

Navigating Management Challenges of Postgraduate Funding Perspectives of NRF-TWAS Doctoral Programme Managers in South Africa

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ABSTRACT

This article explores the complexities of managing postgraduate funding in the context of the National Research Foundation and The World Academy of Sciences (NRF-TWAS) funded doctoral programme in South Africa. The programme was created to foster scientific research excellence in developing nations, especially in Africa, by facilitating the exchange of expertise across borders. The article employed a qualitative methodology and drew on interviews with four designated authorities stationed at public universities in South Africa. It uncovered several fundamental management challenges: poor marketing strategies, insufficient scholarship options, time-consuming documentation processes, and a lack of efficient monitoring and evaluation systems. To enhance the efficacy of such funding initiatives, the article recommends adopting stricter rules and effective monitoring systems to increase the effectiveness of funding projects. It also highlights the significance of using current networks and partnerships to increase the programme's reach. Furthermore, it suggests

augmenting the financial support offered to encompass the full cost of study for students and simplifying convoluted bureaucratic procedures that impede the application process.

INTRODUCTION

The research reported in this article investigated the management of postgraduate funding in South Africa in the form of the NRF-TWAS doctoral programme, funded by the National Research Foundation (NRF) and The World Academy of Sciences (TWAS). Postgraduate funding remains a challenge globally, as many prospective students without adequate funding struggle to access universities. The situation is exacerbated by the increasing demand for more economies to become knowledge-intensive and for higher-order skills (Motala and Sinha 2019). The growing demand has forced institutions to solicit funding and call (with minimal success) on the private sector to fulfil its corporate social responsibility role by supporting postgraduate students. It is, therefore, surprising that the uptake of the NRF-TWAS doctoral programme by postgraduate students in South Africa is low compared to that in other middle-income developing countries. The NRF-TWAS doctoral programme targets 70 applicants from developing countries – 50 applicants from the African continent (excluding South Africa) and 20 from other continents. The target numbers have only been met once, which is at variance with the global demand for postgraduate funding and the need to foster higher-order skills. NRF documentation shows that, although significant volumes of applications were received, the number of candidates awarded scholarships has fluctuated but has declined since the inception of the programme. The scholarship was awarded to 74 candidates in 2016, but only to 36 in 2017, rising to 64 in 2018, and then dropping to 43 in 2019, 17 in 2020, 20 in 2021, and only 23 in 2022 (NRF 2016, 2017, 2018, 2019, 2020b, 2021c, 2022). The declining numbers make it almost impossible to reach the targeted number of 50 applicants from the African continent and 20 applicants from outside the African continent.

The programme's primary mission is to support and promote scientific research excellence in the developing world and to respond to young scientists' needs in countries classified as lagging in science and technology (TWAS 2019:5). It is difficult to understand why such a lucrative postgraduate funding programme fails to attract recipients from across the continent, where student enrolment in postgraduate education is highly desirable, and offers a way out of unemployment and poverty.

Most of the world has entered the knowledge economy, which connects people globally. Competition is inevitable, and postgraduate students can make their mark

by conducting research to address specific questions and problems in sectors such as health, science, engineering, technology, computer science, law, business, media, education and social welfare. Although universities impart knowledge and skills to undergraduates, postgraduate students contribute in a very practical sense to the growth of our knowledge, economy and culture (Phakeng 2017).

In this context, this article examines the management challenges encountered in postgraduate funding with specific reference to the NRF-TWAS doctoral programme. To address the research aim, the authors relied on the management theory of Henri Fayol, which posits that management should interact with personnel in five basic ways to control and plan production: through planning every part of the process(es), organising, ensuring that all the necessary resources come together at the appropriate time; commanding by encouraging and directing personnel activity; coordinating by getting personnel to work together cooperatively; and lastly, controlling (monitoring and evaluation) to check that personnel follow management's commands (Peek 2023). Its academic significance is that the study speaks to practical ways of implementing programmes across the public sector that the government could adopt. The practical contribution is specific recommendations to the NRF to reflect on its implementation processes.

The article is structured as follows; the introduction is followed by a literature review, focusing on a conceptual overview of the NRF-TWAS doctoral programme at the international, continental, and national levels. Next, the theoretical framework is presented. The findings are discussed after describing the research method, followed by suggested strategies to overcome management challenges around this programme and a conclusion.

