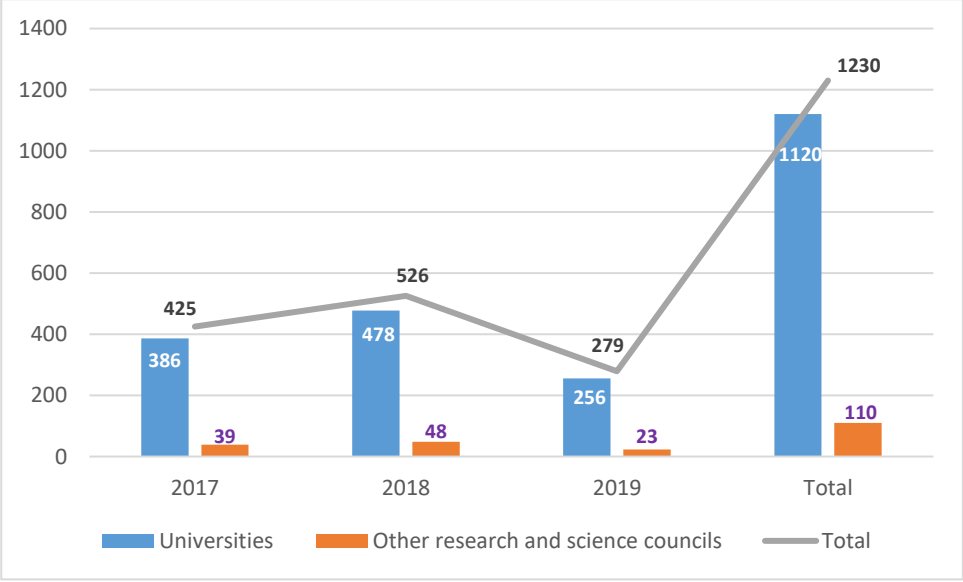


Figure 4-9: Number of KIC grantees by institution per each year under review

Due to the historic background of the evolution of internationalisation of the South African higher education system, it is important to interrogate the data according to

South African institutional types. In this regard, the data were analysed in accordance with the following categories of higher education institutions:

i. Historically Advantaged Institutions (HAIs).
ii. Historically Disadvantaged Institutions (HDIs).
iii. New universities.
iv. Other research and science councils.

Some 80% of all grants were awarded to HAIs, while 10% was awarded to HDIs, 9% to other South African research and science councils, and the remaining 1% went to the new universities. The majority of the funds were used for STiM at 78% of the total grants; 81% of which were by HAIs, as summarised in Figure 4.10 below. This is to be expected since the majority of the South African HEIs are historically advantaged. A total of 16 HAIs were awarded KIC grants during the three-year period under review, as compared with eight HDIs. Although HDIs constitute mainly black African researchers, the findings indicate that many of the black African researchers funded through the KIC grants were also based at HAIs. A total of 15 research and science councils were awarded KIC grants, with low numbers of researchers per institution.

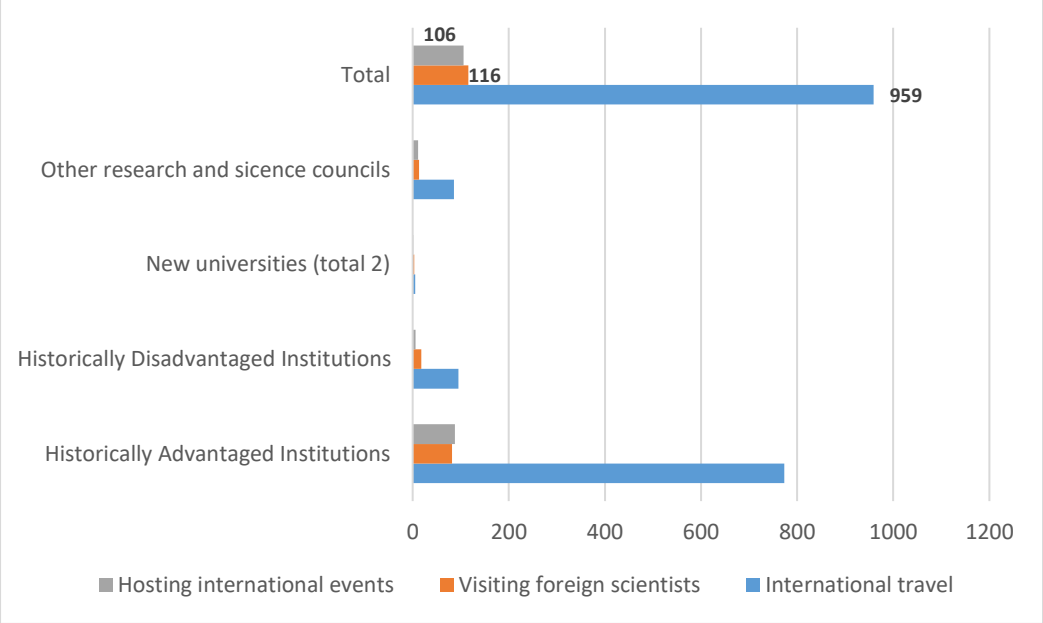


Figure 4-10: Number of KIC grantees by institutional type and networking activity

As evident in Tables 4.5 and 4.6 below, all South African universities, with the exception of Sol Plaatje University – one of the two new universities – managed to take up networking opportunities offered by the KIC programme. It was also expected to find the following five universities taking up the majority of the international networking grants; University of KwaZulu-Natal (102), University of the Witwatersrand (107), Stellenbosch University (110), University of Pretoria (110), and University of Cape Town (122). Some 45% of the 1 230 KIC grants awarded between 2017 and 2019 went to these five universities.

Table 4-5: Number of KIC grantees and amount awarded per individual university

	2017		2018		2019		Total	
	Number of researchers	Amount awarded	Number of researchers	Amount Awarded	Number of researchers	Amount awarded	Number of researchers	Amount awarded
Cape Peninsula University of Technology (CPUT)	9	R199 958,00	9	R187 595,00	8	R317 000,00	26	R704 553,00
Central University of Technology (CUT)	11	R200 952,42	21	R433 000,00	6	R195 552,00	38	R829 504,42
Durban University of Technology (DUT)	5	R133 593,60	11	R256 000,00	7	R349 963,00	23	R739 556,60
Mangosuthu University of Technology (MUT)	5	R94 847,28	3	R60 000,00	1	R20 000,00	9	R174 847,28
Nelson Mandela University (NMU)	8	R324 000,00	9	R190 000,00	3	R100 000,00	20	R614 000,00
North-West University (NWU)	28	R770 907,34	24	R481 811,78	29	R1 017 454,00	81	R2 270 173,12
Rhodes University (RU)	11	R324 700,00	8	R255 000,00	6	R256 452,00	25	R836 152,00
Sefako Makgatho Health Sciences University (SMU)	1	R19 093,00	2	R45 000,00	1	R28 527,00	4	R92 620,00
Sol Plaatje University (SPU)	0	R0,00	0	R0,00	0	R0,00	0	R0,00
Stellenbosch University (SUN)	35	R930 196,00	48	R1 081 400,00	27	R1 036 400,00	110	R3 047 996,00
Tshwane University of Technology (TUT)	10	R2 003 773,57	18	R448 724,00	6	R147 735,00	34	R2 600 232,57
University of Cape Town (UCT)	56	R1 315 108,73	42	R834 798,64	24	R871 106,00	122	R3 021 013,37
University of Fort Hare (UFH)	11	R244 191,00	10	R230 000,00	4	R165 000,00	25	R639 191,00
University of Johannesburg (UJ)	43	R1 140 850,98	35	R900 135,16	16	R639 844,00	94	R2 680 830,14
University of KwaZulu-Natal (UKZN)	42	R943 683,24	45	R1 100 000,00	15	R555 000,00	102	R2 598 683,24
University of Limpopo (UL)	5	R193 348,00	4	R85 000,00	3	R100 000,00	12	R378 348,00
University of Mpumalanga (UMP)	1	R35 000,00	5	R115 000,00	3	R175 000,00	9	R325 000,00
University of Pretoria (UP)	39	R979 501,10	43	R900 945,61	28	R967 910,00	110	R2 848 356,71
University of South Africa (UNISA)	10	R220 800,00	26	R603 884,00	9	R411 980,00	45	R1 236 664,00
University of Free State (UFS)	10	R192 517,31	20	R416 000,00	11	R374 600,00	41	R983 117,31
University of Western Cape (UWC)	11	R406 710,00	20	R456 600,00	7	R276 486,00	38	R1 139 796,00
University of the Witwatersrand (WITS)	27	R518 068,54	47	R976 175,00	33	R1 147 266,00	107	R2 641 509,54
University of Venda (Univen)	4	R90 000,00	8	R185 000,00	4	R200 000,00	16	R475 000,00
University of Zululand (UniZulu)	2	R52 000,00	3	R75 000,00	4	R180 640,00	9	R307 640,00
Vaal University of Technology (VUT)	2	R45 000,00	11	R260 175,00	1	R50 000,00	14	R355 175,00
Walter Sisulu University (WSU)	0	R0,00	6	R135 000,00	0	R0,00	6	R135 000,00
Total	**386**	**R11 378 800,11**	**478**	**R10 712 244,19**	**256**	**R9 583 915,00**	**1120**	**R31 674 959,30**

Table 4-6: KIC grantees and amount awarded per science and research council

	2017		2018		2019		Total	
	Number of researchers	Amount awarded	Number of researchers	Amount Awarded	Number of researchers	Amount awarded	Number of researchers	Amount awarded
Agricultural Research Council (ARC)	14	R286 000,00	12	R263 000,00	3	R95 000,00	29	R644 000,00
Albany Museum	0	R0,00	1	R25 000,00	1	R37 235,00	2	R62 235,00
Centre for Scientific and Industrial Research (CSIR)	11	R231 466,46	17	R445 050,00	3	R109 000,00	31	R785 516,46
Human Sciences Research Council (HSRC)	2	R36 000,00	2	R105 000,00	2	R80 000,00	6	R221 000,00
iThemba LABS	1	R20 000,00	2	R40 000,00	0	R0,00	3	R60 000,00
KwaZulu-Natal Sharks Board	0	R0,00	1	R25 000,00	1	R29 100,00	2	R54 100,00
Onderstepoort Biological Products (OBP)	0	R0,00	2	R50 000,00	0	R0,00	2	R50 000,00
South African Astronomical Observatory (SAAO)	0	R0,00	4	R80 000,00	0	R0,00	4	R80 000,00
South African National Biodiversity Institute (SANBI)	2	R36 000,00	1	R20 000,00	1	R15 000,00	4	R71 000,00
South African Nuclear Energy Corporation (NECSA)	3	R110 000,00	1	R10 000,00	1	R50 000,00	5	R170 000,00
South African Environment Observation Network (SAEON)	0	R0,00	1	R25 000,00	1	R30 000,00	2	R55 000,00
South African Institute for Aquatic Biodiversity (SAIAB)	0	R0,00	1	R20 000,00	1	R50 000,00	2	R70 000,00
South African National Space Agency (SANSA)	2	R43 000,00	0	R0,00	3	R111 407,00	5	R154 407,00
South African Medical Research Council (SAMRC)	4	R86 000,00	3	R60 000,00	4	R276 000,00	11	R422 000,00
South African Sugarcane Research Institute (SASRI)	0	R0,00	0	R0,00	2	R95 000,00	2	R95 000,00
Total	**39**	**R848 466,46**	**48**	**R1 168 050,00**	**23**	**R977 742,00**	**110**	**R2 994 258,46**

No other university or research and science council managed to receive more than 100 KIC grants in the three-year period under review. Only two other universities were comparable; i.e. the University of Johannesburg (with 94 grants) and the North West University (with 81 grants). All the other universities, including the research and science councils, received less than 40 grants each. This finding can be contextualised by the fact that these five universities have invariably appeared as top South African universities on the lists of different HERSs. Their appearance in these university rankings has made them internationally competitive and provided them with a distinct positioning globally.

As indicated in the literature review, despite all documented criticisms of their validity, university rankings are still used by many as a measure to benchmark institutional performance (Egron-Polak *et al.*, 2015; Pouris, 2007). Researchers all over the world are more amenable to collaborating with researchers from institutions ranked highly by the different HERSs. In addition to this, these five universities have strong and well-resourced international offices that help market them globally.

Further to the above, the majority of the KIC grants awarded to these five research-intensive universities went to white researchers. In 2019 alone, of the 127 KIC grants awarded to the top five research-intensive universities, 60% of them went to white researchers, 25% to black African researchers, 10% to Indian, and the remaining 5% were awarded to coloured researchers.

Of the two new universities, only the University of Mpumalanga applied for and received KIC support for a total of nine researchers in the three-years under review. One of the reasons the researchers from these two universities did not participate in higher numbers might be because they did not have full postgraduate student capacity (both having been established in 2014). They do however, gradually enrol postgraduate students and perhaps this profile might change in future.

From the analysis above, it is evident that South Africa-based researchers prefer and value STiM for establishing, strengthening, and maintaining their international research networks. Some 78% of all awarded researchers opted for this methodology, despite

the convenience and financial attractiveness of the other forms of international networking activities offered by the KIC programme. This further validates the claim that STiM has become popular amongst researchers and HEIs alike. Table 4.7 below provides a summary of the demographics.

Table 4-7: Summary of the demographic information from the secondary data

No.	Summary of demographics
1	43% of all KIC grants were awarded in 2018 with fewer grants in both 2017 and 2019.
2	78% of all KIC grants were awarded for short*er*-term international mobility while the remainder were for hosting visiting scientists and hosting international events locally.
3	61% of KIC grants were awarded to black African researchers (inclusive of Coloureds and Indians) with 83% of these grants being used for undertaking short*er*-term international mobility
4	39% of all KIC grants were awarded to White researchers, 70% of which received support for short*er*-term international mobility.
5	57% of all KIC grants were awarded to male researchers, 80% of which received support for short*er*-term international mobility.
6	Female researchers received 43% of all KIC grants and used 75% of these for short*er*-term international mobility.
7	83% of all KIC grants were awarded to both South African citizens and permanent residents, 77% of these allocated for short*er*-term international mobility.
8	Of the 133 KIC grants awarded to foreign researchers, 64% of them were for researchers coming from other African countries.
9	Universities received 91% of all the KIC grants while the remaining 9% were allocated to other South African science and research councils.
10	Of the overall number of the KIC grants awarded to universities, 80% of them were awarded to historically advantaged universities.
11	45% of all the 1 230 KIC grants awarded between 2017 and 2019 went to the 5 research intensive universities combined.

Thus far, this analysis, based only on the demographic information, are testament to claims that STiM is becoming not only the preferred, but the main form of international mobility for the internationalisation agenda.

CHAPTER 5: FINDINGS AND DISCUSSION

5.1 Introduction

Both the secondary data (i.e. primary data already collected by the NRF) and the primary data (online questionnaire) are presented in this chapter. The Chapter presents the findings, interpretation, and discussion of the data. The literature review chapter highlights a number of benefits that can be accrued through investments in international mobility. However, most of the academic-related benefits are mainly reported as a result of long and short-term visits and not necessarily shorter-term mobility. Benefits of shorter-term mobility mostly relates to interpersonal and intercultural skills. It is these constructs that informed the six hypotheses of this study, outlined in Chapter 3 of the research design and methodology. With these hypotheses the study intends to investigate the potential of STiM beyond interpersonal skills. These hypotheses therefore endeavours to illustrate a link between STiM and the academic and research capacity of researchers. The analysis is categorised into six main themes aligned to the six hypotheses mentioned below:

i. **Hypothesis 1 (H1):** There is a difference in the number of research outputs produced by researchers at South African HEIs between the types of shorter-term international mobility and networking programmes.
ii. **Hypothesis 2 (H2):** There is a difference in the quality of research outputs produced by researchers at South African HEIs between the types of shorter-term international mobility and networking programmes.
iii. **Hypothesis 3 (H3):** There is a difference in the opportunities for postgraduate students at South African HEIs to get international exposure between the types of shorter-term international mobility and networking programmes.
iv. **Hypothesis 4 (H4):** There is a difference in the amount of additional funding that researchers at South African HEIs manage to leverage between the types of shorter-term international mobility and networking programmes.
v. **Hypothesis 5 (H5):** There is an association between the type of shorter-term international mobility and networking programmes and the extent of

collaboration between researchers in South African higher education institutions and their international counterparts.

vi. **Hypothesis 6 (H6):** There is a link between the rating categories of researchers at South African HEIs and shorter-term international mobility and networking programmes and the rating category.

5.2 Quantity of research outputs (H1)

It is often argued that a successful research career is dependent on the number and quality of research outputs produced. The incentive and reward systems of HEIs are also research output orientated (Kyvik and Aksnes, 2015; Kwiek, 2019). Many researchers make use of their networks to improve their publication record through co-authorship.

In the study conducted by Mouton *et al.* (2019), it was found that South African researchers are increasingly collaborating with the rest of the world for publication purposes. According to the study, international collaboration by South African researchers increased from 34% in 2000 to 52% in 2016, while both the national collaboration and single authored publications declined, thus verifying claims that partnerships increase the quantity of the research output (Mouton *et al*., 2019). Moreover, the DHET provides subsidies to HEIs for each publication produced by researchers, in line with its national research outputs policy. The purpose of this policy is to encourage research productivity at HEIs through rewards (Mouton *et al*., 2019). The research outputs therefore also serve as a source of income for many South African HEIs (DHET, 2015, 2020; Masinde and Coetzee, 2021). These constructs informed the first hypothesis for this study:

H1: *There is a difference in the number of research outputs produced by researchers at South African HEIs between the types of shorter-term international mobility and networking programmes.*

Variables: *grant type (independent variable), number of research outputs (dependent variable)*

The aim of this hypothesis is to investigate the number of research outputs produced by researchers as a result of the international travel grant they received. The question posed therefore is whether these type of grants gives researchers an added advantage when it comes to research productivity. In the KIC report template, researchers were asked to indicate if the international networks established through the KIC grant led to joint/co-authored publications with international partners.

Table 5-1: Basic descriptive statistic – type of grant (H1)

Item

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Travel Costs	885	78,0	78,0	78,0
	Visiting Scientists	154	13,6	13,6	91,6
	Workshops	95	8,4	8,4	100,0
	Total	1134	100,0	100,0	

The table above indicates that a total of 1 134 beneficiaries completed this section of the report. From this, 78% of researchers from the total number of those who completed this section of the report undertook shorter-term visits in the three years combined. The average number of research outputs produced per grant was also higher for those who hosted international events, i.e. workshops (see Table 5.2 below).

Table 5-2: Research Outputs per grant (H1)

		Grant _outputs	
		Mean	Sum
Item_RECODED	Workshops	5,1	488,0
	Travel Costs	4,1	3613,0
	Visiting Scientists	3,5	534,0
	Total	4,1	4635,0

From the Normal Q-Q Plots above it can be seen that the assumption of normality was violated. It was therefore decided to run the non-parametric Kruskal-Wallis H test instead of One-Way ANOVA (see Table 5.3 and graph 5.2 below).

