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Editorial Commentary

Stop digging: regenerating science for an inclusive and sustainable future

Jairos Kangira, Lawrence Kazembe

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If you would understand anything, observe its beginning and its development

- Aristotle

Healey's first law of holes is, "if you find yourself in a hole, stop digging". Over the years others have added to that law. The second law says "if there is any open hole fill it" - and third law says "any hole not filled now will cause more damage in the future". The first law is attributed to a British politician Healey - following an interview with the Statesman magazine in 1986. Thus, others have referred to it as "Healey's first law of politics" (Guardian, 2015).

Although popularized by Healey, the first recorded use of this saying dates back to 1911, where the Washington Post published the original saying on the sixth page. This saying reads:

nor would a wise man, seeing that he was in a hole, go to work and blindly dig it deeper.

The First Law of Holes simply means "know when to stop". There are many societal lessons we can learn from this concept of stop digging. You may find this law relevant to your business, your political beliefs, or even your financial situation.

But the message remains all the same; if you find you are in trouble, it's best to quit whatever it is you are doing that has gotten you to this point. But first, recognize the hole you have dug. That is to say, the first step in finding a solution is admitting there is a problem. It might take a lot of pride-swallowing, but it is worth it, to be honest about what you are struggling with. To rise above your challenges, you can't continue to go downward. There are usually many factors at play when it comes to finding a solution.

The holes adage speaks to the society we live in. It has been littered with too many "may-tries", a great many experiments to the detriment of the economy, and people around. Tragically, citizens are often taken as pawns. In the 1980s - following the oil crisis - developing countries were faced with the need for structural reforms of their economies - which drove the privatization programme. While the idea was meant to promote efficiency, countries eventually were found in a hole. Each dug a hole. Many state-owned companies were sold, leading to massive unemployment and deepened poverty. The working class was sacrificed.

However, the best thing to do was to realize that they (countries) were in a hole, and then stop digging. The first step was to stop doing harm. Stop approving any more expenses and assess the situation at hand. This was never done.

Following at the heels of structural adjustments was outsourcing, which further shed more jobs. More so it led to a culture of profit making, and ballooned costs - again to the detriment and neglect of delivery of social services for the benefit of the citizenry. This leads to lessons of the second and third laws of holes. The existing holes were left open and are causing societal damages. Of course, the history of outsourcing dates back to the time of the Industrial Revolution, which began in Europe in 1750s. The Industrial Revolution led to the mass production of goods and caused the growth of markets and profits. Many companies experienced a shortage of local human resources, so they started contracting with third-party firms to delegate the accounting, legal, and insurance tasks.

Outsourcing is based on the economic principle of "opportunity cost". Outsourcing was not formally identified as a business strategy until 1989 (Kim, 2018; Gonzales et al. 2020). However, most organizations were not totally self-sufficient; they outsourced those functions for which they had no competency internally. One of the best examples of outsourcing, outstaffing, and recruiting is Japan during the reign of Meiji. The period that marked a place for itself in the history books as the Meiji Restoration, became a major reason for Japan's industrial rise later in the 1900's. Outsourcing is the buzz word of the new millennium - while companies are increasingly moving jobs offshore to cut down costs, the public is feeling cheated that their jobs are being "stolen" by cheap, foreign labour.

The Process of Filling the Hole

Afrobarometer provides reliable and accurate data on the views of ordinary Africans, based on public attitude surveys conducted in more than 30 countries in Africa. A common public voice in these surveys is a sense of despair. Enough is not being done to assist the masses. It's not that nothing is being done by respective governments. In fact, a number of policy strategies have appeared over the past few years in which a pro-poor developmental state response to poverty is discussed. The challenge comes with the process of implementation - which fulfills the adage of the filling the hole.

At regional level, there is a drive for a pro-employment led economic growth. For example, in SADC it is evident that much of its economic growth, in the past two to three decades, did not translate into more and better jobs. Several structural rigidities have impeded further improvement in SADC's job outcomes. In fact, there is no clear structural transformation for many decades. Policies that are growth-oriented, that have worked for developed economies, have not worked to create productive employment for the growing working population in SADC. Proceeding with the same policies that focus on economic growth will maintain the same poor employment outcomes in the coming decades. Considering the structure of SADC economies, and to realize the SADC Industrialisation Strategy and Roadmap - SISR (2015-2063), there is need for pro-employment policies that will alter productive transformation patterns. SADC should alter economic policy making (macro, sectoral/industrial, fiscal, monetary, trade, investment) so that they are focused on employment creation.

In the current SISR, science, technology and innovation (STI) has been identified as a critical element. Put differently, the focus is towards regenerating science for an inclusive and sustainable future, with a commensurate STI policy. However, lacking is policy coherence. STI Policy Coherence facilitates constructive social dialogue between policy-makers and various key stakeholders – from different parts of the government, parliamentarians, civil society, business and industry, philanthropists, among others – to identify and enhance synergies between interacting policy domains for achieving the National Development Agenda and related 2030 Agenda for Sustainable Development. The Policy Coherence Framework provides guidance on how to analyse, apply and track progress on policy coherence, setting through the perspective of policy interaction. Policy Coherence is essential to a balanced implementation of Sustainable Development Goals (SDGs). Collectively, STI promotes strong, inclusive and sustainable economic growth, full and productive employment, and decent work for all. It is broadly aligned with the objective set out in the Decent Work Agenda of the International Labour Organization. It confirms STI is an important lever for sustainable development, equality and poverty reduction.