LITERATURE REVIEW

TWAS was founded in 1983 in Trieste, Italy, by the Pakistani physicist, Nobel laureate Abdus Salam, and a group of distinguished scientists from the developing world (TWAS 2021a). They believed that strength in science and engineering could assist developing nations in building the knowledge and skills needed to address challenges such as poverty, hunger and disease (TWAS 2021a). TWAS was officially launched as the Third World Academy of Sciences by the United Nations Secretary-General in 1985 (TWAS 2019:5). At its inception, 42 fellows were elected to TWAS. The academy received support from political leaders and Italian scientists, the Abdus Salam International Centre for Theoretical Physics (ICTP) campus in Trieste, the Italian government and the Swedish International Development Cooperation Agency (SIDA) (TWAS 2019:5).

At that time, about 80% of the world's population lived in the developing world but produced less than 5% of the world's scientific publications (Schaffer

2015:16). Scientists in the global south also produced fewer international patents. At the time, the global north employed 3600 engineers and scientists per million of the population, compared to fewer than 200 per million in the south. In the 1980s, African universities and others in the developing world faced declining budgets, poor infrastructure, ageing science faculties and political unrest. In developing countries, annual investment in research and development averaged 0.25% of the gross domestic product, compared to 2.5% in developed countries (Schaffer 2015:3). In real terms, the north spent around US\$100 billion on science and technology, but the south spent only around US\$2 billion.

Despite its small size and budget, TWAS has participated actively in raising global awareness and transformation attitudes about the importance of science and technology development (Schaffer 2015:16; TWAS 2022b). One of its first initiatives was to establish research grant programmes exclusively for scientists in the south. The world's largest postdoctoral and doctoral fellowship programmes for early scientists in developing countries were created by TWAS with the help of the south's most scientifically advanced nations. One of the financial contributors to the TWAS programmes to assist the south's most accomplished scientists is China's international technology giant, Lenovo, which contributes US\$100 000 towards the TWAS-Lenovo Science Prize (Schaffer 2015:21).

To reflect science's rapid change in the south and its presence in the international scientific community, in 2004, the name changed to The Academy of Sciences for the Developing World, and in 2012 to The World Academy of Sciences for the Advancement of Science in Developing Countries (TWAS 2021a). Despite its successes, the academy must re-examine its future role in the global scientific community. One challenge is a south-south gap between scientifically lagging and scientifically proficient countries (Albanna, Handl & Heeks 2021); the Academy's membership, fellowship, and roster of grant and prize recipients are dominated by scientists from Brazil, China, India and a few other large developing countries.

For four decades, TWAS's mission has been to support and promote scientific research excellence in the developing world, respond to young scientists' needs in countries classified as lagging in science and technology, promote fields of science, technology and innovation through south-south and south-north cooperation and solve significant problems in developing countries through scientific research and shared experience (TWAS 2019:5). The executive director in the TWAS Secretariat helps to administer and coordinate the TWAS programmes on behalf of the Council. To extend the activities of the programme and the quest to promote science and technology, TWAS disseminates and implements its activities in the various regions of the developing world under five offices: Pretoria (South Africa), Beijing (China), Alexandria (Egypt), Bangalore (India) and Rio de Janeiro (Brazil). These offices' mandate is to manage doctoral and postdoctoral

research fellowship programmes, offering researchers access to world-class science institutions (TWAS 2020:16). To date, every year, TWAS, through its partners, offers over 600 fellowships to scientists in the developing world to further their studies in doctoral and postdoctoral research (TWAS 2021a).

Initially, as part of change management, in 2007, TWAS identified 81 countries lagging in science and technology, most in sub-Saharan Africa and countries with predominantly Muslim populations, to provide researchers in those countries with grants (Schaffer 2015:23; TWAS 2022a). TWAS later reduced the list of countries where science and technology are significantly lagging from 81 to 66, because of scientific advances in some parts of the developing world. Many countries on the new list are poor and struggle to keep up the pace. Of these 66 countries, 39 are in sub-Saharan Africa, 15 are in the Asia and Pacific region, seven are in the Latin American-Caribbean region, and five are in the Arab region.