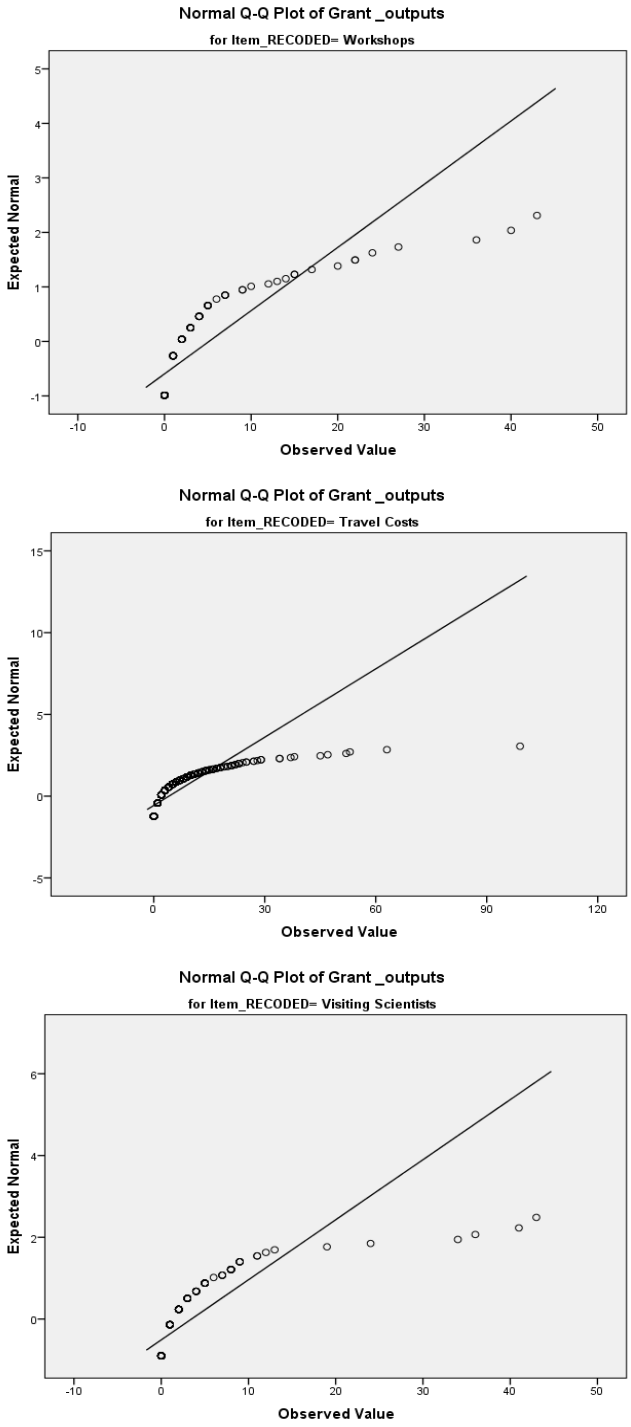
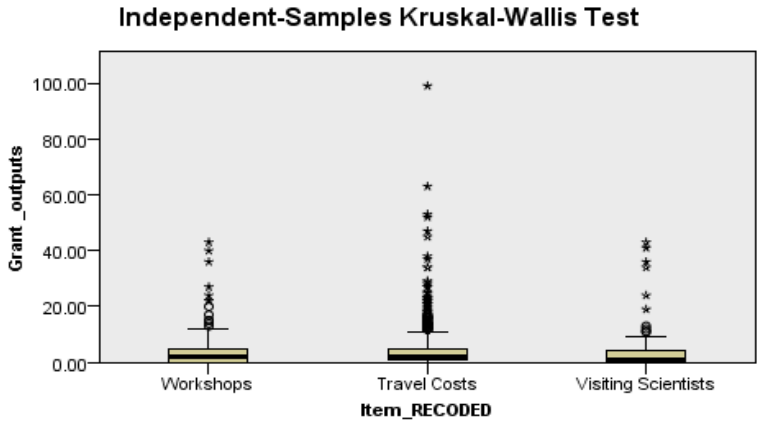


Figure 5-1: One-way Analysis of Variance (H1)

Table 5-3: Kruskal-Wallis H test – analysis results (H1)

		Grant _outputs
		Median
Item_RECODED	Workshops	2,0
	Travel Costs	2,0
	Visiting Scientists	1,0



Total N	1,134
Test Statistic	6.704
Degrees of Freedom	2
Asymptotic Sig. (2-sided test)	.035

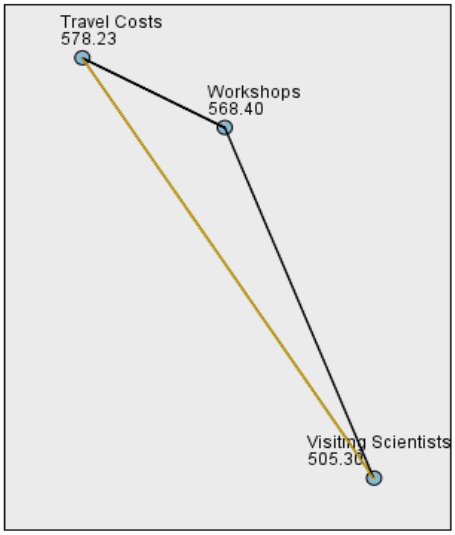
1. The test statistic is adjusted for ties.

Figure 5-2: Kruskal-Wallis H Test (H1)

A Kruskal-Wallis H test was run to determine if there were differences in the median number of research outputs between the different grant types: hosting international events (workshops), international travel grants and visiting foreign scientists. Distributions of research output scores were similar for all groups, as assessed by visual inspection of a boxplot. Median grant output scores were statistically significantly different between groups, $\chi 2$ (2) = 6.704, p = 0.035. To determine between which

groups these significant differences lie, the diagram in Figure 5.3 is presented. Note that mean ranks and not medians are used for this calculation.

Pairwise Comparisons of Item_RECODED



Each node shows the sample average rank of Item_RECODED.

Sample1-Sample2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj.Sig.
Visiting Scientists-Workshops	63.105	42.089	1.499	.134	.401
Visiting Scientists-Travel Costs	72.932	28.169	2.589	.010	.029
Workshops-Travel Costs	-9.828	34.831	-.282	.778	1.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.
Asymptotic significances (2-sided tests) are displayed. The significance level is .05.

Figure 5-3: Kruskal-Wallis H Test – Pairwise Comparisons (H1)

Figure 5.3 above indicates significant differences in mean ranks of number of grant outputs only between visiting foreign scientists and international travel grants. The international travel grants had a significantly higher mean rank (578.23) than the grants for visiting foreign scientists (505.30). This difference in mean ranks indicates that the number of research outputs is generally higher for international travel grants. This finding supports the hypothesis that there is a difference in the number of research outputs produced by researchers at South African HEIs between the different types of STiM programmes. It can therefore be indicated that there is an association between shorter-term mobility and the number of research outputs produced by researchers.

These outcomes were also supported by the responses received from the online questionnaire. The questionnaire requested researchers to provide the number of research outputs they produced as a result of the NRF KIC support provided in three year period under review. As illustrated in Figure 5.4 below, the majority (18 respondents) produced more than three research outputs each, 12 respondents produced two research outputs each, while 7 produced at least one research output.

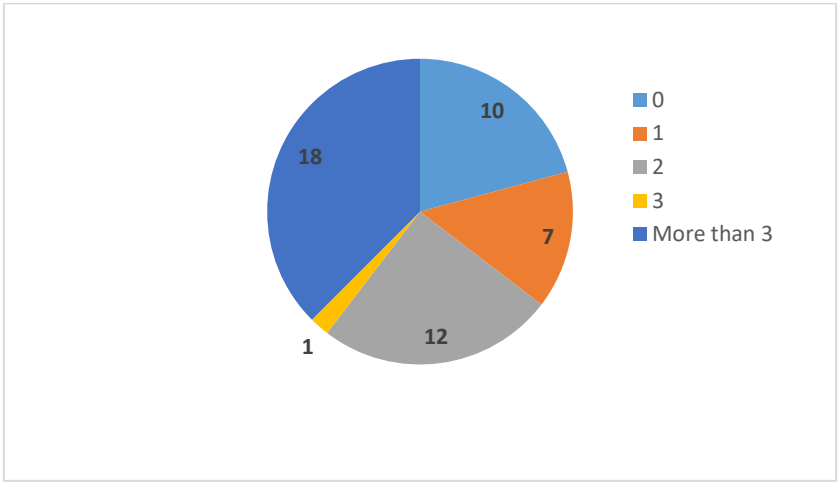


Figure 5-4: Number of research outputs produced by KIC grantees, 2017-2019

The respondents were also asked whether any of the research outputs they reported above were produced in collaboration with the international partners they had met during the KIC sponsored visit. Some 26 researchers responded in the affirmative, and 13 researchers indicated that although the publications produced were directly linked to the KIC grant they received, the publications themselves were not co-authored with international partners.

5.3 Quality of research outputs (H2)

International networks influence both the quantity and quality of research outputs produced. It has been accepted that 'peer review' currently serves as the best indicator of quality in research (Mouton, 2019). In South Africa as well, the DHET, through its national research outputs policy, emphasises peer review as a crucial requirement of all recognised research outputs. The DHET has developed criteria for the evaluation of research outputs for subsidy purposes. In line with these, only the following types

of research outputs are considered of high quality and thus eligible for government subsidy; books (including chapters in books), recognised accredited journal articles, and approved peer reviewed conference proceedings. Any other research outputs not listed above are not subsidised. For HEIs to be subsidised they have to ensure that their researchers publish in journals that are in the DHET's list of approved and accredited journals and indices. The premise is that collaborating with international partners assists researchers not only to produce a high number of research outputs, but to also produce quality research. The previous discussion indicated a high number of research outputs by the KIC grantees. The second hypothesis, listed below, interrogates the quality of these research outputs:

H2: *There is a difference in the quality of research outputs produced by researchers at South African HEIs between the types of shorter-term international mobility and networking programmes.*

Variables: *grant type (independent variable), number of peer-reviewed research outputs (dependent variable)*

Table 5-4: Basic descriptive statistics – type of grant (H2)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Travel Costs	885	78,0	78,0	78,0
	Visiting Scientists	154	13,6	13,6	91,6
	Workshops	95	8,4	8,4	100,0
	Total	1134	100,0	100,0	

Table 5-5: Quality research outputs per grant – peer reviewed (H2)

		Total_quality_outputs	
		Mean	Sum
Item_RECODED	Workshops	4,2	400,0
	Travel Costs	3,4	2992,0
	Visiting Scientists	3,0	456,0
	Total	3,4	3848,0

Of the total number of KIC grantees who completed this section of the report, 78% of them undertook shorter-term visits in the three years combined. A One-way Analysis of Variance test was run for this hypothesis as indicated in Figure 5.5 below.

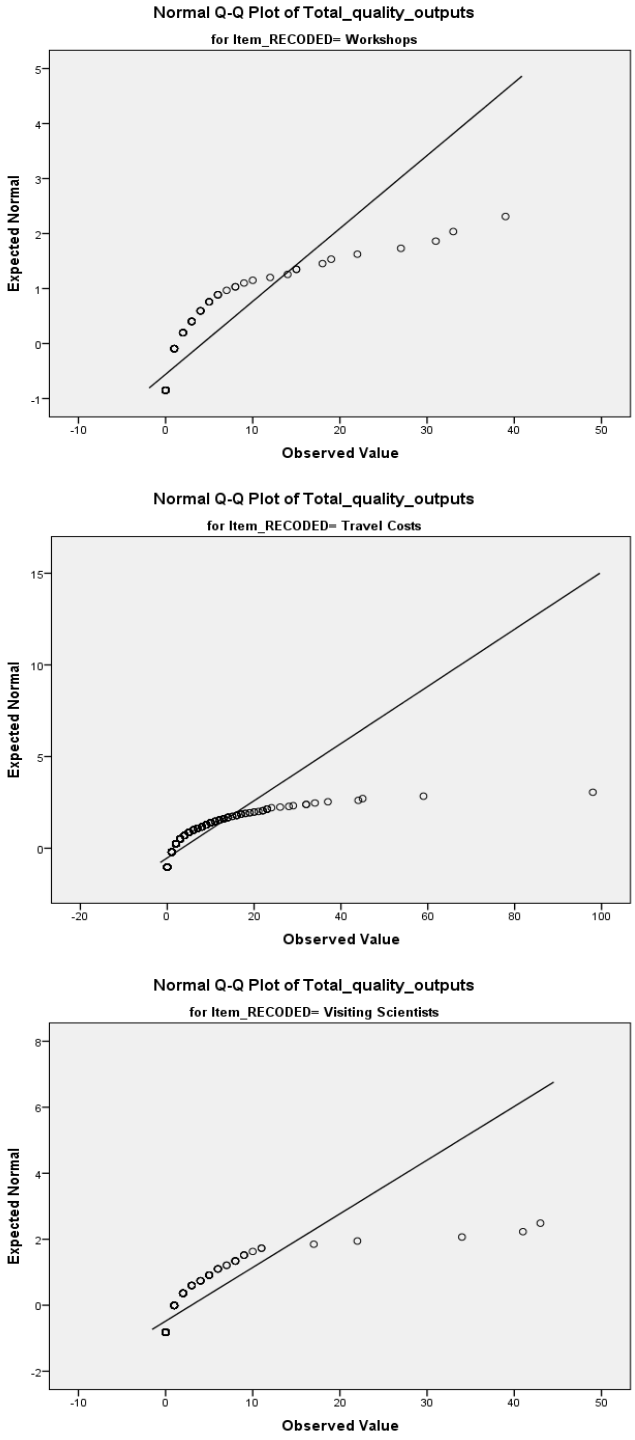
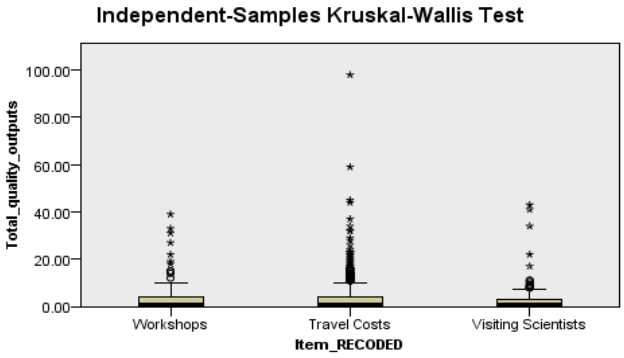


Figure 5-5: One-way Analysis of Variance (H2)

From the Normal Q-Q Plots above it can be seen that the assumption of normality was violated. It was therefore decided to run the non-parametric Kruskal-Wallis H test instead of One-Way ANOVA.

Table 5-6: Kruskal-Wallis H test – analysis results (H2)

		Total_quality_outputs
		Median
Item_RECODED	Workshops	1,0
	Travel Costs	1,0
	Visiting Scientists	1,0



Total N	1,134
Test Statistic	3.617
Degrees of Freedom	2
Asymptotic Sig. (2-sided test)	.164

1. The test statistic is adjusted for ties.
2. Multiple comparisons are not performed because the overall test does not show significant differences across samples.

Figure 5-6: Kruskal-Wallis H Test (H2)

A Kruskal-Wallis H test was run to determine if there were differences in the median number of peer-reviewed research outputs between the different grant types: hosting international events (workshops), international travel grants and visiting foreign scientists. Distributions of peer-reviewed research output scores were similar for all groups, as assessed by visual inspection of a boxplot. Median peer-reviewed research

output scores were not statistically significantly different between groups, $\chi 2$ (2) = 3.617, p = 0.164. This result is confirmed by the descriptive statistics showing that the median was 1 for all three grant types. This therefore, meant that researchers were producing quality research outputs irrespective of the type of grant they received. This finding therefore, did not confirm the hypothesis. Responses from the online questionnaire also yielded the same outcomes. The majority of the respondents produced high quality research outputs. The results are summarised in Figure 5.7 below.

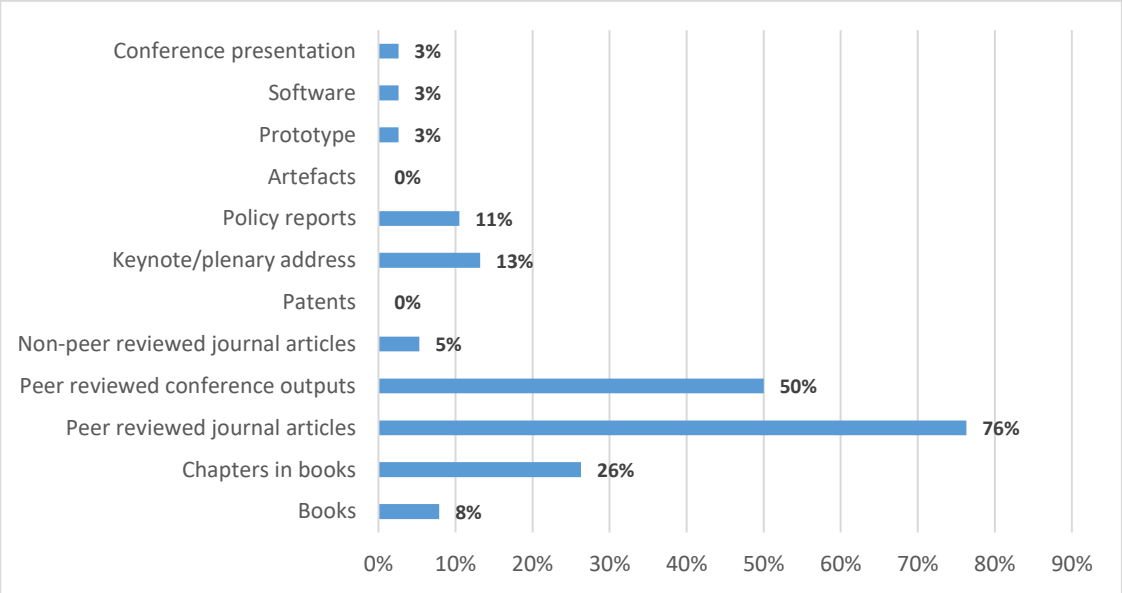


Figure 5-7: Type of research outputs produced by KIC grantees, 2017-2019

It must be noted that this number is higher than the total number of respondents as the majority of the researchers produced more than one research output.