Policy-remaking should address the key challenges of job quantity, quality, and accessibility of jobs. SADC should aim at realigning its industrialization strategy towards maximizing employment outcomes for the poor. There are a number of ways of focusing solutions for jobs and to further strengthen job creation, job quality, and job access. Among others, innovative industrialisation strategies should go beyond

sectoral approaches that target only manufacturing, but instead would need to generally focus on sectors with high potential to create more and better jobs. SADC can accelerate industrialisation by promoting all six economic value chain clusters, identified in the SISR and SADC Action Plan (2015-2030), with employment targeting being one of the considerations to stimulate growth and accelerate structural transformation. Industrialisation and value chains (VCs) present real opportunities only if employment is factored in.

In this issue

Nine articles are presented that capture various strands of solutions for the present challenges our society is facing. The first article by [Chikadzi](#) argue that the social enterprise model of operation can be adopted as a cheaper and effective alternative economic model which can replace the practice of outsourcing. The model is framed from the current stage in the evolution of outsourcing, which is the development of strategic partnerships. [Chikadzi](#) demonstrates that outsourcing of support service functions to private service providers has largely resulted in poor welfare for workers and escalating costs of service provision. The social enterprise model of operation represents a viable, workable and progressive alternative to outsourcing. In their paper, [Ochurub and Jeremiah](#) assessed the operational efficiency as well as the use of valuable resources and strategic capabilities within the rail transport industry/sector in Namibia. [Sifani and others](#) compared the performance of the two National Systems of Innovation for Namibia and Botswana and how they influence national economic development and competitiveness.

Other papers evaluated the knowledge, attitudes and practices towards COVID-19 prevention measures among patients in Windhoek ([Ntumba et al.](#)), considered the role of work engagement and work meaningfulness on turnover intention of nurses ([Moyo et al.](#)), while [Katukula and Kambeyo](#) conducted a systematic review of the impact of research in education, whereas [Lwendo and Isaacs](#) did a qualitative analysis in evaluating service delivery in Namibia. [Mothowanaga and Gladwin](#) called for a re-think on the implementation of secondary school curriculum. Taking the history curriculum - as a case study in the Khomas region of Namibia - they recommended that teachers should try to collaborate with other history teachers, especially in their circuit, while regular trainings and workshops in various circuits should be held for all history teachers with a follow-up system in place to ensure that the trainings are effective. [Kazembe](#) presented a perspective on data ecosystem for enabling domestication of STI in Namibia.

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Original Research Article

Social enterprises as an alternative model to outsourcing in Universities: A theoretical premise

V. Chikadzi^{1*}

¹Department of Social Work, University of Namibia, Windhoek, Namibia

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ABSTRACT

The past three decades have been characterised by massive restructuring of public universities within Southern Africa. In line with the neo-liberal policy framework adopted in many countries, service provision in most public universities has become privatised and highly commercialised. As a result, outsourcing of support service functions to private service providers has become a widely entrenched feature of public universities in Southern Africa, reflective of the global trends. This has largely resulted in poor welfare for workers and escalating costs of service provision. Given the profit motive which is the primary driver for companies bidding for contracts to provide services in universities, the compromised welfare of workers and students will remain an 'achilles heel' of outsourcing. In this paper, I argue that the social enterprise model of operation can be adopted as a cheaper and effective alternative economic model which can replace the practice of outsourcing in Universities.

1. Introduction

The past few decades have seen many countries adopting neo-liberal policy prescriptions that have had far reaching implications for many institutions. Following the adoption of economic structural adjustments programmes in countries such as Zimbabwe, South Africa, Zambia among others, many public universities underwent restructuring. This restructuring was largely characterised by the outsourcing of support service functions. In essence, many public universities became commercialised in their approach and many key service sectors of the universities were privatised and outsourced. According to [Belcourt \(2006\)](#) outsourcing happens when organizations contract other external organisations to render services on their behalf, services that would have been previously provided within the organisation. Similarly, [Ellram & Billington, \(2001\)](#) note that the practice of outsourcing involves the transfer of functions to another organisation which may result in employees of the outsourcing organisation being moved to the new organisation that would have been contracted. Outsourcing was and is still largely viewed as a cost cutting measure that results in efficiency and

effectiveness in service provision within organisations ([Arnold, 2000](#)); [Fan, 2000](#); [Vining & Globerman 1999](#)). The practice is also seen as necessary to ensure the streamlining of service provision in a way that allows universities to focus on their core functions of teaching and knowledge production through research ([van der Walt, Bolsmann, Johnson, & Martin, 2002](#)).