TWAS in South Africa and the role of the NRF

Since 2016, the NRF and the Department of Science and Technology (DST) have been working in partnership with TWAS in developing countries to advance science through the NRF-TWAS Doctoral Fellowships. TWAS-NRF Doctoral Fellowships are tenable at research institutions in South Africa for a maximum period of three years. They are awarded to scientists from developing countries (other than South Africa) to enable them to pursue PhD research in the natural sciences based on the below criteria.

Eligibility criteria

The Memorandum of Understanding and the Framework (2017) document states that among the target cohort of 70 applicants to be funded annually, 50 applicants must be from the African continent (excluding South Africa) and 20 applicants from other continents. The Application Framework document states that the awardees under the NRF-TWAS doctoral programme must be enrolled in any of South Africa's 26 public universities. The NRF provides a standardised scorecard and screening checklist to the universities' postgraduate or research offices to review applications for eligibility. There are various reasons designated authorities might reject applications, for example, missing documents (e.g. a passport), failure to meet eligibility criteria (e.g. regarding the age limit at the time of application, alignment with science, engineering and technology disciplines, coming from developed countries), or failure to meet the application cut-off date for submission.

The scope and strategic goals of the programme are outlined in the NRF-TWAS *Application Framework* document, including information regarding the type of funding, eligibility criteria, areas of support and management processes

(NRF 2021a:8). For instance, applicants should meet several eligibility criteria: they must not be living, working or studying in South Africa in the year of application, must be 32 years of age or younger by 31 December of the year of application, must arrange their own visa and/or study permit relating to studying in South Africa, need to attach proof of evaluation of all foreign qualifications by the South African Qualification Authority (SAQA), and attach an English language proficiency certificate, and they must submit motivation from the prospective doctoral supervisor and an official academic record and official proof of study application. One of the conditions of grant is that they must return to their country of origin and spend at least the number of years equal to the years of study support they received in the programme in their home country.

The role-players

According to the NRF (2020a:6), the main role-players in the NRF-TWAS doctoral programme are the following:

- Executive Director (sponsor) from Human and Infrastructure Capacity Development.
- Director (project manager) Human and Infrastructure Capacity Development.
- Finance Manager.
- Responsible Professional Officers.
- Supporting Directorate Directors from Grants Management and Systems Administration.
- Supporting Directorate Executive Director from Grants Management and Systems Administration.
- Institutions.
- Designated Authorities.

The research and postgraduate offices at the universities serve as the NRF administrative units supporting the implementation of the programme. The designated authorities in these offices perform functions such as advertising the NRF-TWAS call for applications on the universities' websites and screening and sending applications to the review committee (NRF 2021a:8). The NRF works with the research and postgraduate offices as a unit to ensure that the interorganisational processes are implemented.

The application processes

The main stages in the NRF-TWAS doctoral programme cycle start with the registration and opening of funding opportunities, followed by students' applications, screening of applications, funding decisions and announcement of outcomes, feedback to unsuccessful applicants, claiming of funds by students by signing the conditions of grant, the release of funds and project closure (NRF 2020a:8).

The application process for the NRF-TWAS doctoral programme uses an on-line platform. Applicants are required to create profiles on the NRF system before they can apply for the programme. They can track and see different stages of the application (NRF 2021b:5). Once the applicants submit their applications, they are redirected to the institution’s research or postgraduate offices for validation. Research and postgraduate offices as process owners score the applications using the NRF’s scorecard, and only eligible applications are submitted to the NRF for screening and funding decisions.

Number of students awarded funding from 2016 to 2022 and host institutions

As shown in Table 1, from 2016 to 2022, the programme funded 277 students. Only in 2016 did the programme reach a target of 74 funded students, and the number declined from 2017 to 2022, falling below the target number. The most funded students have been based at University L (38 students), followed by University M (37 students). Universities R, S, and U hosted the fewest funded students (one each).