5.4 Human capacity development (H3)

Scholars argue that established researchers or supervisors who are well networked and internationally acclaimed are in a better position to assist, open, and create international opportunities for their postgraduate students. According to Kwiek (2020), senior academics have a higher propensity to collaborate, more power, better networks, longer experience, resources, visibility and scientific standing. Therefore the next generation and emerging researchers have to learn from their supervisors

since they are less likely to succeed in collaborating internationally on their own. This is important since the next generation and emerging researchers are at the beginning stages of their academic or research career. The 2014 impact study commissioned by the EC highlights the employability of graduate students as one of the benefits of internationalisation (de Wit and Hunter, 2015). According to the study, those students international experience gain knowledge in specific disciplines, strengthen key transversal skills that are highly valued by employers, and fare much better on the job market (de Wit and Hunter, 2015). These graduates are unlikely to experience long-term unemployment, compared with those who have never been internationally exposed. It is against this background that the following hypothesis emerged for analysis in this study:

H3: *There is a difference in the opportunities for postgraduate students at South African HEIs to get international exposure between the types of shorter-term international mobility and networking programmes.*

Variables: *grant type (independent variable), number of postgraduate students exposed to international activities (dependent variable)*

Table 5-7: Basic descriptive statistics – type of grant (H3)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Travel Costs	885	78,0	78,0	78,0
	Visiting Scientists	154	13,6	13,6	91,6
	Workshops	95	8,4	8,4	100,0
	Total	1134	100,0	100,0	

Table 5-8: Number of postgraduate students per grant (H3)

		Total_HCD	
		Mean	Sum
Item_RECODED	Workshops	1,2	115,0
	Travel Costs	,6	499,0
	Visiting Scientists	,8	128,0
	Total	,7	742,0

A One-way Analysis of Variance test was run for this hypothesis as per Figure 5.8 below.

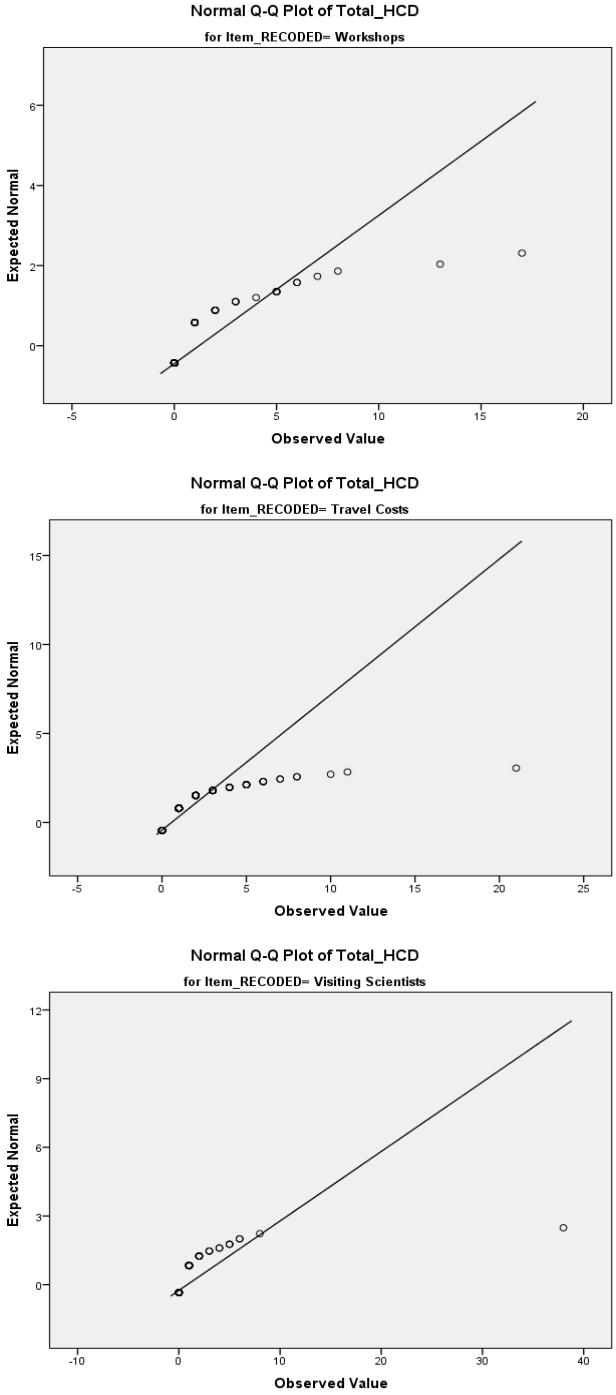
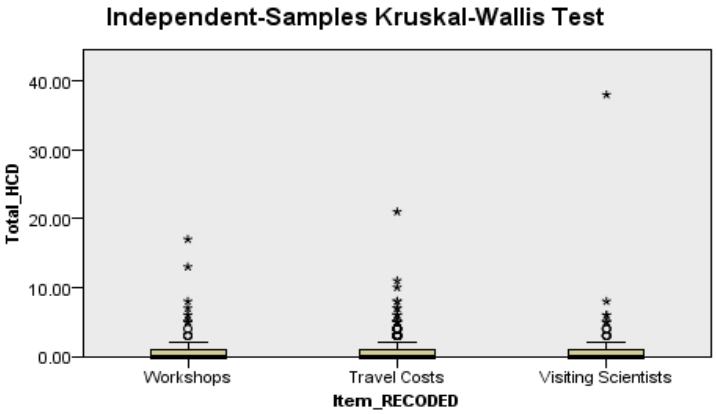


Figure 5-8: One-way Analysis of Variance (H3)

From the Normal Q-Q Plots above, it can be seen that the assumption of normality was violated. It was therefore decided to run the non-parametric Kruskal-Wallis H test instead of One-Way ANOVA.

Table 5-9: Kruskal-Wallis H test – analysis results (H3)

		Total_HCD
		Median
Item_RECODED	Workshops	0,0
	Travel Costs	0,0
	Visiting Scientists	0,0



Total N	1,134
Test Statistic	2.220
Degrees of Freedom	2
Asymptotic Sig. (2-sided test)	.330

1. The test statistic is adjusted for ties.
2. Multiple comparisons are not performed because the overall test does not show significant differences across samples.

Figure 5-9: Kruskal-Wallis H Test (H3)

A Kruskal-Wallis H test was run to determine if there were differences in the median number of postgraduate students exposed to international activities between different grant types: hosting international events (workshops), international travel grants and visiting foreign scientists. Distributions of number of postgraduate students exposed to

international activities scores were similar for all groups, as assessed by visual inspection of a boxplot. Median number of postgraduate students exposed to international activities scores were not statistically significantly different between groups, $\chi 2$ (2) = 2.220, p = 0.330. This result is confirmed by the descriptive statistics showing that the median was 0 for all three grant types. This finding is an indication that researchers, irrespective of the type of KIC grant received, are able to internationally expose their postgraduate students. With every grant received a postgraduate student was networked, making STiM a critical instrument for the internationalisation of postgraduate students.

Doctoral students constituted the majority of postgraduate students supported by KIC for the three-year period combined at 45%, followed by Masters' students at 35%. Doctoral and Masters' students combined made up 80% of all supported postgraduate students. The remaining 20% included Postdoctoral fellows (at 8%) and Honours' students (at 12%). Further to this, the support for postgraduate students followed the Ministerial guidelines in terms of the equity targets. Table 5.10 below demonstrates that the majority of the historically disadvantaged students, i.e. black and female, benefited the most from the KIC programme.

Table 5-10: Total number of supported students by race, citizenship and gender

Black African	**Coloured**	**Indian**	**White**
65%	6%	6%	23%
South African	**Permanent Resident**	**Foreigner (African)**	**Foreigner (outside Africa)**
66%	5.5%	24.5%	4%
Female		**Male**	
52%		48%	

For the three-year period under review, KIC supported 77% of black researchers, 65% of whom were black African postgraduate students. The majority of the postgraduate students (71.5%) were South African citizens and permanent residents. Slightly more than half (i.e. 52%) of the KIC grants benefited female students. Although the actual direct outputs by these postgraduate students cannot be reported, it can be maintained that the KIC programme assisted researchers to internationally expose their students.

Responses from the online questionnaire also supported this finding as respondents reported that their postgraduate students were part of the international visit/event supported by the KIC grant they received. Specifically, 13, 26, 24 and 11 Honours, Masters, Doctoral and Postdoctoral students were involved respectively. A total of 74 postgraduate students were internationally exposed between the 48 KIC grants (see Figure 5.10 below).

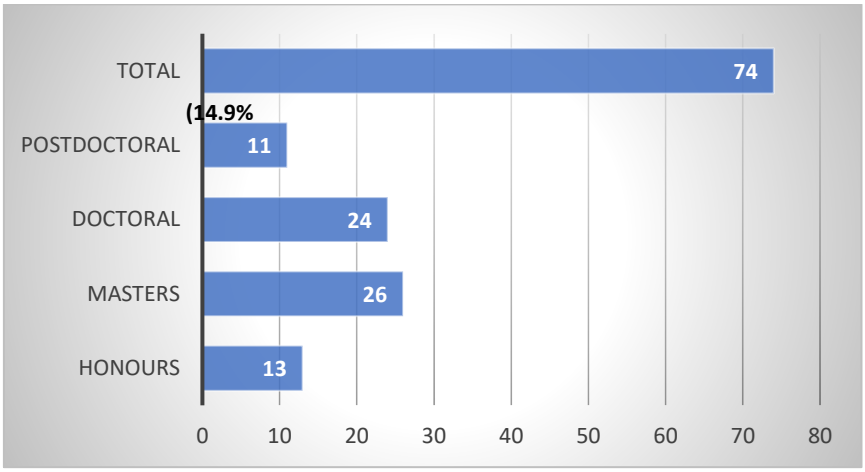


Figure 5-10: Number of students internationally exposed through the KIC grant

With regards to the question of whether or not these 74 postgraduate students maintained a working relationship with the international partners they met during the international visit/event supported by the KIC grant, 26 respondents confirmed that their students were still working with their international partners. Those postgraduate students who did not manage to establish collaboration or make a follow up on the contacts made during the international visit/event might potentially seek future support to continue engagement. This is supported by the finding that 15.4% of the 74 postgraduate students who benefitted from the KIC grant received an additional KIC support to continue the discussions started with the initial visit. Therefore it can be deduced that repeated support for postgraduate students may result in an active continuation of contacts. Unfortunately, very few of the students who maintained a working relationship with their international partners managed to re-apply for the KIC grant on their own.

From this analysis, it is clear that STiM is a useful instrument for internationalisation, especially for the next generation and emerging researchers. However, there is a need to understand the type of activities that these postgraduate students get involved in, and whether or not they are able to sustain these collaborations independent of their supervisors. This can be achieved only if STiM programmes are designed in such a manner that they incorporate structured tracking mechanisms and regular (or repeated) mobility support for postgraduate students.

5.5 Access to additional funding (H4)

Establishing and maintaining international collaboration is relatively expensive for researchers. Kwiek (2019) points out that the availability of funds increases the level of international research collaboration. This is part of the reason why internationalisation is mostly driven by well experienced and established researchers. This was made clear in Kwiek's (2019) cross-generational European comparison whereby established researchers accounted for the highest number of researchers collaborating internationally. In addition, it has been argued that the more networked a researcher is, the more access they would have to other sources of funding. These debates inspired the formulation of the fourth hypothesis.

H4: *There is a difference in the amount of additional funding that researchers at South African HEIs manage to leverage between the types of shorter-term international mobility and networking programmes.*

Variables: *grant type (independent variable), total amount of additional funding attracted (dependent variable)*

A One-way Analysis of Variance test was run for this hypothesis. The descriptive statistics are indicated in Tables 5.11 and 5.12 below.

Table 5-11: Basic descriptive statistics – type of grant (H4)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Travel Costs	885	78,0	78,0	78,0
	Visiting Scientists	154	13,6	13,6	91,6
	Workshops	95	8,4	8,4	100,0
	Total	1134	100,0	100,0	

Table 5-12: Number of postgraduate students per grant (H4)

		Total_ALL_TYPES_ALL_YEARS	
		Mean	Sum
Item_RECODED	Workshops	225206,4	21394609,2
	Travel Costs	21900,6	19382069,8
	Visiting Scientists	45496,5	7006468,5
	Total	42136,8	47783147,5

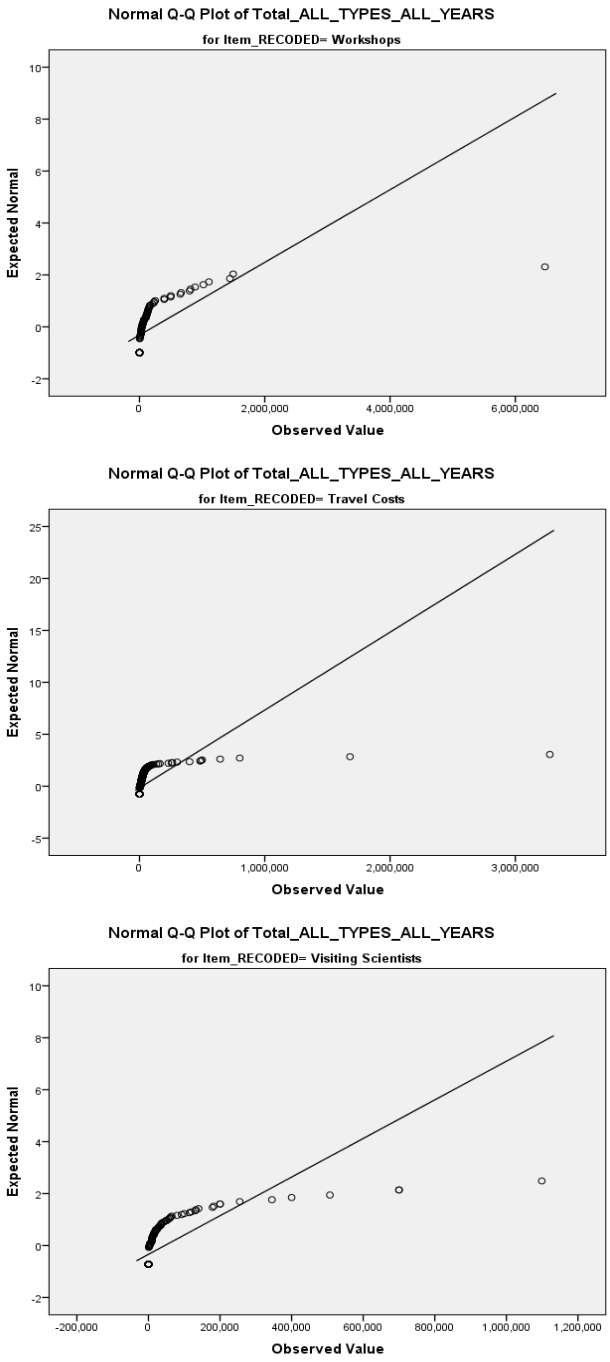
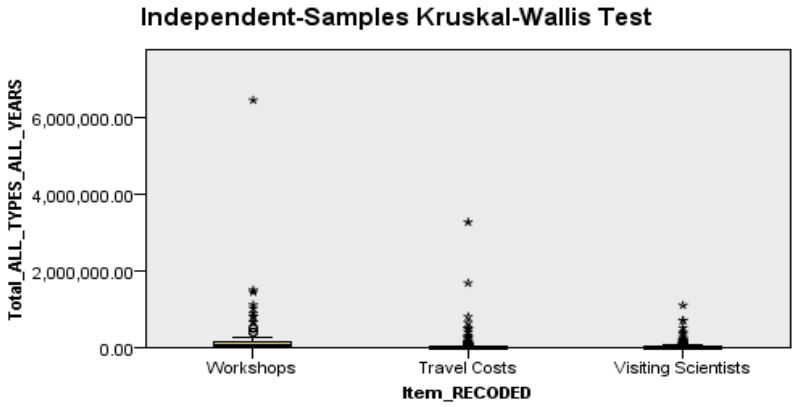


Figure 5-11: One-way Analysis of Variance (H4)

From the Normal Q-Q Plots above (Figure 5.11) the assumption of normality was violated. It was therefore decided to run the non-parametric Kruskal-Wallis H test instead of One-Way ANOVA as indicated in Table 5.13 and Figure 5.12 below.

Table 5-13: Kruskal-Wallis H test – analysis results (H4)

		Total_ALL_TYPES_ALL_YEARS
		Median
Item_RECODED	Workshops	39806,21
	Travel Costs	5000,00
	Visiting Scientists	3000,00



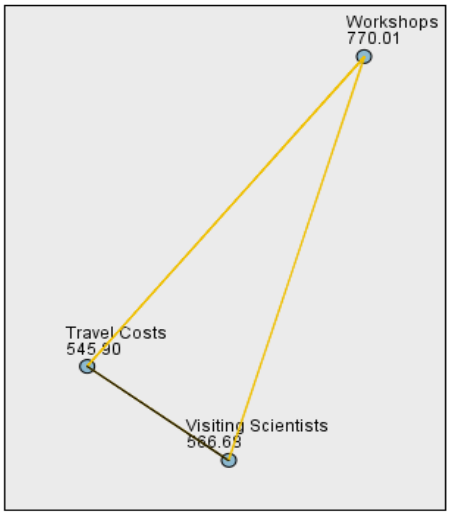
Total N	1,134
Test Statistic	43.763
Degrees of Freedom	2
Asymptotic Sig. (2-sided test)	.000

1. The test statistic is adjusted for ties.

Figure 5-12: Kruskal-Wallis H Test (H4)

A Kruskal-Wallis H test was run to determine if there were differences in the median total amount of additional funding attracted between different grant types: hosting international events (workshops), international travel grants and visiting foreign scientists. Distributions of the total amount of additional funding attracted were similar for all groups, as assessed by visual inspection of a boxplot. The median total amount of additional funding attracted was statistically significantly different between groups, $\chi 2$ (2) = 43.763, p = 0.000. To determine between which groups these significant differences lie, the diagram below is looked at. Note that mean ranks and not medians are used for this calculation.

Pairwise Comparisons of Item_RECODED



Each node shows the sample average rank of Item_RECODED.

Sample1-Sample2	Test Statistic	Std. Error	Std. Test Statistic	Sig.	Adj.Sig.
Travel Costs-Visiting Scientists	-20.774	27.397	-.758	.448	1.000
Travel Costs-Workshops	224.106	33.877	6.615	.000	.000
Visiting Scientists-Workshops	203.332	40.936	4.967	.000	.000

Each row tests the null hypothesis that the Sample 1 and Sample 2 distributions are the same.
Asymptotic significances (2-sided tests) are displayed. The significance level is .05.

Figure 5-13: Kruskal-Wallis H Test – Pairwise Comparisons (H4)

The table above indicates significant differences in mean ranks of total amount of additional funding attracted only between international travel and hosting international events (workshops) and between visiting foreign scientists and hosting international events. The hosting of international events had a significantly higher mean rank (770.01) than either the international travel (545.90) or the visiting of foreign scientists (566.68). This difference in mean ranks indicates that the total amount of additional funding attracted is generally higher for the hosting of international events grant type than for the international travel or the visiting of foreign scientists grant types. This result is also confirmed by the median scores, with the median for the hosting of international events (39806.21) considerably higher than the medians for international travel (5000) or the visiting of foreign scientists (3000).

This finding supports the hypothesis that there is a difference in the amount of additional funding that researchers at South African HEIs manage to leverage between the different types of shorter-term international mobility and networking programmes. Although there are differences between the grant types it is important to note that researchers were able to leverage additional funds in all the three grant types. It can therefore be concluded that with the KIC grant researchers were able attract other sources of funding although at varying degrees. Not all the researchers who received a KIC grant was able to secure additional funding; however the majority were able to secure additional funding during the three-year period under review (see Table 5.14 below).