Several scholars note that outsourcing has had mixed results in achieving its main goals of curtailing costs while enhancing efficiency and organisational effectiveness (see, [van der Walt, et al; Adler, Bezuidenhout & Omar, 2000](#)). However, this has come at a cost. According to [Adler et al \(2000\)](#) outsourcing has had many unintended consequences such as poor welfare for workers, increased cost of services for students and in some instances reduced quality of service provision. At the close of the year 2015, many universities in South Africa were faced with massive protests popularly termed "fees must fall". When students got their desired goal of a zero percentage increase of fees many campuses still resembled 'war zones' this time, students were standing in solidarity with outsourced workers fighting to end the 'exploitative practice' of outso-

urced workers fighting to end the 'exploitative practice' of outsourcing. According to [van der Walt, Bolsmann, Johnson, & Martin \(2002, p. 12\)](#) whenever the practice of outsourcing is adopted,

'manual and menial workers tend to experience declining wages, worsening working conditions and access to benefits, growing job insecurity, and declining or increasingly ineffective trade union representation.'

Several other scholars also note that, outsourcing has many other negative consequences. These include among others, inefficiency, hidden costs, reduced productivity and the erosion of tacit knowledge (see [van der Walt, et al., 2002; Adler, et al., 2000](#)). In 2016, several universities in South Africa committed in principle to abolish the practice of outsourcing and several Vice Chancellors did concur with the students and workers' view that indeed outsourcing was an exploitative labour practice that had resulted in dire consequences for many people. Despite increased government funding for public universities regionally, there is a realisation that it may be difficult for universities to absorb the costs of abandoning outsourcing. Against this backdrop, this paper argues that the social enterprise model of operation can be adopted as a viable alternative to outsourcing in public universities within the Southern Africa region and beyond. The author advances several arguments that provide a basis for justification of the theoretical proposition advanced in the paper.

1.1. What are social enterprises?

The term social enterprise is used to refer to organisations that use business principles in pursuit of social goals or any other purposes that are not primarily profit driven ([Young, 2007; Jones 2007](#)). From country to country, these organisations take upon a different character. As such, there is no universally accepted definition for social enterprise ([Jones, 2007](#)). According to the Social Enterprise Alliance an institution based in the United States of America that specialises in social enterprise development, a social enterprise is an organisation or venture that advances its social mission through entrepreneurial, earned income strategies' ([Jones, 2007, p. 2](#)). [Jones \(2007\)](#) observes that social enterprises embody a hybrid commercial model of an organization that pursues both economic and social goals. To this end, he notes that a social enterprise has two main characteristics. Firstly, unlike conventional for-profit business, social enterprises do not base their success on profit alone. Secondly, social enterprises pursue social and environmental goals rather than profit seeking alone. Profit seeking is pursued as a means to an end rather

than being an end in and of itself. Similarly, [Talbot, Tregilgas, & Harrison \(2002, p. 2\)](#) posit that,

'social enterprise is a means by which people come together and use market-based ventures to achieve agreed social ends. It is characterised by creativity, entrepreneurship, and focus on community rather than individual profit. It is a creative endeavour that results in social, financial, service, educational, employment, or other community benefits'.

[Dees & Economy \(2001\)](#) note that the creation of social enterprise ventures is largely driven by social entrepreneurs who are interested in reforming and revolutionising unjust systems and practices within both the social and private sector. A majority of such people largely account for the advancement of thinking that has led to paradigm shifts in the way certain things are done.

1.2. Differences between traditional for-profit ventures and social enterprises

There are several characteristics that distinguish social enterprises from for-profit ventures. Firstly, in all for-profit ventures the core aim of these organisations is to make as much profit as they can and this in many cases is the sole interest of people who own or invest in the venture. However, in social enterprises profit making is not the core aim of the venture. Whilst profit making is important it is not taken as the end in itself but rather as a means to an end. A social enterprise venture is mainly seen as a way of diversifying the revenue base of the organisation while the mission of the organisation is seen as the core objective. Whatever revenue is generated from the social enterprise, it is regarded useful in as far as it helps in the advancement of the organisation's main mission. ([Skloot, 1987](#)).

Secondly, the success of a for-profit venture is measured in terms the amount of profit which is made. On the contrary, while profit obtained from a social venture is considered as critical; it is not the only indicator of organisational success. If a for-profit venture does not make profit, it is considered as failing but a social enterprise venture may not break even and yet still be regarded as a success in as far as it would have aided the accomplishment of the intended social mission ([Skloot, 1987; Yunus, 2006](#)). [Yunus \(2006\)](#) notes that, people can operate social enterprises at four different levels. The first level is **no cost recovery** where social entrepreneurs (people who run social enterprises) do not manage to get any financial return on investment yet the venture may still remain valuable if it aids the accomplishment of the core objectives of the organisation. The second level is some **cost recovery**; social enterprise that operate at

this level can recover part of the expenses incurred in the initial investment. The third level of operating is **full cost recovery**, where one gets to recover all the costs incurred on the initial investment. The fourth level of operation is, **more than full cost recovery** where a social enterprise becomes self-sustainable. Ideally, it is expected that all social enterprises must operate at more than full cost recovery. The core focus of this paper is social enterprises that operate at the level of more than full cost recovery.