Table 1: Number of students awarded funding from 2016 to 2022 and host institutions

Institution	Number of students awarded funding from 2016 to 2022							Total
	2016	2017	2018	2019	2020	2021	2022	
University A	1				1			2
University B				1		1		2
University C	2	1	1		1	3		8
University D		1		2				3
University E	3	3	4	3	2		3	18
University F	4		2	1		1		8
University G	4	3	5	3	1	1	1	18
University H	1	2	4	1				8
University I	8	2	7	1	4	3	1	26
University J	3	1	3	3	3			13
University K	6	5	5	5	1	3	2	27
University L	12	4	9	7	1	2	3	38
University M	10	8	9	6		1	3	37
University N		1	4	4		4	7	20
University O	4	1	1	2	1			9
University P	3		3	1			2	9

Institution	Number of students awarded funding from 2016 to 2022							
	2016	2017	2018	2019	2020	2021	2022	Total
University Q	13	3	6	1	2	1		26
University R				1				1
University S			1					1
University T		1		1				2
University U							1	1
Total	74	36	64	43	17	20	23	277

Source: (NRF 2016, 2017, 2018, 2019, 2020b, 2021c, 2022)

Table 2 lists the 32 countries from which students were funded from 2016 to 2022 and student numbers. Students from six countries outside the African continent have been funded under the NRF-TWAS doctoral programme since the programme's inception (two each from Afghanistan and Iran, one each from Brazil and Mexico, 19 from India and 16 from Pakistan). Over 45% of funded students are from Nigeria, not listed as part of the 66 lagging countries identified by TWAS. Two students with South African Permanent Resident status benefitted from the programme in 2016, three in 2017 and one in 2018 – they were not eligible according to the criteria set out in the *Application Framework* document.

Table 2: Number of students awarded funding (2016–2022) and their countries of origin

Country	Number of students awarded funding from 2016 to 2022							
	2016	2017	2018	2019	2020	2021	2022	Total
Afghanistan		1					1	2
Benin							1	1
Botswana			1				1	2
Brazil	1							1
Burkina Faso	1							1
Burundi	1		1					2
Cameroon	4	1	3		1			9
Democratic Republic of Congo			1					1
Egypt	1		1					2
Ethiopia	4		2	1		1	1	9
Ghana	1	4	3	2			1	11

Country	Number of students awarded funding from 2016 to 2022							
	2016	2017	2018	2019	2020	2021	2022	Total
India	5		2	1	3	6	2	19
Iran							2	2
Kenya	7	2	1		2	2	1	15
Madagascar						1		1
Malawi						1		1
Mali				1				1
Mauritius	1							1
Mexico		1						1
Namibia	1		1		1			3
Nigeria	23	18	34	31	5	6	10	127
Pakistan	5	1	4	2	2	1	1	16
Rwanda	2		2	1				5
Senegal	1			1				2
South Africa (Permanent Resident)	3	2	1					6
Sudan	2	1	1			1		5
Swaziland	1	1		1	1			4
Tanzania	2						2	4
Tunisia			1					1
Uganda		1	1		1			3
Zambia	1		1	1				3
Zimbabwe	7	3	3	1	1	1		16
Grand Total	74	36	64	43	17	20	23	277

Source: (NRF 2016, 2017, 2018, 2019, 2020b, 2021c, 2022)

In the above, it is evident that the NRF-TWAS doctoral programme is experiencing some serious challenges since it has met the target of 70 applicants for funding only once (in 2016) during its initial implementation stage. The number of funded students has decreased since, and applicants from only 32 countries have participated; fewer than half of the 66 countries identified by TWAS as lagging in science and technology capacity (TWAS 2021b). The programme's challenges could be linked to one or all four management functions (planning, organising, leading and controlling). This study's main aim was to analyse how management challenges were experienced during the implementation of the programme.

THEORETICAL FRAMEWORK

This study was conducted using the administrative management theory lens (which focuses on the management framework part of the programme). Henri Fayol posited that every organisation has six functions: technical, commercial, financial, security, accounting and managerial (Fayol 1917). Therefore, the business life of an organisation consists of six key activities: technical activities, commercial activities, financial activities, security activities, accounting activities and managerial activities. Fayol's managerial activities became known as the five management functions (Fayol 1917). McLean (2011:32) supports this view, stating that managers are responsible for the administrative affairs of the whole organisation, regardless of size and operating environment.

The first managerial function, forecasting and planning, is where managers analyse the future and draw up a plan of action (McLean 2011:32). Forecasting and planning are critical managerial activities for an organisation to survive in a globalised and competitive economy. Planning involves creating a plan of action for the future by determining the phases of the plan and the required technology for its implementation (Edwards 2018:46). This helps managers decide what to do in advance, when, how, and who should do it. Planning also involves establishing the organisation's goals and ranking its priorities. For instance, the NRF-TWAS *Application Framework* document and the *Application and Funding Guide* are essential for the NRF-TWAS programme. These documents provide information about the objectives of the NRF, the process of applying for funding and the stakeholders responsible for the programme's management (NRF 2021a:3).