Further to this, the total amount leveraged by researchers far exceeded the overall amount that the NRF invested in the KIC programme. This additional funding emanated from many different sources, i.e. ggovernment departments/ science councils/ parastatals, host institution, international organisations, other NRF Grants, researchers' own institution, personal funds, private sector, professional bodies, publication subsidy, and other South African HEIs (not own Institution). See Table 5.14 below for the total amount leveraged per stakeholder.

The fact that researchers managed to secure so much additional funding from different stakeholders is a further testament, not only of the value that these stakeholders place on international mobility and networking, but also of the fact that STiM is increasingly becoming a critical instrument for the internationalisation agenda.

Table 5-14: Additional funding per type of grant

	Visiting Scientists Grant			Travel Costs Grant			Workshops Grant		
Different Organisations	Average amount of additional funding received	Researchers who obtained additional funding	Researcher who did not obtained additional funding	Average amount of additional funding received	Researchers who obtained additional funding	Researcher who did not obtained additional funding	Average amount of additional funding received	Researchers who obtained additional funding	Researcher who did not obtained additional funding
Government Department/Science council/Parastatal	2146,81	11	143	1632,10	22	863	25306,90	11	84
Host Institution	5043,17	3	151	671,36	14	871	28172,50	7	88
International Organisation	11057,66	14	140	5641,03	30	855	31675,89	15	80
Other NRF Grant	17875,90	12	142	4064,86	49	836	7937,50	6	89
Own Institution	9694,50	47	107	8188,96	360	525	58445,39	44	51
Personal Funds	35,97	1	153	192,81	18	867	125,00	1	94
Private sector	699,28	3	151	860,49	22	863	10192,74	16	79
Professional Body	935,25	6	148	70,80	7	878	87395,91	13	82
Publication Subsidy	143,88	2	152	722,65	29	856	312,50	2	93
funds leveraged from SA HEI (not own Institution)	43,17	2	152	112,62	6	879	1611,19	4	91
Total ALL TYPES ALL YEARS	47675,59	82	72	22157,69	495	390	251175,52	65	30

Respondents of the online questionnaire were requested to indicate if they have ever applied for other mobility and networking grants (other than KIC) during the time that they were awarded the KIC grant. A low number of respondents applied for another mobility grant (13) however, the majority indicated that they had applied for research funding outside the country (38), followed by those who applied for research funding at the NRF (35). A total of 20 respondents indicated that they applied for additional funding jointly with their international partners (see Table 5.15 below). The majority of those who had applied were successful. It cannot however, be stated with certainty that the KIC grant provided an added advantage when applying for other mobility or research funds.

Table 5-15: Number of researchers who applied for other mobility grants

	Did not apply	Applied	Total	Successful	Un-successful	Still awaiting outcomes	Total
Applied for other NRF mobility grant	35	13	48	7	6	0	13
Applied for other NRF research grant	13	35	48	23	11	1	35
Applied for funding outside the country	10	38	48	32	6	0	38
Applied jointly with international partners	28	20	48	11	6	3	20

It is significant to note that respondents submitted successful joint funding applications with the international partners they had met during the KIC sponsored visit. This is a critical finding, as it indicates the manner in which STiM created an enabling environment for a long-term collaboration to take root.

5.6 Long-term sustainable collaboration (H5)

The travel report template of the NRF poses a question to determine whether or not a collaboration was initiated during the international visit/scientific event funded by KIC. This question is critical since not all visits necessarily lead to a network, and it is not consequential that every mobile person turns their mobility into a future collaboration. The purpose of this question is to determine the extent to which the supported STiM

programme inspired worthwhile networks. To investigate this, the following hypothesis was formulated and tested.

H5: *There is an association between the type of shorter-term international mobility and networking programmes and the extent of collaboration between researchers in South African higher education institutions and their international counterparts.*

Variables: *grant type (independent variable), did collaboration take place or not? (dependent variable)*

Table 5-16: Basic descriptive statistics – type of grant (H5)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Travel Costs	885	78,0	78,0	78,0
	Visiting Scientists	154	13,6	13,6	91,6
	Workshops	95	8,4	8,4	100,0
	Total	1134	100,0	100,0	

Table 5-17: Total number of collaborations (H5)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	552	48,7	48,7	48,7
	Yes	582	51,3	51,3	100,0
	Total	1134	100,0	100,0	

Table 5-18: Number of collaborations – hosting international event (H5)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	50	52,6	52,6	52,6
	Yes	45	47,4	47,4	100,0
	Total	95	100,0	100,0	

Table 5-19: Number of collaborations – international travel (H5)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	442	49,9	49,9	49,9
	Yes	443	50,1	50,1	100,0
	Total	885	100,0	100,0	

Table 5-20: Number of collaborations – visiting foreign scientists (H5)

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	60	39,0	39,0	39,0
	Yes	94	61,0	61,0	100,0
	Total	154	100,0	100,0	

As highlighted in the descriptive tables above, collaboration was successfully initiated in 51% of the KIC grants. In 48.7% of the grants collaboration could not be established.

A Chi-square test of independence was used to test assumptions (see Table 5.21 below). All expected cell frequencies were greater than five. This assumption has therefore been met.

Table 5-21: Chi-square test – analysis results (H5)

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	6.982[a]	2	,030
Likelihood Ratio	7,039	2	,030
N of Valid Cases	1134		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 46.24.

Item_RECODED * collaboration_Any_of_Three_Years Cross tabulation

			collaboration_Any_of_Three_Years		
			No	Yes	Total
Item_RECODED	Workshops	Count	50	45	95
		Expected Count	46,2	48,8	95,0
		% within Item_RECODED	52,6%	47,4%	100,0%
		% within collaboration_Any_of_Three_Years	9,1%	7,7%	8,4%
		Adjusted Residual	,8	-,8	
	Travel Costs	Count	442	443	885
		Expected Count	430,8	454,2	885,0
		% within Item_RECODED	49,9%	50,1%	100,0%
		% within collaboration_Any_of_Three_Years	80,1%	76,1%	78,0%
		Adjusted Residual	1,6	-1,6	
	Visiting Scientists	Count	60	94	154
		Expected Count	75,0	79,0	154,0
		% within Item_RECODED	39,0%	61,0%	100,0%
		% within collaboration_Any_of_Three_Years	10,9%	16,2%	13,6%
		Adjusted Residual	-2,6	2,6	
Total		Count	552	582	1134
		Expected Count	552,0	582,0	1134,0
		% within Item_RECODED	48,7%	51,3%	100,0%
		% within collaboration_Any_of_Three_Years	100,0%	100,0%	100,0%

The chi-square test results indicate a statistically significant association between Grant type and whether collaboration took place or not, $\chi 2$ (2) = 6.982, p = 0.030. To determine which cells contributed the most to the significant result and thus deviated significantly from independence, the Adjusted Residuals in the table above are considered. Adjusted residuals greater than ±2 standard errors indicates that a cell

deviates significantly from independence. From this table, it can be seen that only the cells for visiting foreign scientists have adjusted residuals of greater than ±2 standard errors. It can therefore be concluded that the frequency of collaboration was different for visiting foreign scientists than for hosting international events (workshops) or for international travel. The blue highlighted cells in the table above indicates that collaborations took place in 61% of the visiting of foreign scientists grants as compared to only 50% of the international travel grants and 47% of the hosting of international events (workshops) grants. This finding therefore affirms the hypotheses that there is an association between the type of shorter-term international mobility and networking programmes and the extent of collaboration between researchers in South African higher education institutions and their international counterparts.

For the online questionnaire, respondents were requested to respond to two main questions. Respondents were firstly asked if they, prior to their shorter-term mobility, were already collaborating with the international partners they had met during the KIC sponsored visit. Some 34 respondents indicated that they used the KIC grant to visit researchers that they already knew and had been working with. Only 14 respondents met their potential collaborators for the first time during the KIC sponsored visit. These results were expected for those respondents who were established researchers. The 14 respondents who had no knowledge of their international partners prior to the visit comprised mostly of next generation and emerging researchers. If contacts or networks were made within this cohort, it is highly likely that these were established through the assistance and direction of supervisors (established researchers). The question would therefore be whether these next generation and emerging researchers were able to follow-up, maintain and sustain the contacts and networks made into long-term collaboration.

Respondents were further asked if they were still collaborating with the international partners they had met during their international visit. Some 39 respondents indicated that they were still working together with the international partners they had met during the KIC sponsored visit, as per Figure 5.14 below. These results are an indication that 10.5% of respondents who had no knowledge of their international partners prior to the

KIC sponsored visit managed to maintain and sustain their partnerships post the KIC funding.

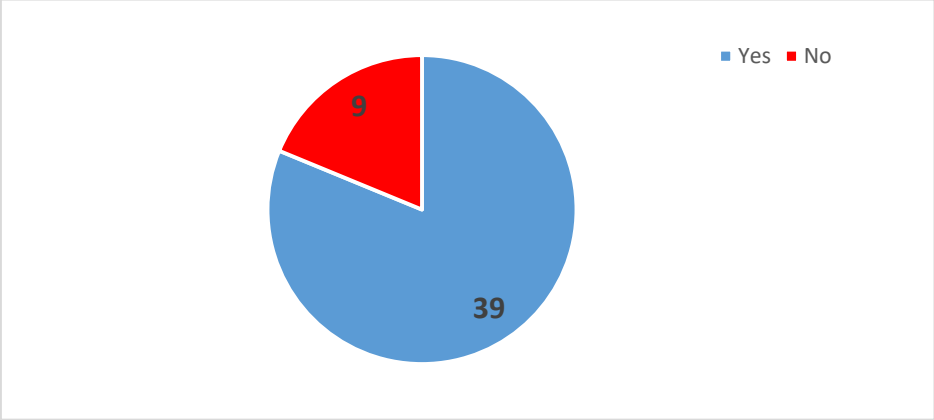


Figure 5-14: Grantees who established and maintained collaboration post KIC

These numbers partly supports the hypothesis that STiM programmes can lead to long-term collaboration between researchers. The majority of the respondents within the category of those who had no knowledge of their international partners prior to the KIC sponsored visit did not establish a collaboration post the KIC support.

5.7 Rating category of researchers (H6)

It is indicated in Chapter 2, international mobility is an inherent value indicative of academic excellence, and that it is associated with improvements in researchers' professional development and academic performance. It was further indicated that there are challenges in linking academic-related achievements to shorter-term mobility. Some authors even argue that the success of researchers is not linked to international academic mobility, but is heavily influenced by the intrinsic characteristics of the researchers/ academics themselves. The analysis on this topic presents a convergent set of arguments. This section investigates the link between KIC and the academic standing of researchers at South African HEIs. For the purposes of this study, the NRF rating system was used as an indicator for assessing the academic standing of the KIC grantees. As was indicated in Chapter 2, the NRF rating is still highly regarded amidst all the criticisms. Many South African universities still use rating to position themselves as research-intensive institutions.

To this end, the researchers' desire to receive this recognition drives them to establish and nurture international networks, especially since the move from a lower to a higher rating generally requires engagement and links with international peers. As a result, less-established researchers tend to make use of STiM to secure their first rating, while more experienced researchers use these types of mobility grants to sustain their already existing international networks, and at the same time retain their NRF rating status. This background informed the following hypothesis:

H6: *There is a link between the rating categories of researchers at South African HEIs and the shorter-term international mobility and networking programmes.*

Variables: *grant type (independent variable), rating category (dependent variable)*

The online questionnaire contained selected questions on NRF rating. Half of the respondents indicated that they applied for NRF rating after being awarded a KIC grant. The majority of them applied for C rating - established researcher (12) followed by Y rating - promising young researcher (7) and B rating - internationally acclaimed researcher (3), as per Figure 5.15. The rest of the rating categories had one applicant each. It is important to note that 33 of the respondents were not rated prior to receiving the KIC grant.

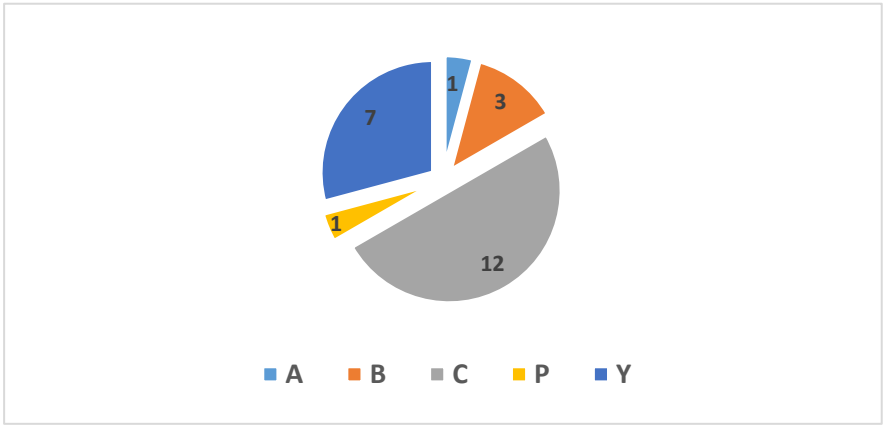


Figure 5-15: KIC grantees who applied for NRF rating after receiving KIC grant

Of the total number of respondents that applied, 18 were successful, 17 of which received a Y-rating and only one respondents received a P-rating. Only 15 of the other

half that did not apply were already rated by the time they received their KIC grants (their ratings were A, B and C). It cannot be definitively proven that KIC had influenced the success of the 18 respondents who received rating post the grant. However, the majority of those who were awarded a rating post the KIC grant were within the Y-rating category. This category is composed of emerging researchers, i.e. researchers who are 40 years or younger and who have had their Doctoral degrees for less than five years at the time of applying for a rating. These are predominantly postdoctoral researchers. It is therefore possible that an international mobility grant would have had a positive influence on such a group of researchers.

Further to this, the KIC grant is prioritised for those researchers who had not already been allocated travel support through any other NRF research grants. Therefore, it is to be expected that the majority of researchers making use of KIC were the next generation and emerging researchers with no or limited international travel experience. For this cohort, an international mobility grant would give them an added advantage when applying for rating.

It is highly unlikely that the KIC grant had any impact on those researchers who were already rated prior to receiving the KIC grant, other than to assist them with maintaining their already established networks. From the responses provided in the online questionnaire, these researchers indicated already having had an A, B or C rating by the time they applied for KIC. Researchers who are awarded these ratings are unequivocally recognised by their peers as leading international scholars and enjoy considerable international recognition for the high quality and impact of their recent research outputs. Therefore, for this category of researchers, STiM-related grants would perhaps only contribute in terms of maintaining their international networks and exposing their postgraduate students.

As indicated in Chapter 3, through the questionnaire that was circulated, there were two main questions in which researchers were requested to share their general impressions of the KIC by [1] indicating the type of impact the KIC have had on their academic career and by [2] sharing ideas for improving KIC in order to achieve long-lasting benefits. Below is the outcome of the analysis of these open-ended questions.

5.8 Researchers' opinions about KIC

Researchers' responses for the two open-ended questions were coded and grouped into different themes for analysis purposes. Below is the outcome of this analysis.

5.8.1 Impact of the KIC on the academic career development of researchers

In analysing the researchers' responses for this open-ended question three themes emerged, i.e. research capacity building, establishing international networks and long-term collaboration, and access to funding.

5.8.1.1 Research capacity building

The majority of the respondents reported that KIC enhanced and strengthened their research findings, predominantly the case for respondents who travelled to attend a workshop or seminar. For these respondents KIC afforded them an opportunity to present their research findings and receive useful inputs and comments to improve and ready their research papers for publication.

While established researchers appreciated the type of inputs they received when travelling to international conferences, both the next generation and emerging researchers, on the other hand, appreciated learning from the best in the field. These researchers benefitted from meeting established researchers in their field and learning from them. This, as they argued, provided confidence in their field. Further to this, meeting global experts has assisted them to learn about some of the gaps they were initially not aware of, and that attending international/ global conferences exposed and introduced researchers to new/other techniques they were not aware of.

In general, the KIC instrument was viewed positively by all, especially emerging researchers. They highlighted the international research networks they established through KIC which they could continue to access in their future careers.

Another established researcher pointed out that his/her research journey would have been far more informed and that his/her academic career would have probably been

fast-tracked had they also had access to KIC-type of grants in their early years of their career.

It was also indicated that building a long lasting partnership takes many years and requires trust and patience, that no partnership can be sustained in the long-term if it is not genuine or built on mutual benefit, and that although individual partners might derive highly diverse benefits from a collaborative activity, the principle of mutual gain in line with agreed objectives should not be negated. These could only be ensured through regular face-to-face meetings that grants such as the KIC provide for.

Therefore, KIC was viewed as a useful tool, not only for building the foundation for a long-term partnership but also for servicing and sustaining partnerships. These regular short trips were appreciated and were believed to assist in managing expectations, building trust and respect, and ensuring complementarity between the varied skills and needs of the collaborating partners.

5.8.2 Establishing international networks and collaboration

The majority of the researchers indicated that their KIC grant facilitated and fast-tracked the development of their international networks. KIC was praised for its flexibility and the manner in which it facilitates cross-collaboration of various kinds. It was viewed as a grant sufficient enough for enhancing staff networking and joint research grant applications.

The aspect of interpersonal relationships was a prominent response. It was argued that researchers choosing to work collaboratively should seek out partners with whom they can establish strong interpersonal working relationships as a platform to carry the collaboration forward. Furthermore, responsible researchers should plan for longevity and success through a continued focus on maintaining and growing interpersonal relationships between researchers, working together in the collaborative effort, and by ensuring the continuation of expertise through capacity development and succession planning. Strong interpersonal relationships within collaborative efforts also enhance

the establishment of international research networks for young and emerging researchers and lay the foundation for new and emerging collaborations in the future.

5.8.3 Access to funding

The respondents reported that whilst they were already established researchers at the time they received the KIC support, the grant nonetheless allowed them to improve the chances of obtaining external funding. Those researchers seeking successful international collaborations should therefore avoid the notion that any one form or source of funding will be sufficient to sustain the research/initiative/project indefinitely.

Planning for, and enabling, longevity is partly dependent on the structure of the funding mechanisms. It is dependent on the researcher' initiative in seeking multiple sources of funding and using initial seed-funding, like the KIC instrument, to leverage access to a broader resource network. It was confirmed that successfully accessing one source of funding (particularly from a reputable funder) can in fact provide leverage for other sources of funding.

Further to this, it was argued that smaller amounts of funding can be of significant value in establishing relationships and setting the stage for future collaboration, and also during the course of the collaboration. Once the international collaborations are solidified, small additional investments like the KIC can have an important impact on the sustainability of the collaboration. Table 5.22 below provides a summary of the discussion above highlighting critical impact factors.