Another distinguishing feature between a for-profit enterprise and a social enterprise relates to how the earned income is distributed. In a for-profit venture, profit is shared among investors or shareholders of the company. In contrast to for-profit ventures, people who operate a social enterprise venture using a not-for-profit model are by law forbidden to distribute profit to their members, employees and board members. Compensation of employees or board members is only limited to the activities that they do for the organisation at market related or below market value. This means that all net income accrued from commercial activities must be ploughed back into the organisation for the furtherance of its core mission (Skloot, 1987; Young, 2007).

Finally, for-profit ventures are by law required to pay a certain amount of tax on their net income while many non-profit commercial ventures are exempted from paying taxes. This however, will differ from country to country and tax exemption status is also determined by the registration status of the social enterprise. In some countries social entrepreneurial organisations pay no tax at all while in some countries such organisations would be by law required to pay tax on a small percentage of their net earned income (Dees, 1999).

2. Materials and Methods

This paper is an attempt at advancing a theoretical proposition that argues for the adoption of the social enterprise model of operation as an alternative to outsourcing in universities. The premises of the theoretical propositions advanced are based on conclusions reached after reading primary data and secondary data on social enterprise operations across the globe. Using the insights gleaned from the various literature available on social enterprise, the author makes some postulations and demonstrates how the social enterprise model can be operationalized within the university context. Several arguments based on factual secondary data are advanced to justify why adopting a social enterprise way of operating will be a better alternative to the often exploitative practice of outsourcing. To this end, the paper should be understood from the stand point of theory building.

3. How the model can be operationalized.

The main argument of this paper is that the social enterprise model of operation can be adopted as a form of insourcing that can replace outsourcing of university business activities to external stakeholders. Such a modus operandi would allow universities to drive a lot of advantages that go beyond mere service provision. At present, most universities outsource services such as transport, cleaning, catering, security, building maintenance and grounds maintenance services (van der Walt, et al., 2002). The use of the social enterprise model would mean that, in each of the areas that the university seeks to outsource or has outsourced; they can form social enterprise ventures to run such services instead of contracting private service providers whose sole aim is to generate profit. These social enterprises would be registered and structured as Non-Profit Organisations (NPOs). There are several advantages of running such a model of operation as it brings with it several advantages that cannot be derived from contracting private service providers. These merits are discussed below.

3.1 Cost savings on management structure

Outsourcing is largely cost driven. Most Universities note that private service providers are able to render certain services in a much more efficient and effective way owing largely to specialisation. Scholars such as, Kremic, Tukul & Rom (2006); Harler (2000); Bers, (1992) among others, note that the rationale for cost driven outsourcing decisions is usually taken into consideration when the costing by private contractors is lower even after factoring overhead, profit and other transaction costs. It would therefore appear sensible to outsource such a service. My argument is that what a private company can deliver at a low cost, a social enterprise venture can deliver a similar or better service at an even lower cost without compromising workers' welfare and quality of services. Several reasons account for this. Firstly, the nature in which non-profit distributing social enterprises are configured is such that they are run by a board of directors who are not salaried personnel. Many social enterprises have highly skilled people who sit on their boards and give strategic direction to these organisations. These skills are given on a pro bono basis. On the other hand, when companies cost their services as private contractors, salaries and benefits of the management team account for some of the major costs. Consequently, a social enterprise model would allow for better cost savings than a private sector company.

3.2 Cost savings on profits

Private companies are run by people who seek to make profit on their investment or service rendering. This is usually the sole purpose why private companies exist. Any other activity or endeavor is done as a means to an end, the end which is profit maximisation. On the other hand, a social enterprise seeks to make profit, but not just profit for its sake. Rather, profit making is a means to an end, and end which is usually to save a particular social purpose in society. As such, when using a social enterprise model; it is possible for the venture to charge less on contracting fees and still make an acceptable return on investment. For example, where a private company seeks to make a 40% profit margin as return on investment, a social enterprise can make a 30% or 15% or even 5% profit margin and its operation will be regarded as highly successful given that profit making is secondary. The core mission of the social enterprise will be to ensure that the university can attain cost savings in a viable and sustainable way that is sensitive to workers' and students' welfare.

3.3 Cost savings via volunteerism

Social enterprises that are registered as NPOs are also able to attract many people who can volunteer their services on a pro bono basis. For example, if a cleaning company that is registered as a social enterprise does spring cleaning of offices once a year, it would be possible to attract hundreds of students and community members who would be willing to lend their support to the initiative. A private company cannot attract such volunteers given that they exist for profit. On the other hand, many people would be more receptive to giving a few hours of service in a day, week or month to an organization whose core mission is not to make profit but rather exists to ensure that the university can run on a viable cost serving model that benefits students, staff and the wider community. To this end, it would be possible to operate a social enterprise model that creatively deploys the use of volunteerism as a cost cutting measure. Such an initiative would inculcate and foster of a spirit of citizenship in students and many other people whose services are enlisted for such initiatives.