Organising as a managerial function is concerned with the organisation implementing the correct infrastructure to enhance the organisation's resources, systems, processes, procedures and services (McLean 2011:32). Managers must mobilise the organisation's financial and human and material resources. Organising involves carrying out a plan of action by gathering human resources, tools, raw materials and capital (Edwards 2018:46). Individuals are assigned responsibilities and grouped into divisions or departments. In the NRF-TWAS doctoral programme's value chain system, the designated authorities stationed at the research and postgraduate offices form part of the human resources and are responsible for advancing the programme's objectives at an institutional level and have commanding roles.

The command function concerns a manager's implementation of the plan (Edwards 2018:46) by appropriately allocating resources to achieve the organisation's goals. For McLean (2011:32), the command function refers to the manager's responsibility to direct and lead to achieve the organisation's strategic goals.

Coordination requires managers to unite and mobilise all the organisation's efforts and activities. It also involves maintaining relations between internal and

external stakeholders. Edwards (2018:46) maintains that managers must ensure that the system or units operate effectively according to various responsibilities. The designated authorities are involved in coordinating and setting up the review committees at their institutions to review applications (NRF 2021a:14). Once reviews are concluded, the outcomes are forwarded to the research or postgraduate office for the designated authority to input review scores on the NRF's online platform. As a control mechanism, the designated authority sends the eligible applications to the NRF before the cut-off date.

Control is concerned with managers' responsibility to exercise appropriate leadership to ensure that the organisation operates within budget, according to plan, and the time frames and resources allocated (McLean 2011:33). Managers are also expected to ensure that systems are put in place to prevent disruption in the business activities of the organisation. The designated authorities, as managers, use the online system to report on the finances of the funded students, including students' progress to date (NRF 2021a:20).

RESEARCH METHODOLOGY

A qualitative research approach was used because the qualitative approach allows for an in-depth evaluation of the topics and issues covered. The emergence of new information and findings assist in revising the framework and direction of research (Lacey and Luff 2009:20). A sample of four designated authorities stationed at four public universities in South Africa who serve as administrators or managers of the NRF-TWAS doctoral programme were interviewed. These universities were selected because they have the highest number of students enrolled in the programme (see Table 1). This selection ensured that we captured the perspectives of institutions with the most experience managing the programme and its related challenges. While a larger sample size would have been ideal, focusing on these four critical administrators with institutions with high enrolments, we believe, provides a more in-depth insight. Ethical approval for this study was obtained from the University of Pretoria ethics committee and the institutions involved to ensure compliance with all relevant guidelines and regulations before commencing the research.

A non-probability sampling procedure was followed, and the sample was drawn using the purposive sampling technique. This technique was chosen because the researchers knew about the target population and were confident that valuable data would be obtained (Walliman 2011:96). The study used semi-structured interviews that included structured and unstructured sections with standardised and open-ended questions. We employed the thematic analysis technique to analyse the qualitative data gathered from the interviews, which

involves identifying and extracting critical themes from the data. This was accomplished using a framework that organises and synthesises the information, categorising the data into core themes and subthemes, then displayed in a matrix format for each case.

FINDINGS

This article focuses on the management challenges encountered in postgraduate funding, specifically the NRF-TWAS programme. Findings include poor marketing strategies, insufficient value amounts for the scholarships, problems with the design of the funding programme, complicated documentation processes, and lack of monitoring and evaluation. These themes are discussed in detail below.

Poor marketing strategies

The interviews showed that the programme is not well marketed or advertised. The designated authorities believe that this reduces the number of applications. They also complain that the programme is only known and marketed in a few countries:

We can do better in terms of advertising. The way I see it is that it would benefit most countries if awardees were from various countries instead of one country because it seems like now the programme is a partnership between South Africa and a particular country and not a programme between South Africa and developing countries. It is quite important that TWAS advertise this funding opportunity in institutions of developing countries by identifying some institutions in a particular country and then sending through information concerning the programme to encourage more applicants to submit their applications (Designated authority 3).