Table 5-22: Researchers' perspectives of KIC

Impact Category	Indicators
Research capacity building	Strengthened research findings
	Provided an opportunity to learn from experts
	Exposed researchers to new techniques
	Established strong foundation for long-term collaboration
	Assisted researchers with sustaining their established partnerships
Establishing networks and long-term collaboration	Fast-tracked the process of establishing an international network
	Provided opportunity to share common interests
	Established strong interpersonal relationships needed for sustaining a long-term international partnership
Access to funding	Improved the chances of obtaining external funding
	Provided seed funding needed for relationship building

5.8.4 Improving shorter-term mobility: researchers' perspective

The following section summarises the respondents' opinions on mechanisms that can be used to improve KIC for the maximum benefit of researchers. In the analysis of this question, seven themes emerged as outlined below.

5.8.4.1 Flexibility

Some of the respondents indicated the lack of flexibility in KIC. Respondents suggested that KIC should not be limited in the type of activities supported. For example, if researchers applied for international conference attendance, they should be allowed to build in side events, such as study visits to some of the international institutions where the conference is hosted. The researchers indicated that it would be useful to have a bottom-up approach to KIC by allowing researchers to indicate desired engagements, and the KIC funding then follows the activities. In addition, it was

suggested that KIC should not have a 'one size fits all' approach. Different categories of researchers have different needs and should not be treated the same. For example, it is not feasible to provide an established researcher with the same amount as an emerging researcher. These two categories do not play the same roles and do not have the same level of responsibilities. Therefore, the NRF should design KIC according to the needs of the researchers in mind.

5.8.4.2 Timing

It is recommended that the programme should not be fixed to deadlines. In many instances the researchers are notified about relevant international events when the deadline for KIC applications has already passed. Therefore, it would be beneficial for the NRF to separate the KIC instrument from other NRF opportunities, and the standard time-related application procedure. The argument is that the NRF should allow researchers the freedom to apply for mobility grants at any time during the year.

5.8.4.3 KIC alumni network

It was suggested that the NRF should consider an alumni network of KIC beneficiaries through a platform to network and share experiences; especially at the level of the next generation and emerging researchers. This platform could be combined with various small capacity building workshops, such as proposal writing. In this way, the NRF would be able to hold researchers accountable for some of the activities initiated. This would form part of the monitoring, evaluation and learning (MEL) framework for mobility grants. The importance of keeping researchers engaged was highlighted here.

5.8.4.4 Joint mentor and mentee funding

The NRF is advised to consider allowing for joint HEI staff and student funding. This will allow the established researchers to travel together with a group of their postgraduate students. This would allow established researchers to link their next generation and emerging researchers with other international researchers. Pairing the

less-experienced researchers with their mentors/supervisors will increase the return on investment.

5.8.4.5 Repeated funding

Respondents also recommended that the NRF should allow postdoctoral researchers to apply for the KIC grant directly as this serves as an important element of research capacity building for emerging researchers. It was further suggested that applications from emerging researchers should be approved regularly, even if they had been successful in previous years. This repeat funding of support will assist the researchers to maintain their international partnerships.

5.8.4.6 Diversity

It was further advised that the NRF should diversify its support for international mobility, especially informed by the experience of the COVID-19 pandemic. Respondents suggested a hybrid mobility model whereby support for travel could be combined with virtual mobility. Virtual mobility is becoming a critical alternative and innovative way of connecting researchers without physical travel. It was indicated that this type of networking activity is highly beneficial as it is more affordable, and it also increases access to many more researchers than travel.

5.8.4.7 Awareness campaigns

It was highlighted that the majority of the research community in South African are not aware of the KIC opportunities. The NRF was urged to invest in innovative campaigns to create awareness as too many deserving cases do not know about the instrument.

Final question

Respondents were also requested to rate the statement:

KIC is a useful funding tool for the internationalisation of researchers at South African HEIs.

A total of 31 respondents "*strongly agreed*" and 14 "*agreed*" with the statement. Only 1 respondent "*strongly disagreed*" and the other 2 indicated a "*no opinion*".

5.9 Conclusion

From the literature reviewed in Chapter 2 the majority of the benefits of internationalisation were associated with long-term and short-term visits abroad (of more than three months) and rarely with STiM. The value of STiM as an aspect of internationalisation was viewed mainly as advancing interpersonal and intercultural skills. The chapter sought to illustrate the potential of STiM beyond interpersonal skills and analyse its prospects in advancing the academic and research capacity of researchers.

Based on the analysis the following findings could be drawn:

- The number of research outputs was found to be generally higher for international travel grants as compared to other types of shorter-term international mobility and networking grants.
- Researchers were found to produce quality research outputs irrespective of the type of shorter-term international mobility and networking grant they received.
- It was found that researchers were able to internationally expose their postgraduate students irrespective of the type of shorter-term international mobility and networking grant received. A postgraduate student was networked with every grant received.
- Researchers were able to leverage additional funds in all the three types of shorter-term international mobility and networking grant received, although at varying degrees. Further to this, the total amount leveraged by researchers far exceeded the overall amount that the NRF invested in the KIC programme.
- Research collaboration was established from the shorter-term international mobility and networking grant received. Collaborations took place in 61% of the visiting of foreign scientists' grants, 50% of the international travel grants and 47% of the hosting of international events (workshops) grants.

- A total of 18 respondents out of the 48 who responded to the online questionnaire received an NRF rating post the KIC grant. The majority of these were awarded within the Y-rating category (i.e. promising young researcher).

From the findings above, it can be concluded that there is an association between the independent variable (i.e. shorter-term international mobility and networking programme) and the dependent variables. This study therefore has managed to prove a correlation between two variables in the six hypotheses but did not prove causality. Being able to prove correlation does not imply that a change in one variable is as a direct result of the change in another. There might be other underlying circumstances influencing this strong correlation. Due to time constraints, the researcher could not perform a cause and effect test. It will therefore, be worthy for the researcher to continue this study in the near future and undertake a cause and effect test on these six hypotheses.

On the basis of these findings, some practical and operational recommendations are offered in Chapter 6, in the form of an operational framework for the effective coordination and management of STiM. The intention behind these practical recommendations is to provide critical factors to be considered in the design, implementation, monitoring and evaluation of STiM programmes for value add. The framework is developed on the basis of a systems approach whereby:

- unconventional resources and tools such as the tracking systems, online platforms, monitoring, evaluation and learning (MEL) frameworks are integrated to ensure impact and sustainability of STiM;
- an enabling environment for innovative ideas and activities (e.g. mobility excellence awards, return fellows, chaperones for the next generation of researchers, etc.) for the diversity and flexibility of STiM; and whereby
- co-creation is encouraged between the different stakeholders involved in the process.

The inter-link between these three elements (technology, innovation and people) is embedded in the design of this operational framework making it system wide (Da Vinci

Institute, 2020). These interlinks are illustrated in Figure 6.1 in the following chapter. This systems approach to the coordination and management of STiM will provide a strong base for long-term sustainable collaboration to take root.

CHAPTER 6: STIM: PROPOSED OPERATIONAL FRAMEWORK

6.1 Introduction

The difference in duration between shorter-, short-, and long-term international mobility is clearly articulated in this research study, using the following distinction in differentiating between the three mobility types as the basis of analysis:

i. Shorter-term international mobility – duration of min 3-days to max 4 weeks.
ii. Short-term international mobility – duration of min 1 month to max 12 months.
iii. Long-term international mobility – more than 12 months in duration.

In this chapter, the findings of the study (as detailed in Chapters 5) are considered to develop an operational framework that can ensure that STiM programmes contribute to advancing the academic careers of researchers at HEIs. The recommendations serve as a guide for researchers, HEIs, funders, and policy makers interested in advancing internationalisation of the higher education agenda. It provides information on concrete actions to be undertaken in ensuring the positive impact of STiM on the career development of researchers.

The success of this framework is influenced and nuanced by the context and policy dynamics of the country and each institution. This suggested framework is contextualised within the South African system, cognisant of the evolution of the internationalisation of the South African higher education sector, and its landscape and policies. The presentation of this framework is divided into three main sub-sections as follows:

i. Firstly, the framework offers basic principles that should be adhered to in implementing STiM programmes.
ii. Secondly, the framework outlines the roles and responsibilities that different stakeholders should embrace for the success of STiM.
iii. Lastly, the framework offers different types of STiM activities that stakeholders should invest in for impact to be realised.

6.2 Basic principles for the implementation of STiM

The following basic principles should be in place for an effective and impactful implementation of STiM, to be observed by all stakeholders interested in using STiM for their internationalisation strategies.

6.2.1 Interface between STiM, short and long-term mobility

For STiM to work effectively it should be applied for its intended use. The introduction of STiM is not meant to replace traditional short and long-term international mobility programmes. These programmes are important for achieving long-term internationalisation goals. Therefore STiM should be implemented for the purposes of serving both the short and long-term mobility agendas. It should serve an initial purpose to encourage longer duration mobility in the future. Implementing it in this way assists with managing unreasonable expectations and provides stakeholders the latitude of setting realistic and achievable goals. As a result, the level of investment in STiM will be realistic vis-à-vis the expected outputs/outcomes. Any internationalisation strategy focusing on mobility should therefore embrace, plan for, and incorporate the interface between STiM, short- and long-term mobility and not strive to select one for the purposes of three. The sustainability of STiM is to design it in such a manner that it serves as a foundation for the other mobility types, acknowledging the complementary nature of all three mobility types.

6.2.2 Alignment with national imperatives

STiM programmes should be aligned with national priorities (i.e. relevant government policies or strategies) if they are to be sustained. Not only will this alignment enable securing national funds for STiM activities, but it will make the STiM programme highly recognisable as one of those central and strategic programmes for policy or action planning and implementation. STiM programmes should therefore be designed as a means to address a particular national imperative.

6.2.3 Partnership approach within STiM programmes

STiM programmes are designed for various purposes. Some research networks are established as a way of addressing an immediate challenge at a local or institutional level, while others are designed for research capacity building. Whatever the reasons for initiating STiM, it is important for all stakeholders interested in making use of these programmes to understand 'why' they would like to initiative such mobility. This question can be responded to through one of the three approaches mentioned below.

i. Bottom-up approach: Whereby STiM programmes are informed by what is happening locally and sometimes at an institutional level. This is a highly researcher-focused approach suitable for designing STiM programmes.
ii. Top-down approach: In which STiM programmes are informed by mostly policies and strategies either at a national, regional, or continental level.
iii. Incentive driven approach: Whereby targeted funds are offered to an institution or researchers to implement a particular type of an activity. This approach can either be researcher- or institutionally-focused, or both.

6.2.4 Matchmaking researchers

Whatever approach is used for setting up or undertaking STiM, there are certain key factors to bear in mind. First, it is important to ensure that the right partners are engaged for each STiM programme. For a STiM programme to be successful, it requires partners that share the same vision and have an interest in the same type of outcomes. This is critical because the duration of STiM does not provide partners with sufficient time to get to know each other. As Guthrie *et al.* (2017) point out, shorter-term mobility works best if it is with particular types of individuals coming together, or committed to addressing a specific topic. Therefore, selecting international research partners that are fit-for-purpose is a determining factor of success. A shared vision, reflected in a genuine, mutually shared scientific interest and research direction, is a fundamental component of any STiM programme as it has the potential to turn a simple mobility venture into a sustainable long-term partnership.

6.2.5 Mutually beneficial

STiM programmes should be mutually beneficial for all partners involved. It is highly possible that partners may derive diverse benefits from the STiM programme; however, the principle of mutual gain in line with agreed objectives and activities is central. Thus, before any STiM is undertaken, partners should clearly articulate their expectations and there must be an intentional effort to ensure complementarity between the different skills, needs and interests of the partners. STiM programmes established within these parameters are more likely to contribute to the career development of the researchers in the long-term.

6.2.6 Commitment and ownership

Researcher commitment and ownership ensures the success of any activity, even in the absence of formal agreements/contracts. Commitment by the researchers can contribute, not only to continued partnerships, but to the retention of the best well-networked cohorts of next generation and emerging researchers in the academic environment. It is critical therefore to have researchers who have ownership of their STiM programmes. As it has been argued, long-term collaboration takes time to solidify. Therefore, it is imperative that researchers commit to shorter visits as a build-up to long-lasting partnerships.

6.3 Roles and responsibilities of different stakeholders

Carrying out STiM programmes involves many different stakeholders, depending on the identified activities and approach. The discussion below outlines the roles and responsibilities of the three main stakeholders who are usually involved in STiM, with the highest propensity to elevate the coordination of STiM for the internationalisation agenda.

6.3.1 Funders/donors

The value of funding for international mobility as a way of establishing long-term networks, continuing existing collaborations, and accessing research facilities outside the home country, cannot be overstated. This is one of the key ways in which funders can assist with enabling successful STiM. A prerequisite to the successful coordination of STiM is a stable funding structure. Funders interested in contributing towards, and ensuring impact in STiM programmes should consider the diversification of STiM activities as a multi-modal approach consisting of different activities (as further discussed in sub-section 6.4). The funding structure by funders/donors should therefore be flexible enough to allow for diversified activities within STiM. A balance between structure and flexibility in funding should be sought, allowing researchers to use their discretion within specified STiM activities and within an appropriately monitored environment.

Diversified STiM activities require innovative and reliable application processes that can enable funders to identify researchers with a high likelihood of succeeding in terms of establishing long-lasting research collaborations. At the very least, the submitted applications should be able to identify a complementarity of skills, shared vision, the opportunity for mutual benefit, and a demonstration of how the STiM activity will contribute to capacity development. The funders' systems must allow for innovative thinking in STiM. Further to this, review panels play an important role in the proposal approval process. A continued focus on monitoring the integrity of these processes, and guidance on a broad-based understanding of the value and advantages of STiM, are needed to ensure that this essential quality assurance process serves the purpose of selecting excellent proposals with the potential to establish long-term partnerships.

Sustainable and successful STiM should harness the value of regular feedback and monitoring in order to inform growth and improvement. This can include methodologies such as regular and structured meetings between partners, dialogue with researchers within the network, as well as formal evaluation processes. Lessons learnt from these multiple feedback mechanisms should be used in an ongoing and structured manner to effectively and efficiently strengthen and shape STiM activities. In order to

successfully assess STiM achievements, improvements to be made should be determined to inform and direct further planning by way of a comprehensive monitoring system. The governance structure is important for the successful coordination of STiM. It requires a dedicated centralised management structure with a team of mobility professionals to oversee all STiM-related matters for quality standards, monitoring outcomes, and follow-up on reporting. Therefore, coordinating and managing STiM programmes is a continuous process.

6.3.2 Higher Education Institutions (HEIs)

Researchers based at HEIs should have clear roles and responsibilities within the different STiM programmes. This is irrespective of whether or not the researchers serve as the hosts for the STiM activity or as the hosted. Researchers should search for affordable mobility schemes in line with their context and realities. There is also a need for extensive research on who should participate in the STiM, why they should participate, and to identify the gaps in participation. These issues should be addressed prior to the researcher submitting a STiM application for funding support. This type of research should also be conducted prior to the researchers meeting their international partners.

Mobile research teams should be all-inclusive, and should consist of a mix of different levels of researchers in a single team. These hybrid teams are necessary for the successful implementation of STiM. Mentors should be mobilised within teams to ensure that the next generation and emerging researchers do not travel alone as they are unlikely to network by themselves. In addition, researchers should embrace the issue of equity, diversity, and inclusivity (EDI) into the design of their STiM activities. EDI considerations can be incorporated in many different ways. For example, it can be incorporated into the team members of the network, into the design of the STiM programme itself, through recruitment of postgraduate students, by offering quality training and mentoring for less-experienced researchers from disadvantaged groups, and/or by ensuring that decisions are made in an inclusive manner.

For the sustainability of STiM, it is critical for researchers to design activities that are linked to academic courses or programmes. Next generation and emerging researchers should not be allowed to undertake STiM without it enhancing any of their academic courses. It is therefore critical for researchers to plan ahead for the STiM activity. Preparatory work will ensure a steady and effective STiM programme. In their preparations researchers could, for example, invest in matchmaking strategies. This approach/pairing mechanism should be conducted carefully to ensure alignment between research topics, interests, and level of experience.

6.3.3 Critical cross-cutting issues

There are cross-cutting factors that are important for the success of STiM that researchers should carefully consider. The first factor pertains to institutional support. No STiM programme can be successful without the full support of the researchers' institution. This support does not always have to be in monetary terms. The support can also mean the institution's internationalisation strategy. Researchers who are most likely to succeed in their STiM activities are those that come from institutions that value the role of internationalisation in advancing the careers of their researchers.

Secondly, the aspect of communication in STiM programmes should be taken seriously. Clear communication can assist researchers to understand how their alliance really functions, the constraints under which it operates, and the respective roles they need to play. Therefore it might be helpful to have a communication concept. The same is also true for communication between researchers and funders.

Lastly, researchers advancing STiM should take reporting seriously in order to improve the opportunities within STiM, whether it is researchers reporting back to their institutions or to their funders. The reporting template used should be carefully designed and should be focused on areas where impact can be delivered. The primary aim of reporting is to convey integral details about the STiM activity undertaken in order to reconsider and refine certain aspects of the STiM and to develop new or revise existing strategies.

6.4 Key STiM activities for impact

Not all STiM activities can deliver an impactful outcome, and priorities should be identified where impact can be realised. As a result, this impact model suggests two categories of STiM activities. The first/primary category serves as the main category as it is inclusive of all the initial activities supported for each researcher. The second category, which is the post STiM category, deals with activities that should be supported post the international visit.

6.4.1 Primary STiM activities

Support for any of the following five STiM activities might potentially lead to impactful outcomes.

6.4.1.1 Scientific events and conference attendance

For any researcher, international conferences play a major role in building their academic careers, and they are in many cases long-lasting for individual researchers. Being part of an international conference should in essence be at the top of the researchers' checklist. Conference attendance has many benefits for researchers. For example, it can stimulate the researcher's thoughts and ideas, allows researchers to meet prominent people and experts in their field of study, improves the researcher's presentation skills, can grow the researcher's profile, and can generally expose the researchers to the opinions and works of great leaders and experts long before their findings are published in high-impact journals.

6.4.1.2 Individual mobility relating to academic programmes

Another primary activity for the sustainability of STiM is international mobility that is linked to the researchers' academic programmes. This type of activity provides some structure to STiM and ensures the institutionalisation of STiM. For instance, STiM activities could become part of the tuition fees of postgraduate students. In this manner there would not be any need for researchers to solicit additional funding in order to support their postgraduate students to undertake STiM. Further to this, linking STiM

with academic programmes can also be achieved by developing summer/winter schools. This STiM activity can be easily incorporated into the university structures.

6.4.1.3 Consortia, cohort or group visits

In addition to support for individual researchers, cohorts and consortia type of visits are equally attractive and impactful. The differentiating factor for increased success will be the diversity of the cohort/consortia. It is through this methodology that researchers can best make use of the hybrid team system, mentor-mentee type of partnerships, and matchmaking of the next generation and emerging researchers. Much can be achieved through this type of partnerships and could be used successfully by supervisors or established researchers to network, and to internationally expose, train, and build the research capacity of their postgraduate students. A long-term collaboration of networks is highly likely in this type of STiM programme.