Infrastructural development accounts for one of the major costs that drain a significant portion of the budgets in most universities. Private building contractors make millions in profits yearly at universities. Most of this cost burden can be drastically reduced if universities operate using the social enterprise model. The cost of building is substantially high. In most instances, labour costs account for the huge chunk of the costing in building projects. However, when using a social enterprise model, a lot of money can be saved. A social enterprise would be

able to creatively cut costs while still delivering the same quality of product. For example, if company A is a private sector venture and its costs for labour in a building project amount to \$5,000,000, a social enterprise venture within a university setting would mostly likely be able to lower costs to around \$2,000,000 for similar nature of labour costs. How does this happen? Firstly, a social enterprise is operated by a board comprised of people with specialized skills who would be able to offer their services on a pro bono basis. On the other hand, universities are able to use their own personnel at less cost to provide skills such as, engineering, quantity surveying, architecture and accounting and finance among other skills sets. Most universities have students at master and Doctorate levels and senior academics who have the requisite industrial experience to spearhead and deliver on complex infrastructural projects. Most such people would be more than willing to provide their services at minimal or no cost to a social enterprise whose aim is not to make profit but to rather serve a social purpose which is to benefit the university community. On the contrary, very few people would be willing to give their services for free or at less cost to a for-profit company. Another, key cost saving on labour would be to enlist the service of students (within guided and acceptable parameters) to provide manual labour in some of the building projects. Hundreds of students would be more willing to volunteer their services for such a noble cause which benefits not only them but generations to come. More so, universities operating a social enterprise model would also be in a position to negotiate with suppliers of building materials and machinery to lower the cost of purchasing. This again serves to lower the costs of doing business. The monies saved via such initiatives would then be reinvested to grow the institution as well as to benefit students and workers within the university. To this end, the social enterprise model mirrors a sound and viable alternative to outsourcing in universities.

3.4 Fundraising

The adoption of the social enterprise model will also allow for the ventures to raise funds via donations. The NPO sector is a multi-billion dollar industry in Southern Africa. Most of the funds available to the sector are sourced from private individuals, corporates and overseas donors. The adoption of a social enterprise model of operation would allow for the entities to fundraise for additional income that would enable them to charge even less contracting fees to the university. Many universities especially in South Africa are increasingly putting emphasis on and looking into ways of raising the so called 'third stream income'. Deploying the social enterprise structure as an

alternative to outsourcing would no doubt enhance the ability of universities to benefit from third stream income given that more costs will be saved as universities pay less contracting fees.

3.5 Student welfare (catering services and groceries)

Most of the money spend by students each year goes to catering and buying of groceries. In many universities, such services are rendered by private companies that make millions of dollars out of their ventures. In most cases, their products are overpriced compared to the prices that are charged by similar business serving the general populace. For example, a can of fruit juice costs around R12 (Rand) or less at most retail outlets at University A, 100 meters away at a major supermarket, a similar can costs R8. A sandwich at an outlet at University A costs between R22 to R35 while at a nearer Pick N Pay a similar product would cost R15. Why such a big difference? One would expect that services and products offered at universities, most of which enroll students from poor backgrounds would be more affordable. Yet sensitivity in this area has largely been ignored. The social enterprise model of operation can best be deployed to eradicate such anomalies. It is possible to set up various social enterprises that would provide catering to students and staff in universities at cheaper rates. Where a private company runs a supermarket at a university and charges 15 percent mark-up on their products, a social enterprise is able to run a similar supermarket and charge 6 percent mark-up which allows it to operate in a viable and sustainable way. This is possible because the use of social enterprise eliminates the profit motive as the core mission unlike in a private company where profit trumps all other considerations. By adopting a social enterprise model of operation, universities will be able to run cheaper catering services that would immensely benefit students' welfare and the welfare of the broader university community. Innovation is one of the core strengths of people who largely operate within the social enterprise arena. As such, it is possible for social entrepreneurs (those who initiate social enterprises) to craft and deliver services in an inventive way at a fraction of what it would cost when using a private sector company.

3.6 Rotating money in the university system

One of the key advantages of using the social enterprise model is that it keeps money growing and rotating in the university system. The use of private sector companies means that the universities are draining money out. However, when using the social enterprise model, no dividend or surplus is given to individuals. To this end, all the social enterprise

ventures initiated to provide services would remit any excess profits back to the university system. Such resources are then redeployed for other purposes such as scholarships, infrastructural development and improvement of student welfare among other things. This ensures that a bigger chunk of the monies invested within a university that uses a social enterprise model would keep growing and rotating within the university system, instead of enriching the coffers of private individuals.