Designated authority 2 agreed, mentioning a lack of advertising resources and visibility, as well as contradictory limitations on the universities involved:

The programme should be advertised more and we haven't marketed this programme extensively, because we lack adequate resources. The programme should be more visible or stand out more and should not be merged with other NRF funding opportunities in one pool. We can only advertise to students that are in our university, and the funders should be responsible for advertising this programme in other African countries.

Insufficient value amount of the scholarship

The value amount of the scholarship and the conditions attached to the use of these funds influence students' decision to apply for funding opportunities. The designated authorities stressed that the value amount of the scholarship is insufficient for international students:

The partial cost of the study is very low for international students who want to stay in South Africa. These students do not pay the normal tuition fees that South African students pay; some of these students pay international rates. Some of them pay double the tuition fees, which are implemented by the institution for international students (Designated authority 1).

The problem is compounded by the conditions attached to the scholarship, which state that a student may not hold any contractual or permanent employment, whether salaried or unpaid, during the scholarship tenure:

A full scholarship or increasing the amount will assist the students better because the program only provides a partial cost of study, which is R100,000, and covers only the tuition and accommodation. ... the NRF and the partners can actually give more to the students in terms of meals as well, and also for research equipment. It is a big challenge for them to come to South Africa and try to manage or cope with that amount, without getting assistance from other sources, whereas they are not supposed to be in any form of employment (Designated authority 4).

The scholarship amount fails to align with the cost of living:

...before the value is set up, some research needs to be done on how much it is in terms of tuition, accommodation, and the cost of living for individuals. For instance, the funders need to determine how much an individual can live on monthly and then transport in a specific geographic area or province (Designated authority 3).

The design of the funding programme

The study also found that the current design and placement of the programme, integrated with other funding opportunities, creates significant confusion for stakeholders and reduces the number of applications. Designated authorities reported that the NRF-TWAS scholarship should be offered as a stand-alone programme rather than being bundled under the broader category of

Postgraduate Scholarships. This integration has led to students mistakenly applying for general scholarships without selecting the TWAS option, resulting in missed opportunities and reduced application numbers. One designated authority stated that:

This scholarship must come as a stand-alone, not under the Postgraduate Scholarships. Some students were found to have made mistakes when applying for the general scholarship and did not choose the TWAS options. If we can have a stand-alone call for the NRF-TWAS, that will be helpful (Designated authority 4).

A second designated authority was of the view that:

The design of the programme needs to be looked at in relation to the timing. Successful students are expected to overcome the obstacles..., sort their paperwork and claim those funds within a short space of time, similar to the other students in other categories, where those documents are not required (Designated authority 2).

This view aligns with Bhuyan, Jorgensen, and Sharma (2010:2), who argue that policy design is key to policy implementation. Throughout the implementation process, policies are often redesigned and interpreted as and when they confront the realities on the ground.

Complex documentation processes

The designated authorities indicated that only a handful of applications make it through to the screening phase, and of those that successfully make it through screening, only a few of the students claim those funds. The number of applications is low, and few claims are made because of the costs of and delays in obtaining the relevant documents. It is costly and time-consuming to obtain the proof of a SAQA certificate, which is required during the screening of applications, and evidence of an English language certificate to confirm competency in English, a visa and a study permit for South Africa.

There is not enough assistance for applicants:

The NRF should assist the applicants in fast-tracking the process of getting visas and study permits to study in South Africa to attract more students to come into the programme because obtaining approval takes forever (Designated authority 4).

Applicants may also miss out because of internal deadlines in universities which are not aligned with the NRF-TWAS deadlines and timelines to acquire the necessary documentation:

The timing issue... If the students miss out on coming to the university before a certain time, which also has its academic calendar, they forfeit that position or that place at the university (Designated authority 2).

Designated authorities indicated that one significant factor reducing the number of successful applications is the absence of a letter from a supervisor endorsing specific applicants. The NRF considers ineligible applications which supervisors do not endorse. Supervisor endorsement is meant to ensure that all the designated postgraduate supervisors have the necessary training, capabilities and capacity to train and supervise students under this programme. Supervisors and students are expected to enter a Memorandum of Understanding, which clarifies the expectations and preferences for managing the research project. However, finding suitable and willing supervisors can be challenging:

[T]he supervisors do not know those applicants. ... with this whole process, the academics will look out for the students that they know, and if they do not have existing relationships, they are not going to support this application, especially when you come up with a project on your own (Designated authority 1).