6.4.1.4 Staff exchanges and professional training

Unlike the cohort/consortia type visits discussed above, the staff exchange visits are researcher-focused. Staff exchange visits provide researchers with the opportunity to teach or conduct research for a given period (e.g. one week) at an overseas university. The purpose of this type of STiM is to match staff members between different institutions who can collaborate and work together on various topics, such as a partial design and the teaching of an academic course. This STiM programme, however, can only work where there is strong institutional support.

6.4.2 Post STiM activities

Finally, at the end of each STiM programme, small additional investments, mainly from the original or additional funding, should be put in place to support post-STiM activities. These post-STiM activities can make a substantial difference to the sustainability of the international network. There are four main post-STiM activities to be considered.

6.4.2.1 Alumni network/association

Funders of STiM should consider establishing an alumni network/association for all their STiM-funded researchers. The association can be divided into different networks/groups, depending on the preference of the funder. Such an activity for the funders will be worthwhile as it will make the feedback sessions, and the monitoring and evaluation processes, more effective. For researchers, such an association could serve as a learning platform whereby researchers could be allowed to continue their networks or freely share ideas. Establishing an alumni association is also part of tracking and assessing impact.

6.4.2.2 Mentors' network/association

Alternatively, funders could establish a mentors' association whereby all the researchers who serve as STiM mentors for next generation and emerging researchers can learn from each other, and further establish the STiM into a winning model. This could serve as a network of well-established researchers interested in internationally networking their postgraduate students.

6.4.2.3 Return Fellowships (RF)

Funders of STiM should also consider earmarking funds to provide grants for Return Fellowship (RF). These are fellowships to be awarded after the STiM programme has been concluded. A call could be launched and all those researchers who have undertaken STiM activity could apply for continued support. For the success of STiM, the support for RF should be for a longer period, i.e. 12 months at least. The support should also be geared towards establishing networks into fully developed research partnerships.

6.4.2.4 STiM Excellence Awards (SEA)

It would be beneficial for funders to consider introducing an excellence award into shorter-term mobility. This will bring some form of prestige in mobility support and assist researchers to strive for impact in their STiM.

6.5 STiM Impact Framework and Conclusion

The schematic diagram in Figure 6.1 provides a STiM Impact Framework for the internationalisation of higher education. This diagram provides a simplified illustration of the relationship between different stakeholders within the STiM Impact Framework, interactions, basic principles, and activities as discussed above.

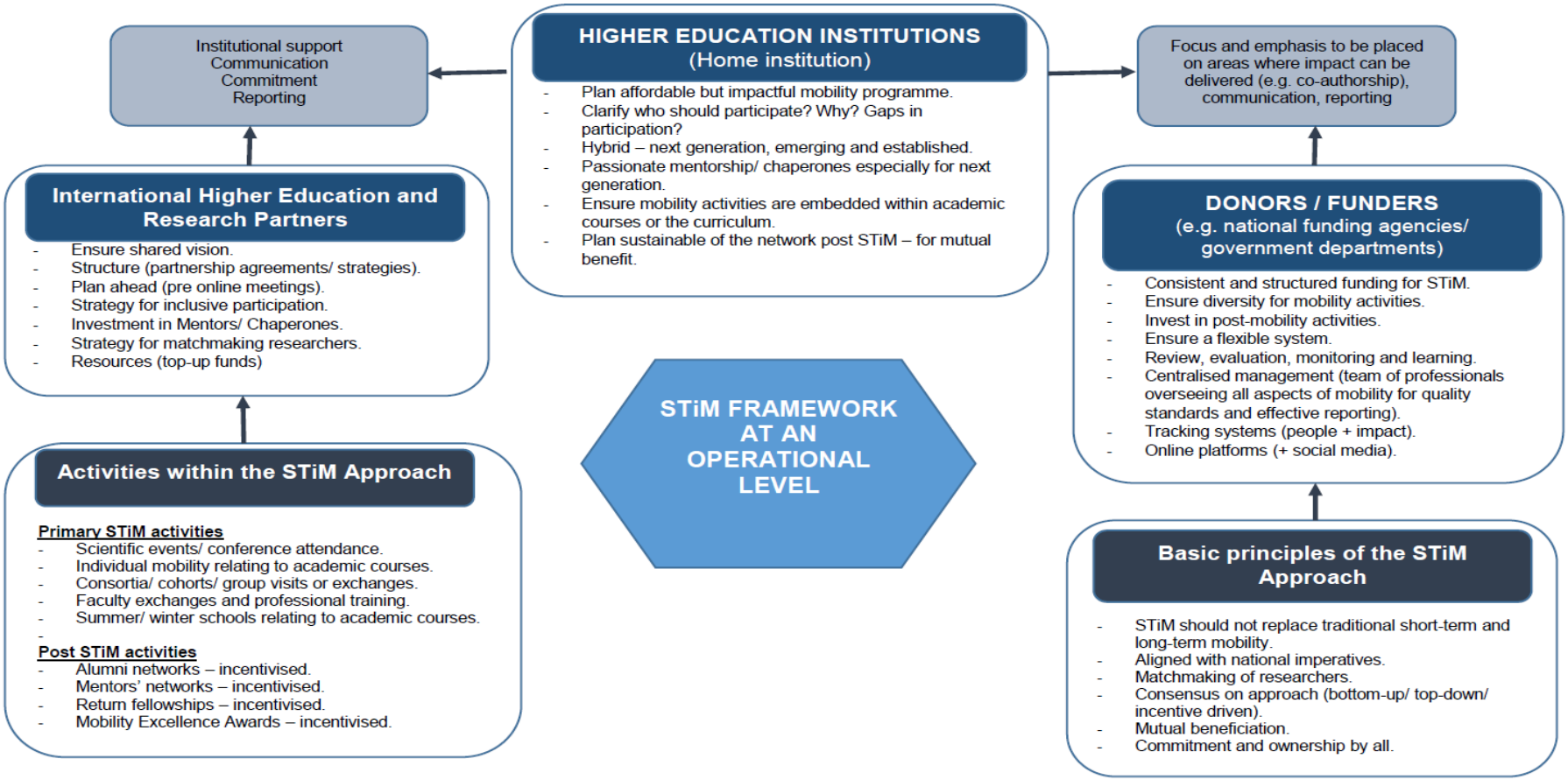


Figure 6-1: STiM Impact Framework for internationalisation of higher education

CHAPTER 7: SUMMARY AND CONCLUSION OF THE STUDY

7.1 Summary of the research study

International academic mobility, whether in terms of long or short-term, has been well researched over the years and is considered as one of the key activities for the internationalisation of higher education. However, the majority of the academic-related benefits mentioned in the literature are usually associated with long-term and short-term visits (of more than three months) and very rarely with STiM. STiM is mostly reported as advancing interpersonal and intercultural skills. This study endeavoured to illustrate the potential of STiM beyond interpersonal skills. The study demonstrated the prospects of STiM in advancing the academic and research capacity of researchers by using the KIC programme as a case study. The aim of the study was to assess the contribution of this KIC programme on the academic and research career progression of the next generation, emerging and established researchers in South African institutions of higher learning.

The findings of this study indicate an association between the independent (shorter-term international mobility and networking programmes) and the different dependent variables. Although the study reported a relationship between these variables, it could not, however, prove causality. Notwithstanding this, the findings of this study are still significant as they confirm that the contribution of STiM does go beyond advancing the researchers' interpersonal and intercultural skills. The evidence in this study indicates that, in one form or another, STiM also contributes to the academic work and research career development of researchers.

Making use of these findings, an operational framework was conceptualised, providing concrete steps that higher education fraternity could take in ensuring STiM programmes that are geared towards the advancement of both the academic and research careers of researchers at different levels. The framework offers basic principles that should be adhered to in implementing STiM programmes, resources and tools that could be integrated for the sustainability of STiM, outlines the roles and responsibilities that different stakeholders should embrace for the success of STiM,

and describes the types of STiM activities that should be supported for return on investment, value addition and effective internationalisation of higher education.

7.2 Limitations of the study

When contacting researchers to complete the online questionnaire it was found that most of them have moved and changed institutions and for the majority the emails they had used when they were being awarded a KIC grant were no longer valid. Therefore it was challenging to locate all researchers who had previously benefitted from the KIC programme. Further to this, the online questionnaire was distributed during the rampant COVID-19 global pandemic, i.e. 2019-2021. This was the period in which much of the world had imposed international travel restrictions. In South Africa both the international travel and the national movements of people between different provinces and cities were restricted. The majority of people were working from home at that time, and all South African HEIs were closed. This caused time delays in the data collection process for the online questionnaire that was disseminated in 2020. Nonetheless, the data drawn from the online questionnaire was only used as supplementary to the main data for this study.

The three-year period that was selected for this study (2017 – 2019) was also too short for a comprehensive analysis of STiM. The study could not make use of the NRF data pre-2017 due to many reasons. Informed by the availability of travel reports, the transition within the NRF from manual to an online system, and a significant change in reporting requirements within mobility grants, only data starting from 2017 could be analysed for this study. Data from 2020 and 2021 were intentionally not considered given the negative impact that the COVID-19 global pandemic had on international travel. Many countries imposed international travel restrictions during this time. Therefore, there wouldn't have been much data to analyse during this time period. A longitudinal study of at least 5-10 years could possibly have provided a deeper analysis; however, it is postulated that the main results would have correlated with those reported in this study.

The information captured for analysis relied on self-reporting; and it is acknowledged that the perceptions of researchers about their research achievements could influence objectivity. It is therefore assumed that researchers provided accurate information about their research achievements in relation to the KIC programme. The responses were monitored to ensure that there were no significant outliers or perceived inaccurate feedback.

Lastly, because the questionnaire mostly used closed, rather than open ended questions, it is likely that there are other factors which could have influenced the researchers' achievements that were not captured in this study. Even so, there were few selected open-ended questions that were included in the questionnaire to capture the researchers' opinions and perspectives.

7.3 Future research

The following are suggested as potential areas for further research on this topic.

7.3.1 Correlation vs. causality

This study has managed to demonstrate a relationship between the independent variable (STiM) and the dependent variables in the six hypotheses. However, the study could not prove causality. Proving a correlation between variables does not automatically imply that the change in one variable is the direct cause of the change in the values of the other variable. In this regard it will be useful to build on this type of research to include a cause-and-effect test on each of the hypotheses in order to examine other possibilities or explanations for such a correlation or association. Scientific evidence is required to verify that no moderating variables other than STiM are causing the strong correlation. It is once all other possibilities have been ruled out that the contribution of STiM on the academic and research career of researchers' can be confirmed.

7.3.2 Virtual mobility

It is further recommended that the full spectrum of shorter-term mobility types be investigated. The COVID-19 pandemic has forced institutions to adapt many of their activities, including international mobility, to an online modality. Therefore, 'virtual mobility' has emerged as an innovative way of connecting researchers without travelling abroad. The primary benefit of virtual mobility is perhaps its low cost, compared with physical mobility. Further to this, it is accessible to many more researchers than physical mobility. For these reasons, virtual mobility has the potential to be an important aspect of the internationalisation strategies of HEIs. Further research into this approach would add to the debate on the internationalisation of higher education. Factors to be investigated in this regard could include, amongst others, creating the right institutional infrastructure; outlining the rationale and benefits of virtual mobility; institutional IT support, training of researchers to transition from in-person to virtual, monetary incentives, monitoring and evaluation, and different online collaborative platforms.

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APPENDICES

Appendix I: Sampling frame

No.	2017 Grants	Selection	2018 Grants	Selection	2019 Grants	Selection
1	PR_KIC180215313566		PR_KIC190131412551		PR_KIC200218505515	
2	PR_KIC180119306795		PR_KIC190114407636		PR_KIC191003480996	
3	PR_KIC180208310966		PR_KIC190122409849		PR_KIC191207496443	
4	PR_KIC180108299291		PR_KIC190204413204		PR_KIC200131501089	
5	PR_KIC180205309957		PR_KIC190215418304		PR_KIC190614447636	
6	PR_KIC180226315376		PR_KIC190131412714		PR_KIC190620449296	
7	PR_KIC180215313592		PR_KIC190207414403		PR_KIC200210502933	
8	PR_KIC180126308334		PR_KIC190215418467		PR_KIC200208502390	
9	PR_KIC180215313576		PR_KIC180710349778		PR_KIC190619448959	
10	PR_KIC180111302599	**1**	PR_KIC190124410617	**1**	PR_KIC200206502105	**1**
11	PR_KIC180214312957		PR_KIC190210415287		PR_KIC190816467699	
12	PR_KIC180213312409		PR_KIC190208414835		PR_KIC200124500210	
13	PR_KIC180210311646		PR_KIC180917359842		PR_KIC190614447768	
14	PR_KIC180215313594		PR_KIC190213417206		PR_KIC200208502409	
15	PR_KIC180208311001		PR_KIC190215417961		PR_KIC191121493414	
16	PR_KIC180215313697		PR_KIC180604339609		PR_KIC190723458443	
17	PR_KIC180214313202		PR_KIC190117408695		PR_KIC200122499985	
18	PR_KIC180306315978		PR_KIC190214417472		PR_KIC190901473909	
19	PR_KIC180211311767		PR_KIC190121409574		PR_KIC190816467581	
20	PR_KIC180215313570	**2**	PR_KIC190201412835	**2**	PR_KIC200120499711	**2**
21	PR_KIC180203309843		PR_KIC190214417729		PR_KIC191014482618	
22	PR_KIC180208311250		PR_KIC190212416182		PR_KIC191124493917	
23	PR_KIC180210311647		PR_KIC190116408562		PR_KIC200204501566	
24	PR_KIC180121307032		PR_KIC180712350033		PR_KIC200212503641	
25	PR_KIC171222295704		PR_KIC190207414526		PR_KIC191213496995	
26	PR_KIC180130308865		PR_KIC190215418549		PR_KIC191118492804	
27	PR_KIC180131309180		PR_KIC190215418345		PR_KIC190725459291	
28	PR_KIC180215313299		PR_KIC190131412520		PR_KIC200211503314	
29	PR_KIC180215313710		PR_KIC181108390117		PR_KIC190614447642	
30	PR_KIC180108299406	**3**	PR_KIC190212416185	**3**	PR_KIC200103497835	**3**
31	PR_KIC180226315410		PR_KIC190215418029		PR_KIC200128500672	
32	PR_KIC180215313328		PR_KIC190214417870		PR_KIC191031487042	
33	PR_KIC180124307882		PR_KIC190215418512		PR_KIC190717456525	
34	PR_KIC180212311839		PR_KIC190102405290		PR_KIC200125500340	
35	PR_KIC180211311714		PR_KIC190220419886		PR_KIC190618448348	
36	PR_KIC180122307266		PR_KIC180822353886		PR_KIC200211503479	
37	PR_KIC180226315215		PR_KIC190124410542		PR_KIC200205501723	
38	PR_KIC180226315194		PR_KIC190127411192		PR_KIC200207502325	
39	PR_KIC180205310111		PR_KIC180723350706		PR_KIC190724458816	
40	PR_KIC180119306824	**4**	PR_KIC190214417585	**4**	PR_KIC200123500125	**4**
41	PR_KIC180108299466		PR_KIC190201413015		PR_KIC190930480385	
42	PR_KIC180213312368		PR_KIC190215418165		PR_KIC191213497039	
43	PR_KIC180208310885		PR_KIC190207414550		PR_KIC190610444185	
44	PR_KIC171217294582		PR_KIC181130399007		PR_KIC191126494301	
45	PR_KIC180207310583		PR_KIC181206401049		PR_KIC191028485705	
46	PR_KIC180207310830		PR_KIC190109406682		PR_KIC200127500529	
47	PR_KIC180208310887		PR_KIC180704349443		PR_KIC190710454394	
48	PR_KIC180213312716		PR_KIC190114407617		PR_KIC200212503611	
49	PR_KIC180215313605		PR_KIC190212416379		PR_KIC190804463476	
50	PR_KIC180213312365	**5**	PR_KIC180703349380	**5**	PR_KIC200119499527	**5**
51	PR_KIC180108299229		PR_KIC190211415398		PR_KIC190730460724	
52	PR_KIC180208311083		PR_KIC190213417122		PR_KIC190613447270	

53	PR_KIC180215313810		PR_KIC190115407992		PR_KIC191213497032	
54	PR_KIC180216313874		PR_KIC190124410702		PR_KIC200213504094	
55	PR_KIC180109299697		PR_KIC190212416181		PR_KIC190731461175	
56	PR_KIC180215313626		PR_KIC190205413786		PR_KIC200116499239	
57	PR_KIC180205309945		PR_KIC190214417654		PR_KIC191219497384	
58	PR_KIC180214313256		PR_KIC180613346130		PR_KIC200213504266	
59	PR_KIC180215313812		PR_KIC190108406397		PR_KIC200116499370	
60	PR_KIC180123307692	**6**	PR_KIC190215417973	**6**	PR_KIC191003481018	**6**
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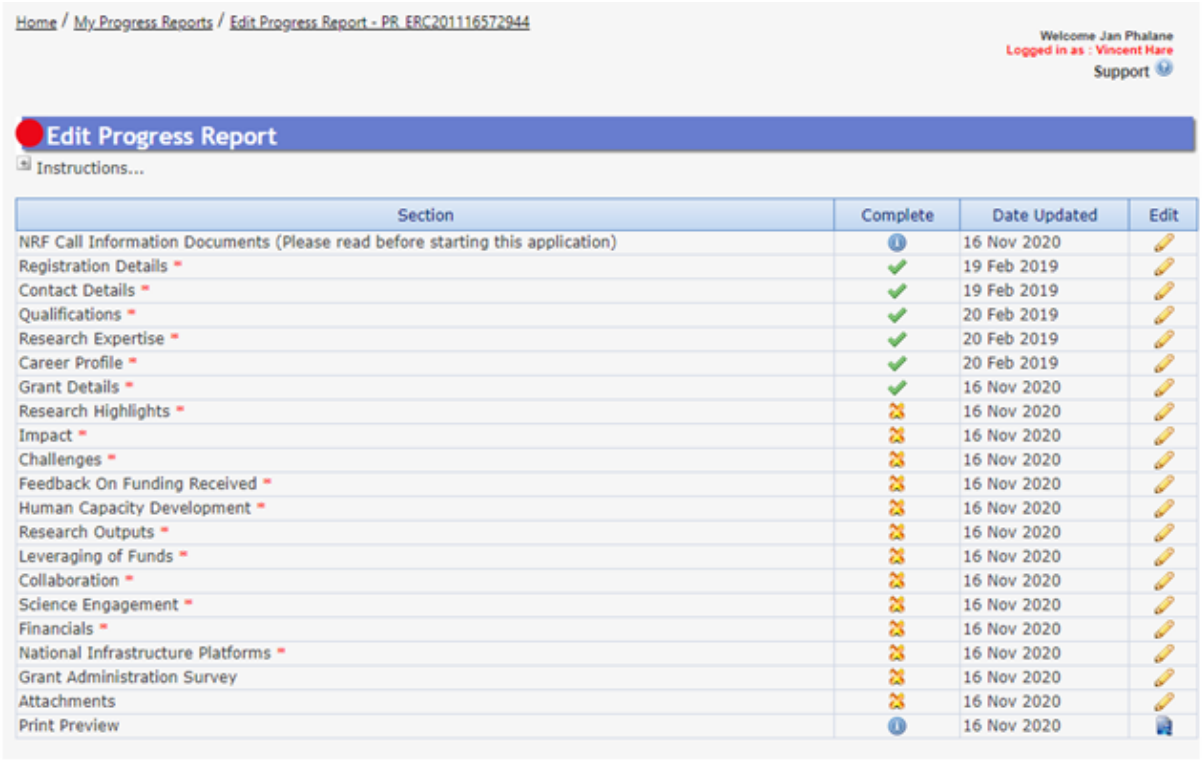
Appendix II: NRF report template for travel grants



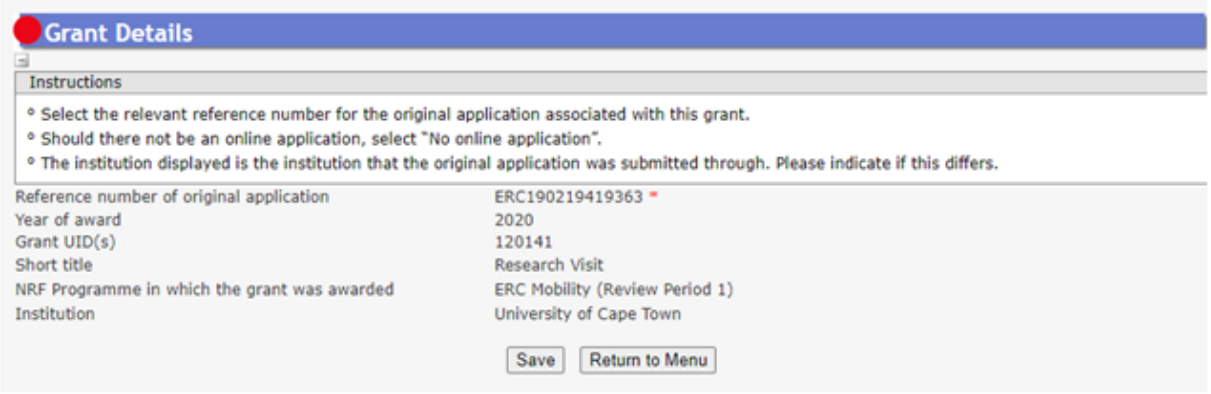
Home / My Progress Reports / Edit Progress Report - PR ERC201116572944

Welcome Jan Phalane
Logged in as : Vincent Hare
Support

Edit Progress Report

Instructions...