4. Implications

Universities play a critical role both locally at country level and in the global sphere. They are or rather should be centres of knowledge production and cutting age initiatives that will give birth to a just and equitable society. The practice of outsourcing goes against this mandate. By embracing outsourcing, universities have given in to the currency of marketisation and have become active participants in embracing structural reforms that have a costly effect on vulnerable segments of the university population- workers and students. Most scholars and leadership of universities are usually at the forefront of criticising governments for adopting policy prescriptions and practices that harm the interests of the poor, yet their own 'houses' are not in order in this regard. It is therefore imperative that universities should lead the way in crafting creative mechanisms that allow for the restructuring of service provision in a way that protects the interests of low income workers and students from vulnerable backgrounds. In this paper, I have demonstrated that non-profit distributing social enterprise ventures can be adopted as a sustainable and viable alternative to outsourcing. Several reasons have been highlighted which include among others, the non-profit distribution constrain, being mission rather than profit driven, ability to innovate and ability to enlist volunteerism. This model of operation will no doubt if adopted lead to better outcomes for workers in form of improved wages and working conditions, the larger university community would benefit from reduced pricing of critical services such as catering and the university itself would be able to earn surplus income which can be reinvested into growing and strengthening the institution. This model will keep money rotating within the university system. This in turn benefits a large majority of people rather than using the outsourcing model which benefits a few individuals at the expense of workers' and students' welfare. Needless to say, outsourcing unnecessarily drains finances out of the university system. On the contrary, the use of the social enterprise model would keep money circulating within the university system. To this end, the social enterprise model mirrors a viable alternative to private sector driven outsourcing

currently dominating the university spaces in Southern Africa and beyond.

5. Conclusion

In this paper, I have argued that the social enterprise model of operation can be adopted as a cheaper and effective alternative economic model which can replace the practice of outsourcing in Universities. At

present, outsourcing is not only leading to expensive goods and services; but it has also in many cases resulted in poor welfare for workers and escalating costs of service provision at universities. The social enterprise model of operation represents a viable, workable and progressive alternative to outsourcing. This would be true not only in a university context, but in many public institutions which contract external service providers for goods and services.

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Original Research Article

Assessing operational efficiency and the use of strategic capabilities in the rail transport industry in Namibia

Michael Ochurub^{1*}, Andrew Jeremiah¹

¹Department of Management, Namibia University of Science and Technology (NUST), Windhoek, Namibia

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ABSTRACT

This paper assessed the operational efficiency as well as the use of valuable resources and strategic capabilities within the rail transport industry/sector in Namibia, with specific reference to TransNamib Holdings Limited. This paper also focusses on the long-term direction of the rail transport sector as well as the causes of poor performance in the sector. The researchers analysed the questionnaires using descriptive statistics. The researchers explored and presented the individual variables to show specific values, highest and lowest values, trends, propositions and distribution values. The major findings from the data collected revealed that available resources and strategic capabilities are effectively utilized to optimize operational efficiency and that the top management does not pay much attention to development of strategic capabilities, customer value, new strategies, corporate governance, risk management, communication, benchmarking, knowledge management etc. It is also evident from that findings that the main causes of poor performance are the lack of strategic direction and long-term objectives, decline in volumes transported, lack of new technologies to create value, lack of funding or financial assistance from the shareholders, lack of performance agreements and measures as well as the aging and poor rail transport infrastructure. It is recommendable that TransNamib Holdings Limited develop strategies to turn around the current situation to transform the company into self-sustaining and profitable organization. The rail transport sector needs restructuring to streamline the business operations, with more focus on core business, secure funding, enhanced customer services, enhance value proposition for road-to-rail strategy, and enhancing stakeholder and shareholder relations.

1. Introduction

This study explores the view that the companies in rail transport sector can only increase its operational efficiency if they effectively utilise strategic capabilities, because even the successful strategies are dependent on the organisation having the strategic capability to perform at the level required for success (Johnson et al, 2017). The rail transport industry of Namibia traced back to 1895 when a first local railway was constructed in 1895 for commercial purposes. After the independence of Namibia in March 1990, the new government established TransNamib Holdings Limited (Pty) to take control of the national rail network.

The company was established in terms of the National Transport Services Holding Company Act, no. 28 of 1998 and specialises in the transportation of bulk and

containerized freight utilizing a combination of rail and road transportation (Integrated Strategic Business Plan, 2018). Hence, the specific focus of this study would be on TransNamib Holdings Limited. In this context, the study aims to assess and analyse the operational efficiency in the rail transport industry in Namibia as well as the use and development of strategic capabilities to optimise operational efficiency in this sector.

The strategic capability is concerned with providing products or services to customers that are valued and whether the organisation has necessary resources, competencies and strategies in place for value creation and effective service delivery (Johnson, Scholes, Wittington, Angwin & Regner, 2017). In this context, the researchers explore and assess the ability of companies in the rail transport industry to harness all its skills,

*Corresponding author: mochurub@nust.na or michaelochurub62@gmail.com

capabilities and resources in order to gain competitive advantage, and thus survive and increase its value over time (Brunninge, 2009). The researchers also put emphasis on the causes of poor performance, operational challenges and difficulties experienced in the rail transport industry in Namibia. Furthermore, the researchers opined that communication within any organisation is crucial for building sound relationships among employees and enhancing operational efficiency.