Lack of monitoring and evaluation

The principle of monitoring in the management process is vital to enforce policies and rectify deviations from predetermined standards. Das and Mishra (2019:15) argue that planning must culminate in action, followed by control. The main purpose of monitoring is to ensure that activities yield the desired outcomes.

The research reveals that there is little or no monitoring to follow up whether the applicants have returned to their home countries after completing the programme, as required for the requirements or conditions of grant of the programme, or have stayed in South Africa:

These students do not want to return home. We have one student who was supposed to return home, and now the student is already in a postdoctoral programme funded by the NRF. He is trying to get a job at the university, and I do not think he even wants to go back. We cannot hold them accountable because the NRF does not hold them accountable. Instead, it enables these students to stay by giving them another funding for postdoctoral studies. The agreement is between the NRF and the student and not between the

university and the student. There is no proper monitoring system on what is happening with these students, about where are they going or how are they contributing. I think we are just bringing in more people from these African countries, and the only hope for them is to stay on. ... If you are not going to monitor if the objectives are reached in this programme, then what is the programme for? (Designated authority 2).

...the challenge is to check if applicants are applying from their home country or are already in South Africa, how does the NRF determine whether a person is outside the country or not? Furthermore, it is difficult to verify if awardees have left the country because booking a flight to go back home does not guarantee that someone boarded the flight and left the country. Even if they do go home, others might come back into the country within the next two months or so, since there is no system to monitor that (Designated authority 3).

This challenge is at odds with the programme, which requires applicants not to be in South Africa or enrolled in any South African higher education institutions at the time of application. Awardees are expected to return to their home countries after completing the programme and must stay there for at least the same number of years as the years of study support received.

DISCUSSION

Overall, the findings from the evaluation of the NRF-TWAS programme reveal significant management challenges hindering the programme's success, all of which align with the four management functions: planning, organising, leading, and controlling.

Regarding planning, the findings showed an absence of a robust monitoring and evaluation system, undermining the programme's ability to ensure that students comply with the requirements to return to their home countries after completing their studies. This lack of monitoring led to a deviation from the programme's intended outcome, as evidenced by students staying in South Africa beyond their study requirements. This finding is supported by previous studies that also reveal that if monitoring and evaluation of programmes or projects are not well coordinated or planned, this results in interventions missing the opportunity to improve the functioning of the project concerned (Presidency 2016:16; Keeton 2012; Dipela & Mohapi 2021).

Additionally, the findings revealed that designated authorities were unaware of the plans, strategies, programmes and policies enabling the implementation of the NRF-TWAS doctoral programme and had not collaborated in their formulation,

making implementation more difficult. Stakeholder involvement is essential in facilitating successful implementation – stakeholders need to assess current needs, the feasibility of the innovation and levels of readiness and capacity (Burke, Morris and McGarrigle 2012:9). Mthethwa (2012:40) maintains that a policy designed without engaging relevant stakeholders is hard to implement; without buy-in, those who are expected to benefit from a policy or enforce it are reluctant to take ownership.

Concerning the organising function, the study found that implementing the scholarship programme was mired with complex documentation processes and insufficient scholarship value. The application process, characterised by tedious and expensive documentation requirements, is a significant barrier for many applicants. As well as a lengthy process of obtaining necessary documents, such as SAQA certificates and visas, it delays and often deters participation (NRF 2021b:5). This finding aligns with research by Odle *et al.* (2023), which shows that complex application processes where students must manage various deadlines keep many talented and eligible students from applying and enrolling for university studies. Concerning the insufficient scholarship value, the current scholarship amount is inadequate to cover the total cost of living for international students in South Africa, which includes higher tuition fees for international students. This insufficiency affects the students' ability to focus on their studies without financial stress. This finding is confirmed by the Council for Higher Education Research, which alludes to the fact that the funding from the NRF and other agencies usually covers the total cost of studies, but not the full cost of living, making it difficult for most students to cover these expenses using their scholarship or bursary funds (Saidi 2024:18).