Section	Complete	Date Updated	Edit
NRF Call Information Documents (Please read before starting this application)		16 Nov 2020	
Registration Details *		19 Feb 2019	
Contact Details *		19 Feb 2019	
Qualifications *		20 Feb 2019	
Research Expertise *		20 Feb 2019	
Career Profile *		20 Feb 2019	
Grant Details *		16 Nov 2020	
Research Highlights *		16 Nov 2020	
Impact *		16 Nov 2020	
Challenges *		16 Nov 2020	
Feedback On Funding Received *		16 Nov 2020	
Human Capacity Development *		16 Nov 2020	
Research Outputs *		16 Nov 2020	
Leveraging of Funds *		16 Nov 2020	
Collaboration *		16 Nov 2020	
Science Engagement *		16 Nov 2020	
Financials *		16 Nov 2020	
National Infrastructure Platforms *		16 Nov 2020	
Grant Administration Survey		16 Nov 2020	
Attachments		16 Nov 2020	
Print Preview		16 Nov 2020	



Grant Details

Instructions

- Select the relevant reference number for the original application associated with this grant.
- Should there not be an online application, select "No online application".
- The institution displayed is the institution that the original application was submitted through. Please indicate if this differs.

Reference number of original application	ERC190219419363 *
Year of award	2020
Grant UID(s)	120141
Short title	Research Visit
NRF Programme in which the grant was awarded	ERC Mobility (Review Period 1)
Institution	University of Cape Town

Save | Return to Menu

Research Highlights

Instructions

° Report on the research highlights / milestones achieved, relative to the project timelines for the reporting period, as approved in the original submitted proposal. Any deviation in the research focus/milestones from the original proposal must be clearly stated and elaborated upon.

Description

Impact

Instructions...

Original Impact

No original application data found, please capture data in textbox below.

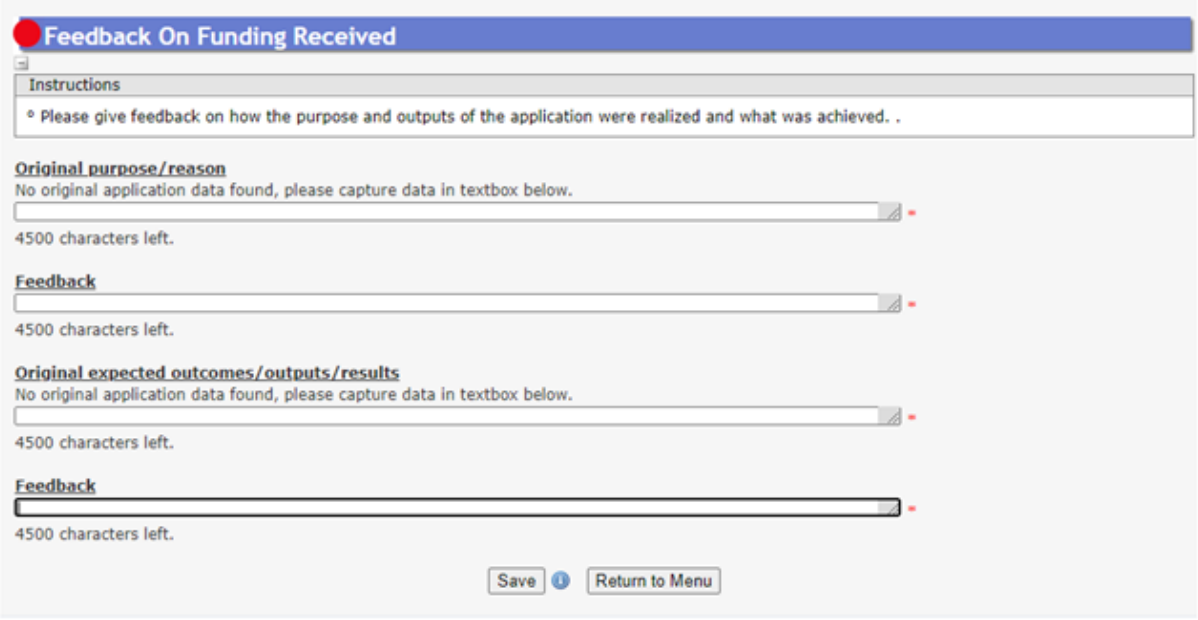
4500 characters left.

Realised

4500 characters left.

Save | Return to Menu


Challenges
Instructions
° Report on challenges and constraints impacting negatively on this project for the reporting period. These should include inherent/apparent issues affecting the area/discipline of research.
Description


Feedback On Funding Received
Instructions
° Please give feedback on how the purpose and outputs of the application were realized and what was achieved. .
Original purpose/reason
No original application data found, please capture data in textbox below.
4500 characters left.
Feedback
4500 characters left.
Original expected outcomes/outputs/results
No original application data found, please capture data in textbox below.
4500 characters left.
Feedback
4500 characters left.
Save
Return to Menu

Human Capacity Development

Instructions...

Supported Students/ Researchers/ Other						
Surname	Initials	Level	Degree/Diploma	Status	Date Completed	Edit

Add

Other student not supported by the NRF							
Surname	Initials	Level	Degree/Diploma	Status	Role of student in Project	Edit	Delete

Select Students | Add

Students supervised by other members on the project							
Surname	Initials	Level	Degree/Diploma	Status	Role of student in Project	Edit	Delete

Select Students | Add

☐ No human capacity development in the reporting period

SUMMARY OF STUDENTS PER LEVEL									
Supported Students/Researcher/Other		Black		Coloured		Indian		White	
Level	Total	Female	Male	Female	Male	Female	Male	Female	Male

Other student not supported by the NRF		Black		Coloured		Indian		White	
Level	Total	Female	Male	Female	Male	Female	Male	Female	Male

Student supervised by other members on the project		Black		Coloured		Indian		White	
Level	Total	Female	Male	Female	Male	Female	Male	Female	Male

Save | Return to Menu

Research Outputs

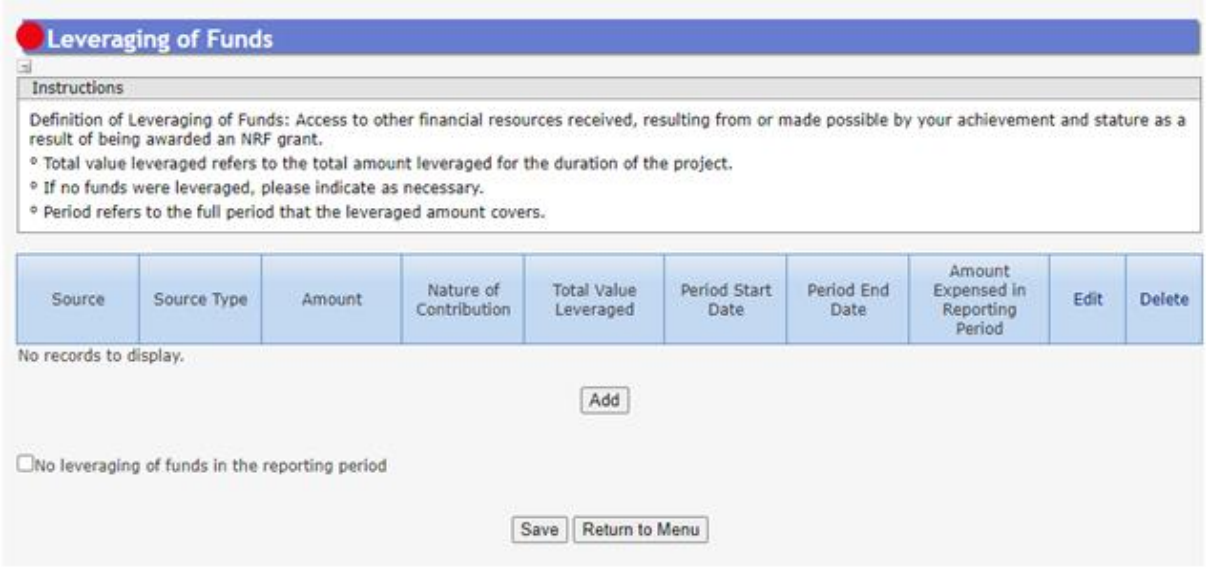
Instructions

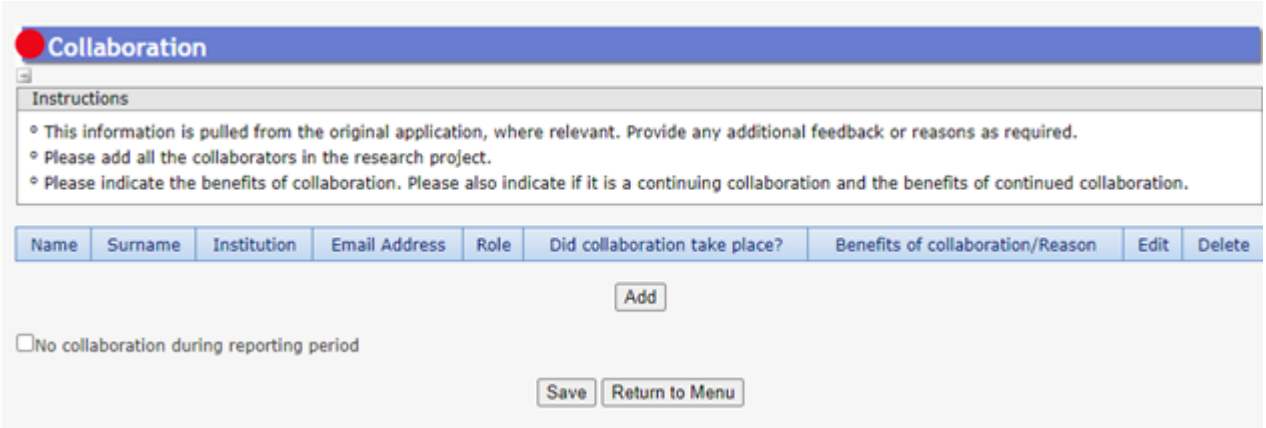
- The outputs shown below are drawn in from the CV for the year/reporting period.
- Ensure all outputs related to this grant for the year/reporting period are listed under this section. If outputs are not related to this Grant, please delete. This will not remove the outputs from the CV.
- If any outputs for the year/reporting period are missing, please add them. Provide outputs of the research such as publications, poster and/or oral conference presentation etc.
- This section only requires publications that are published, and not publications that are been submitted and/or accepted.
- If there are no published outputs, provide reason below.

Owner	Output Type	Title	Applicant's Contribution	Output Related to the Project	Proof Uploaded	View	Edit	Delete

Refresh | Add | Delete


No research outputs published in the reporting period
Reason
500 characters left.
Save
Return to Menu


Leveraging of Funds
Instructions
Definition of Leveraging of Funds: Access to other financial resources received, resulting from or made possible by your achievement and stature as a result of being awarded an NRF grant.
° Total value leveraged refers to the total amount leveraged for the duration of the project.
° If no funds were leveraged, please indicate as necessary.
° Period refers to the full period that the leveraged amount covers.
Source
Source Type
Amount
Nature of Contribution
Total Value Leveraged
Period Start Date
Period End Date
Amount Expensed in Reporting Period
Edit
Delete
No records to display.
Add
No leveraging of funds in the reporting period
Save
Return to Menu


Collaboration
Instructions
° This information is pulled from the original application, where relevant. Provide any additional feedback or reasons as required.
° Please add all the collaborators in the research project.
° Please indicate the benefits of collaboration. Please also indicate if it is a continuing collaboration and the benefits of continued collaboration.
Name
Surname
Institution
Email Address
Role
Did collaboration take place?
Benefits of collaboration/Reason
Edit
Delete
Add
No collaboration during reporting period
Save
Return to Menu

Science Engagement

Instructions

- For the purposes of this application/report, the use of the overarching term science engagement is inclusive of all aspects of public engagement with science, science communication, science literacy as well as science outreach and awareness. It includes all participation by targeted groups of society in a programme aimed at generating mutual understanding and responses to science, including but not limited to awareness, accumulation of knowledge, enjoyment, opinion formulation and scientific literacy.
- It also embraces a broad understanding of "science" and "the sciences", encompassing systematic knowledge spanning natural and physical sciences, engineering sciences, medical sciences, agricultural sciences, mathematics, social sciences and humanities, technology, all aspects of the innovation chain and indigenous knowledge.
- Broader impact considers the impact of the activities/project on the public and/or targeted participants in terms of knowledge and/or awareness, behavioural and/or attitudinal change, skills acquisition etc.
- For more information, click here.

Explanation of Categories

Category	Objectives	Delivery mode and content	Engagement experiences	Intended audience	Actual number reached	Broader impact	Edit	Delete

Add

☐ No science engagement activities in the reporting period

Save | Return to Menu

Financials

Instructions...

Carry Forward Guidelines

Refresh My Financial Data

- Please note that this functionality will refresh the Financial data below.
- This functionality should be used if your Financial data below appears to be incorrect.
- Any data that you might have captured and saved in the **Justification**, **Carry Forward** or **Motivation** fields might be lost if you refresh your financial data.
- Please click the 'View Summary' button if you wish to view a summary of your financial data to date, you will be able to use this summary as a reference if data is lost after refreshing.

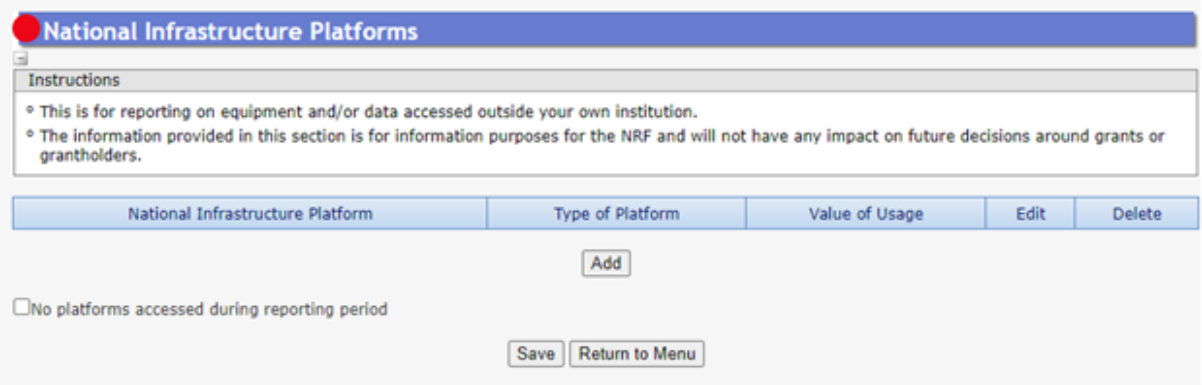
Refresh my financial data | View Summary