Therefore, this study also explore how TransNamib communicate the underlying and enduring core strategic issues that guides the organisation's strategy and define the way that the organisation should operate (Burt, Kilduff & Tasselli, 2013). A thorough analysis would be conducted on how the strategic capabilities might provide sustainable competitive advantage in terms of VRIO (Valuable, Rarity, Imitability and Organisational support) to the rail transport sector in Namibia (Alon & Herbert, 2009).

The rail transport system in Namibia was developed to accommodate needs far in excess of present-day requirements, but the economic viability and long-term survival of TransNamib is under threat. During the past 20 years, significant structural changes in the mode of transport surfaced, with both the number of commodities and passengers showing a dramatic drop and losing their market share to other modes of traffic. TransNamib Limited's rail transport tonnage declined dramatically. During the financial year ending 31st March 2018 the operating loss of TransNamib LTD rail and road amounted to N\$ 86 million, reflecting the fact that operating expenditure spiralled out of control. Consequently, the rail system is faced with maintenance costs of a large spare capacity which cannot be optimally used.

TransNamib Holding Limited has to continuously adjust to an ever more rapid structure and technological change in the transport sector and as a result of the liberalisation of the market, facing a severe onslaught by the competition of the private road hauliers. In respect of road versus rail, the scales have tipped in favour the right of road, a trend that will accelerate if the top/executive management does not devise and implement the appropriate strategies, with a specific focus on effective utilisation of its strategic capabilities.

However, Bach & Allen (2010) acknowledge that strategic capabilities are difficult to manage and develop as it arises from everyday tasks of the organisation's employees, and are often the unquestioned ways of carrying out the job activities, which distinguishes the organisation by providing better customer services than their competitors. From the Resource-based view (RBV) of Winter (2015), it is clear that the uniqueness of the organisation's resources and capabilities are not sufficient to sustain

its competitive advantage in a profitable manner, because it is the way resources are configured that is the source of competitive advantage (Barney, 2016).

Therefore, the purpose of this study is to focus on the operational efficiency of TransNamib Holdings Limited, which is the measure of how much costs are incurred by the company during a given economic or financial activity, where lower costs equals greater efficiency. The researchers will also explore the use of resources and strategic capabilities to achieve its basic objective of delivering quality goods and services to its customers in the most cost-effective and timely manner, and by doing so increase its revenue base.

This study also focus on the long-term direction of TransNamib Holdings Limited as a State owned enterprise solely responsible for the provision of rail transport services in Namibia and analysis of the causes of problems and poor performance within the rail transport sector. The extent to which TransNamib Holdings Limited strengthen or complements its strategy for greater benefits and improvement of operational efficiency is a crucial aspect of this research.

2. Methodology

This research focusses on the logical sequence that connects the empirical data to the research questions on assessing the use of strategic capabilities to improve operational efficiency in the rail transport industry. Hence, in considering an appropriate design and methodology, a quantitative approach best fit the purpose of this research. A number of variables and constructs were identified in this research and operationalised. The research was done in number of stages as the first stage dealt with an intensive literature review as this research is also rooted in deductive logic given the abundance of literature available in this area of the study.

The second stage focuses on the creation of a quantitative study questionnaire addressing the research questions, research problem and the purpose of this study. The last stage was based on the administration of the questionnaire in the wider sample of 60 employees ranging from executive management to the employees at the lower levels within TransNamib Holdings Limited as an in-depth analysis of a single case. The quantitative method of data collection applied in this research involved the objective measurement of data followed by numerical analysis of data through the use of SPSS to infer results to the larger population of employees at the TransNamib Holdings Limited and to generalise findings. Hence, the methodology in this research aims to describe and analyse quantitative method, throwing light on its limitations and sources, clarifying its suppositions and consequences, relating its

potentialities to twilight zone at the frontiers of knowledge (Witt & Redding, 2013).

2.1 Research methods

TransNamib Holdings Limited, as a rail transport sector, employs 1770 people in Namibia, but the focus of this paper was on the employees at the Head Office in

Windhoek, which employs 500 people. There are 9 Executives, 23 middle management staff, 58, specialised/supervisory staff, 118, skilled and 99 unskilled staff members. The researchers used stratified random sampling method to selected participants from various departments as indicated on Table 1.

Table 1: Departments and number of participants form each department

Departments and number of participants from each department					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Engineering & Technical Services	10	16.7	16.7	16.7
	Operations	5	8.3	8.3	25.0
	Human Capital	5	8.3	8.3	33.3
	Finance	5	8.3	8.3	41.7
	Properties	5	8.3	8.3	50.0
	Innovation & Technology	7	11.7	11.7	61.7
	Corporate Services	7	11.7	11.7	73.3
	Commercial & Marketing	16	26.7	26.7	100.0
	Total	60	100.0	100.0	

Source: Authors' computation

The strata of employees selected are only from the first four categories namely executive/senior management, middle management, Specialised/senior supervisory and skilled workers due to their knowledge and understanding in strategic issues within the company, which are 208 in total Five (5) executives, fifteen (15) middle managers, thirty-five (35) specialist/senior supervisors and five (5) skilled employees or officers completed questionnaires. (See Table 1).