In addition to the above, the inadequacy in the leading function was observed in the poor marketing strategies, the findings revealing that leadership had not prioritised nor allocated resources for compelling marketing. This finding indicates the programme's low uptake as shown in Tables 1 and 2. NRF documentation shows that, although significant applications were received, the number of candidates awarded the scholarships has fluctuated but has declined since the programme's inception. The scholarship was awarded to 74 candidates in 2016, but only to 36 in 2017, rising to 64 in 2018, and then dropping to 43 in 2019, 17 in 2020, 20 in 2021, and only 23 in 2022 (NRF 2016, 2017, 2018, 2019, 2020b, 2021c, 2022).

RECOMMENDATIONS

The findings highlight critical areas where the scholarship programme can improve across the four management functions. To address the challenges witnessed in the deviation of the programme's intended outcomes, as evidenced in the student's stay in South Africa, effective planning should incorporate detailed strategies for continuous monitoring to track student locations and activities post-graduation,

ensuring adherence to grant conditions and ultimately contributing to the programme's success. Additionally, the programme must be marketed outside South Africa's borders. The funders and South African Higher Education Institutions could disseminate information on the programme to institutions in countries with which they already have relations or ask those institutions to share these funding opportunities and attract more applicants. Moreover, the NRF, through the Department of Science and Innovation, could request the Department of International Relations and Cooperation, responsible for South Africa's relationships with foreign countries, to assist in advertising this programme through diplomatic missions in the 66 priority developing countries.

- To address the organising challenges related to the complex documentation process, streamlining the application processes and aiding applicants can improve the organisation of the application phase to ensure that more students can meet the application requirements.
- Funders should consider adjusting or allocating adequate funding to students under this programme. In the interim, international students under this programme could be funded under the Full Cost of Study to align with the value amount of scholarships afforded to South African citizens and permanent residents.
- Funders should embark on public-private partnerships to mobilise resources to finance the programme.
- Supervisors should be given incentives to identify and recruit top students from qualifying countries during conferences. Then, supervisors can send recommended students to the NRF to be funded.
- Lastly, to address the control challenges related to the programme's design, funders can consider streamlining the control framework with specific guidelines for the NRF-TWAS programme to provide more precise direction to the applicants.

CONCLUSION

This article explored the complexities of managing postgraduate funding in the context of the NRF-TWAS doctoral programme in South Africa, funded by the NRF and TWAS. The study identified the following challenges that align with the four management functions: a lack of monitoring and evaluation, poor marketing strategies, insufficient scholarship amounts, onerous documentation processes, and poor funding programme design. There is little to no monitoring of whether applicants are still in South Africa or have, in compliance with the conditions of grant, returned to their home countries after completion of the programme. Nor is the programme well marketed or advertised – the designated authorities cite this

as a factor contributing to the reduction in the number of applications because the programme is known and marketed in too few countries.

The researchers strongly believe that these challenges threaten the survival and stability of the programme. The most critical challenge the funding partners must face is the scholarship's value amount. Without adequate capital injection and commitment from key role-players, it will be difficult for the programme to realise its objectives. According to the Presidency (RSA 2020:14), data on programme implementation should determine whether to continue with the existing policy options or establish ways to modify those options. For policy evaluation, policy-makers systematically evaluate the design and implementation of public policies against the agreed policy objectives. Policy evaluation assists in highlighting areas for improvement and strengthens accountability channels by communicating progress to policymakers, policy beneficiaries and authorities.

The findings of this study could assist funders in understanding better the implementation challenges that the universities, programme managers, students, applicants, and a giant stakeholder community face concerning programmes that target and host international students. The findings can also be used by the NRF as the lead organisation entrusted with managing the partnership to learn and reflect on the effectiveness and efficiency of its application, screening, and funding decision processes. The findings can also be used as a platform for conversations around developing better monitoring and evaluation systems.

The researchers believe these findings demonstrate the need for further or future research on whether the programme's objectives have been realised. A future study could include interviewing the designated authorities at all 26 public universities. The research could involve other stakeholders, such as programme alumni and the NRF. Using mixed-method research will also strengthen this work.

NOTE

- * This article is based on a master's dissertation of Alfred Lehlogonolo that was completed at the University of Pretoria under the supervision of Dr Stellah Lubinga in 2023, titled: Lehlogonolo, P.A. 2023. *The implementation of the National Research Foundation and the World Academy for Sciences (NRF-TWAS) doctoral programme in South Africa*. Pretoria: University of Pretoria.

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