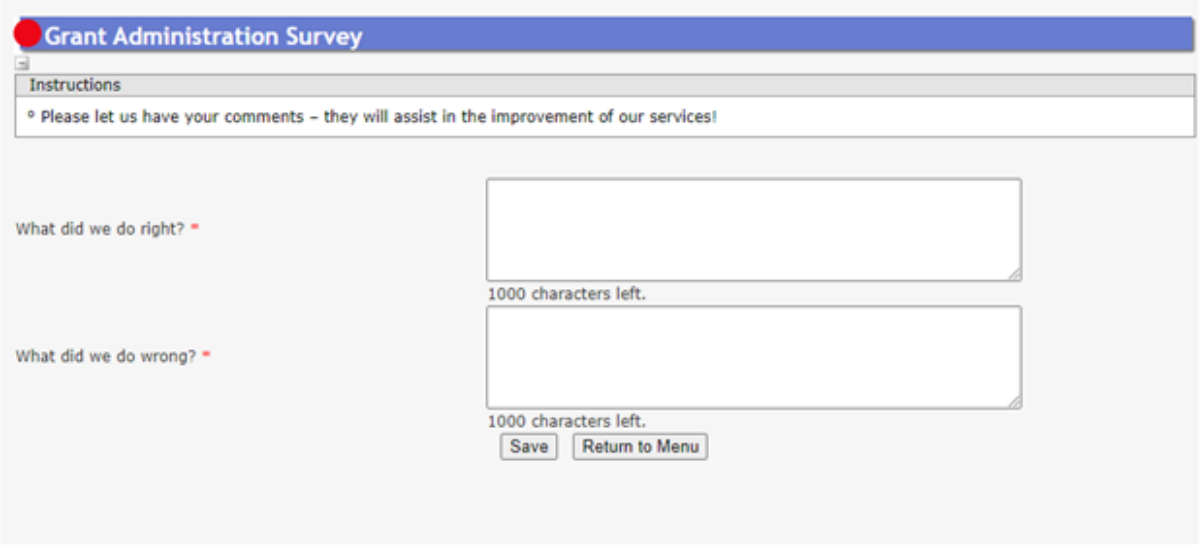
Approved Grant

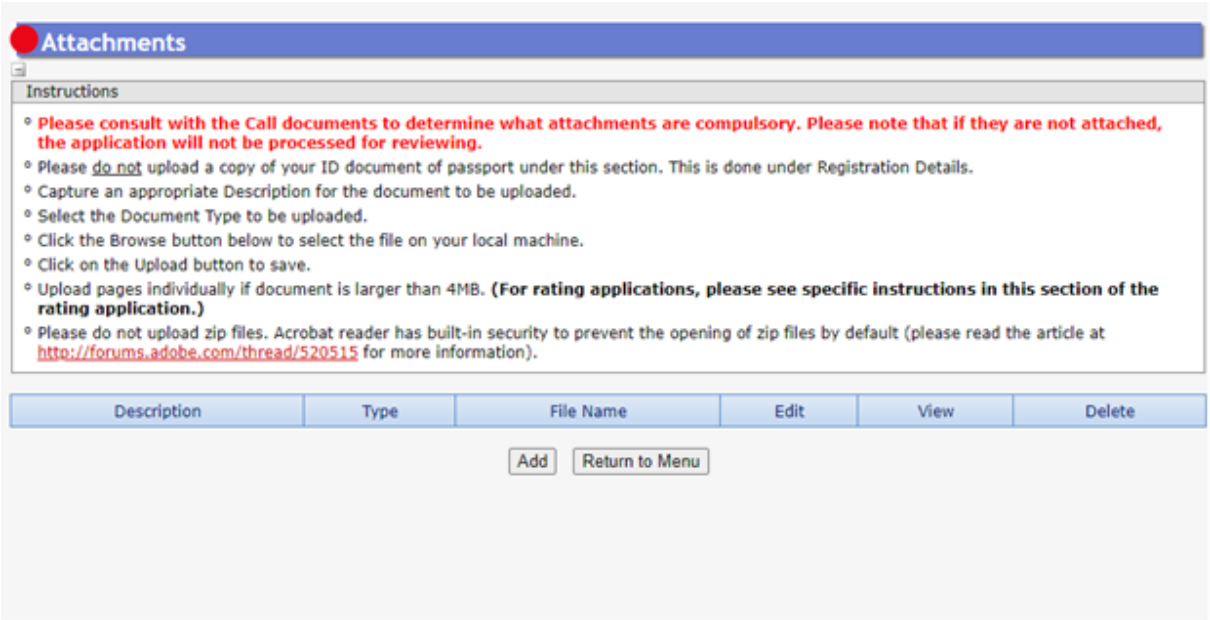
Funding Category	Awarded Amount in Reporting Period	Total Amount Expensed	Balance Available for Carry Forward	% Claimed
[BF]-Running Expenses	R16 082,78	R16 082,78	R0,00	100%

Justification for Unspent Funds	Amount Requested for Carry Forward	Motivation for Carry Forward/Continuation of Grant
	0,00	
500 Characters left.		500 Characters left.

Save | Return To Menu


National Infrastructure Platforms
Instructions
° This is for reporting on equipment and/or data accessed outside your own institution.
° The information provided in this section is for information purposes for the NRF and will not have any impact on future decisions around grants or grantholders.
National Infrastructure Platform
Type of Platform
Value of Usage
Edit
Delete
Add
No platforms accessed during reporting period
Save
Return to Menu


Grant Administration Survey
Instructions
° Please let us have your comments – they will assist in the improvement of our services!
What did we do right? *
1000 characters left.
What did we do wrong? *
1000 characters left.
Save
Return to Menu


Attachments
Instructions
° Please consult with the Call documents to determine what attachments are compulsory. Please note that if they are not attached, the application will not be processed for reviewing.
° Please do not upload a copy of your ID document of passport under this section. This is done under Registration Details.
° Capture an appropriate Description for the document to be uploaded.
° Select the Document Type to be uploaded.
° Click the Browse button below to select the file on your local machine.
° Click on the Upload button to save.
° Upload pages individually if document is larger than 4MB. (For rating applications, please see specific instructions in this section of the rating application.)
° Please do not upload zip files. Acrobat reader has built-in security to prevent the opening of zip files by default (please read the article at http://forums.adobe.com/thread/520515 for more information).
Description
Type
File Name
Edit
View
Delete
Add
Return to Menu

Appendix III: Online questionnaire

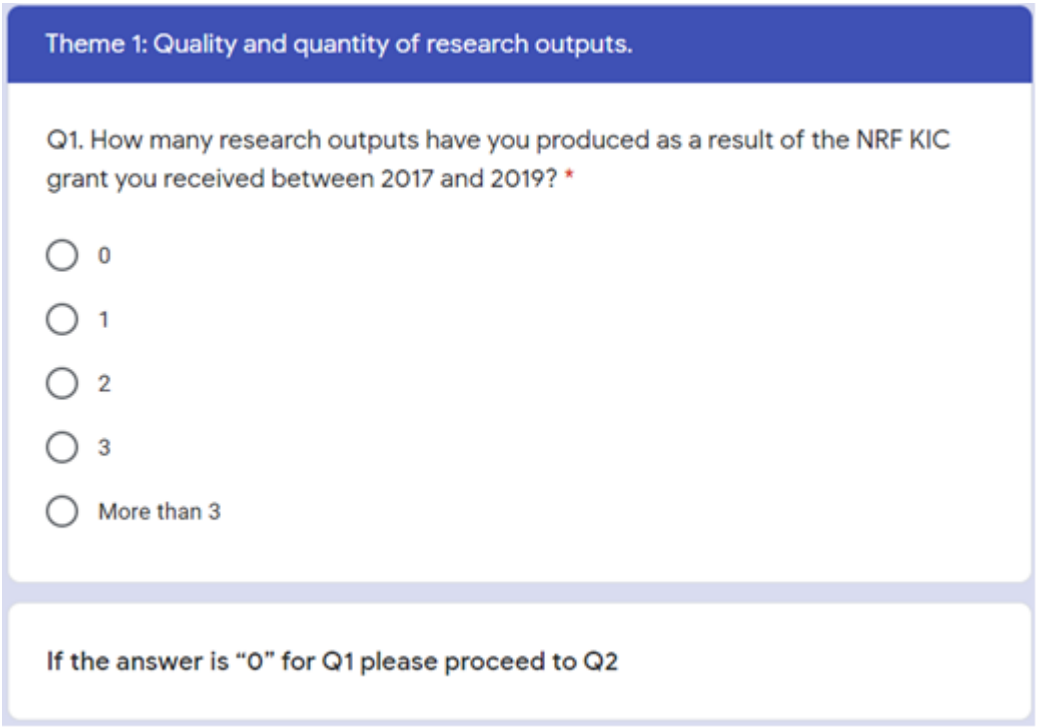
Contribution of shorter-term international mobility on the career pathing of young, emerging and established researchers in South Africa.

prudencenm1@gmail.com (not shared) Switch account

Introduction

My name is Prudence Makhura and I am conducting a research study for my PhD Thesis at The Da Vinci Institute for Technology Management. I am requesting you to participate in this study because of your experience as a former participant in the NRF shorter-term international networking and mobility programmes known as the Knowledge, Interchange and Collaboration (KIC) Programmes, between the period 2017 to 2019 (inclusive). The study focuses on the career progression of young, emerging and established researchers within South African institutions of higher learning. It further seeks to undertake a comparative analysis of the KIC programme with traditional short-term and long-term internationalisation programmes.

Back Next Clear form



Theme 1: Quality and quantity of research outputs.

Q1. How many research outputs have you produced as a result of the NRF KIC grant you received between 2017 and 2019? *

- 0
- 1
- 2
- 3
- More than 3

If the answer is "0" for Q1 please proceed to Q2

Q1.1 What type of research outputs were produced in Q1?

- [ ] Books
- [ ] Chapters in books
- [ ] Peer reviewed journal articles
- [ ] Peer-reviewed conference output
- [ ] Non-peer reviewed journals
- [ ] Patents
- [ ] Keynote/plenary addresses
- [ ] Policy reports
- [ ] Artefacts
- [ ] Prototypes
- [ ] Other:

Q1.2. For journal publications – please indicate the names of journals in which you published.

Your answer

Back Next Clear form

Q2.1. Which NRF-rating did you apply for?

Choose

Q2.2. Was rating granted?

Choose

Q2.3. Were you already an NRF-rated researcher prior to receiving the NRF KIC grant?

Choose

Back Next Clear form

Theme 3: Establishing long-lasting international partnerships between researchers

Q3. Were you already collaborating with the international partners you met during the visit/event supported by the NRF KIC grant prior to the award?

Choose

Q3.1. Are you currently still collaborating with the international partners you met during the visit/event supported by the KIC grant?

Choose

Q3.2. Were any of the research outputs (mentioned in Q1) produced in collaboration with the international partners you met during the visit/event supported by the NRF KIC grant?

Choose

Back Next Clear form

Theme 4: Internationalising postgraduate students

Q4. How many of your postgraduate students were part of the visit/event supported by the NRF KIC grant?

	0	1	2	3	4	5	More than 5
Honours students	☐	☐	☐	☐	☐	☐	☐
Masters students	☐	☐	☐	☐	☐	☐	☐
Doctoral students	☐	☐	☐	☐	☐	☐	☐
Postdoctoral students	☐	☐	☐	☐	☐	☐	☐

If the answer is "0" for all of the categories above please proceed to Q5

Q4.1. Are any of the postgraduate students mentioned above still working with the international partners they met during the visit/ event supported by the NRF KIC grant?

Choose ▾

Q4.2. Have any of the postgraduate students mentioned above applied for the NRF KIC grant on their own?

Choose ▾

Back Next Clear form

Theme 5: Other sources of mobility and research funding

Q5. Have you ever applied for other NRF mobility grants (other than KIC) since you were awarded the NRF KIC grant?

Choose

Q5.1. Was the application successful?

Choose

Q6. Have you ever applied for NRF research grants since you were awarded the NRF KIC grant?

Choose

Q6.1. Was the application successful?

Choose

Q7. Have you ever applied for other funding other than the NRF grants?

Choose

Q7.1 Was the application successful?

Choose

Q8. Have you and the international partners you met during the visit/ event supported by the NRF KIC grant jointly applied for other sources of funding?

Choose

Q8.1. Was the application successful?

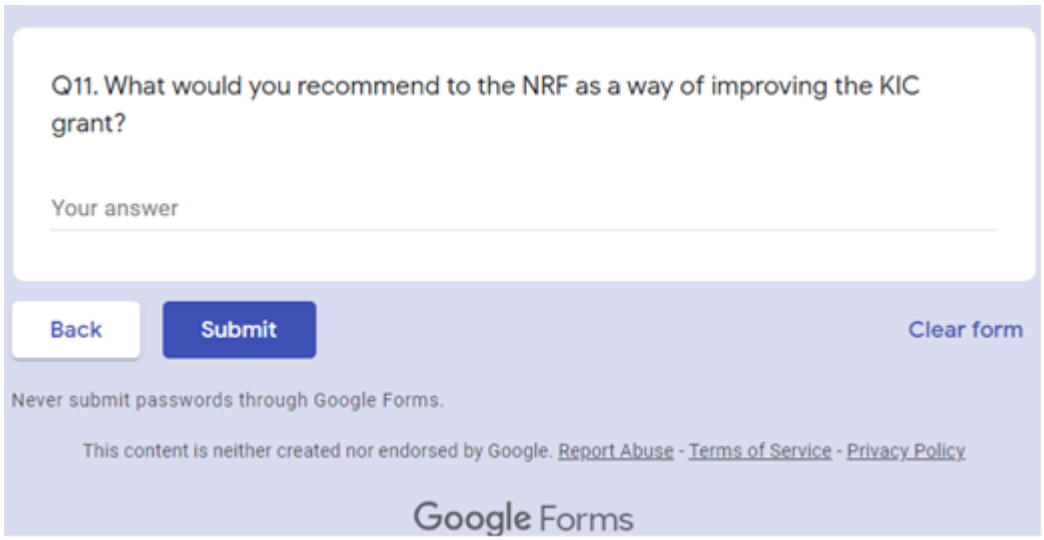
Choose

Q9. To what extent do you agree with the statement: "KIC is a useful funding instrument for the internationalisation of researchers in South African institutions of higher learning"

Choose

Q10. In your own words, what would you say was the impact of the KIC grant on your research career development?

Your answer


Q11. What would you recommend to the NRF as a way of improving the KIC grant?
Your answer
Back
Submit
Clear form
Never submit passwords through Google Forms.
This content is neither created nor endorsed by Google. Report Abuse - Terms of Service - Privacy Policy
Google Forms

Appendix IV: NRF approval to conduct the study

File: 8/4/3/1/2

MEMORANDUM OF AGREEMENT

Entered into by and between -

The National Research Foundation
(from now on referred to as the NRF)

and

Prudence Nare Makhura (Director: Overseas Collaborative Grants, Knowledge Advancement and Support (KAS) in the National Research Foundation (NRF)) (from now on referred to as the Researcher)

The Parties agree that:

1. The Researcher will treat all information received from the NRF in the strictest of confidence and will not reveal private and confidential information to any third party without the prior written consent of the NRF. The NRF will not permit the Researcher to disclose the names and personal details of the grant holders/beneficiaries, NRF staff members, staff members of international partners and agencies, institutional contacts, the creators of records, the signatories of bilateral agreements and funding spreadsheets.

2. The Researcher will not use the information provided by the NRF for any purpose other than the completion of the Doctor of Philosophy in the Management of Technology and Innovation (MOTI) Degree at the Da Vinci Institute for Technology Management as indicated in the attached letter dated 12 November 2020. Any departure from the original proposal must be approved by the NRF before implementation.

3. The Researcher will, before the publication of the results of the research, present a final report to the NRF, which is potentially publishable as one or more research outputs for scrutiny to protect confidential information. Approval to publish the research outcome will rest with the NRF and will not be unreasonably refused.

4. The Researcher will submit the final theses/dissertation to the NRF by date of publication for NRF's records.

5. The Researcher will acknowledge the NRF's assistance in all publications which flow from the information/data.

SIGNED at Pretoria on this 28 day of November 2020

FOR THE RESEARCHERS

AS WITNESSES
1.
2. Lorraine M. Makhura

SIGNED at Pretoria on this 30th day of November 2020

FOR THE NRF

AS WITNESSES
1.
2.

Appendix V: DaVinci Ethics Clearance Certificate

The Da Vinci Institute for Technology Management (Pty) Ltd
PO Box 185, Modderfontein, 1645, South Africa
Tel + 27 11 608 1331 Fax +27 11 608 1332
www.davinci.ac.za

Reference: 003020
Date: 14 December 2020

Ethical Declaration

I, the undersigned, hereby declare that the Doctorate Research of the student named below has received ethical clearance from The Da Vinci Institute Ethics Committee. The student and supervisor will be expected to continue to uphold the Da Vinci Institute's Research Ethics Policy as indicated during the application.

Proposed Title: Contribution of shorter-term international mobility on the career pathing of young, emerging, and established researchers in South Africa

Student Name: Makhura Nare Prudence

Student number: 10436

Supervisor: Dr Aldo Stroebel

Co-Supervisor: N/A

Period: Ethics approval is granted from 2020/12/14 to 2023/10/09

Chairperson: Research & Ethics Committee

Prof HB Klopper
Executive Dean: Research and Institutional Partnerships

Directors: B Anderson (Principal and Chief Executive Officer), M Burger
Company Registration No. 2001/009271/07
Registered with the Department of Higher Education and Training as a private higher education institution under the Higher Education Act, 1997.
Registration No. 2004/HE07/003

Appendix VI: Informational leaflet and consent form

Title of the study

'Contribution of shorter-term international mobility on the career pathing of young, emerging and established researchers in South Africa.'

Introduction

This study, 'Contribution of shorter-term international mobility on the career pathing of young, emerging and established researchers in South Africa' is conducted by Ms Prudence Makhura as part of her studies towards a Doctoral Degree (PhD) at The Da Vinci Institute for Technology Management.

You are invited to participate in this study. This information document is to help you to decide if you would like to take part in the study. Before you agree to take part in the study, you should understand fully what is involved. Participation in the study is voluntary.

Purpose of the study

The purpose of the study is to assess the contribution of shorter-term international networking and mobility programmes of the NRF, known as the Knowledge, Interchange and Collaboration (KIC) Programmes, between the period 2017 to 2019 (inclusive), on the career progression of young, emerging and established researchers at South African institutions of higher learning. The study further seeks to undertake a comparative analysis of the KIC programme with traditional short-term and long-term internationalisation programmes.

No medical examination needed to participate

There is NO medical examination of any kind required to participate e.g. NO blood will be drawn. All the information from participants is gathered in the form of Focus Group Discussions, surveys and key informant interviews where participants are asked specific questions.

Benefits

Your participation in this study will assist with better conceptualisation and design of short-term international networking and mobility programmes for value add and desired impact. Participants will not be paid any money to take part in this study.

Risks

There are NO risks involved with participation in the survey.

Has the study received approval?

The study has been approved by the National Research Foundation for use of data. Additionally, ethical clearance for this study has been obtained from The Da Vinci Institute for Technology Management Research Ethics Committee.

Your rights as a participant during the study

Your participation in this study is entirely voluntary and you can refuse to participate or you can withdraw your participation at any time without stating any reasons whatsoever. Your refusal to participate in or your withdrawal from this study will not affect you in any way.

Sources of additional information

If you have any questions or need more information, please feel free to contact:

Prudence Makhura

The Da Vinci Institute for Technology Management.

Mobile No:

Email:

Confidentiality

The confidentiality and anonymity of the participants will be guaranteed at all times. The completed interview forms will be kept in a locked file that can only be opened by the study staff. Participants will not be required to write their name on the interview-sheets. The participants' name will not be used in any report of the results of the study. All the information obtained will be treated very privately.

CONSENT

Participant: _____

Signature or mark Date

Appendix VII: Language editing and proof-reading certificate

Melody Edwards

Editing • Formatting •Writing •Research •Document preparation

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To whom it may concern: **April 2022**

This is to certify that I have professionally edited and formatted the following thesis:

SHORTER-TERM INTERNATIONAL MOBILITY AS AN INSTRUMENT FOR CAREER ADVANCEMENT OF NEXT GENERATION, EMERGING AND ESTABLISHED RESEARCHERS IN SOUTH AFRICA

by

Nare Prudence Makhura
Student number: 10436

Melody Edwards

Editing, Writing, Research, Document preparation
BA (Communications & Industrial Psychology)
BA Hons (Industrial & Organisational Psychology)

Member: The English Academy
Member: Professional Editor's Group
Member: Society for Industrial & Organizational Psychology SA
Member: Academic & Non-fiction Authors' Association of SA
Associate: Consortium for Language Dynamics
Cell: 082-496-8156