2.2 Ethical considerations

Ethical considerations were considered during exploration of secondary data collection as well as analysis and interpretation, given its sensitivity. All participation was voluntary and participants could withdraw at any stage. This voluntary process did not infringe on the rights of any respondents.

3. Research results and findings

The data collected revealed that forty three (43) (71.7%) males completed the questionnaires compared to seventeen (17) (28.3%) of their female counterparts. A vast majority (25) (41.7%) of respondents have honours degrees, nineteen (19) (31.7%) have bachelor's degrees, eleven (11) (18.3%) have master's degrees, two (2) (3.3%) have diplomas, two (2) (3.3%) have certificates and the remaining one (1) (1.7%) has grade 12. It is evident from the data collected that most of the respondents (18) (30%) have 6-10 years of working experience in the rail industry of TransNamib Holdings Limited. Fifteen (25%) have 11-

15 years of working experience, fourteen (23.3%) have 2-5 years of working experience, seven (11.7%) have over 21 years of working experience and the remaining six (10%) have 16-20 years of working experience in the rail transport industry.

3.1 Managing strategic capabilities

Strategic capabilities could be considered strenuously by investing in training and developing employees, and by encouraging employees to upgrade their skills and knowledge (Eisenhardt and Martin, 2018). This focuses on managing capabilities, which also involves conducting capability audits, evaluating and building employees to create intangible value, managing their competencies by motivating and retaining competent and committed employees. In Table 2, the data collected revealed that a vast majority (81.6%) (49) of respondents disagree that the top management understand the importance of Resource Based View (RBV) for the rail infrastructure. The same number of participants (46) also disagree that the development of strategic capabilities take place and is considered as one of the priorities. Developing strategic capabilities for the organization involves expanding operations by relying on developing own internal resources and capabilities internally through assessing organization's core competencies and by determining and exploiting the strength of its current resources with the aid of VIRO (value, inimitability, rarely and organization support) framework (Johnson, Scholes, Wittington, Angwin, & Regner, 2017). External capability development is also crucial, which focus more on

putting in place external growth strategies to increase output with the aid of resources and capabilities that are not internally developed such as merger with or acquisition or partnership with other companies. Hence, it is vital to leverage and stretch capabilities in the rail transport sector. It is much inferential from the

data collected (83.3%) that customer value in terms of products and services needed and provided is not well understood. Only 8.3% of the participants agree that there is understanding of customer value in the rail transport sector in Namibia. See Table 2.

Table 2: Summary of respondents' perception on the use of strategic capabilities

Strategic capabilities	Strongly disagree	Disagree	Do not know	Agree	Total
	Percent (Frequency)	Percent (Frequency)	Percent (Frequency)	Percent (Frequency)	Percent (Frequency)
Resource Based View (RBV) for the rail infrastructure	53.3% (32)	28.3% (17)	10.0% (6)	8.3% (5)	100.0% (60)
Development of strategic capabilities as a priority	28.3% (17)	53.3% (32)	10.0% (6)	8.3% (5)	100.0% (60)
Customers value in terms of products and services	43.3% (26)	40.0% (24)	8.3% (5)	8.3% (5)	100.0% (60)
Strategic capabilities and competitive advantage	68.3% (41)	15.0% (9)	8.3% (5)	8.3% (5)	100.0% (60)
Data on challenges and limitations of rail transport	46.7% (28)	8.3% (5)	0 (0)	45.0% (27)	100.0% (60)
New strategies to address and meet the challenges	16.7% (10)	33.3% (20)	0 (0)	50.0% (30)	100.0% (60)
Good corporate governance and risk management	35.0% (21)	38.3% (23)	0 (0)	26.7% (16)	100.0% (60)

Source: Authors' computation

Employees have to build enduring relationship of trust with the customers through customer connection, exposure to and interaction with customers. Even from the resource-based view (RBV), the top management has to consider whether the organization has strategic capabilities to achieve competitive advantage. It means considering to which extent it has capabilities that are value strategies, rare, animatable, and organizational support and organising the company around these capabilities and resources to achieve competitive advantage. The findings revealed that a vast majority of respondents (83.3%) disagree that strategic capabilities are regarded as source of competitive advantage in rail infrastructure. Competitive strategy is about being different, which means deliberately choosing a different set of activities to deliver unique mix of value (Ferrari, Bonaccorso, Falko, Novoselov, Roche, Boggild & Borini, 2015). In competitive environments, an organization needs to better than others seeking the same goal and increase its capability to be superior to other rival companies. It is clear from the data collected that most of participants (55%) disagree that employees are always informed about the challenges and limitations of rail transport, whereas the remaining 45% agree that employees are always informed about the challenges. The responses indicates that 50% of participants disagreed that the top management devise new strategies to address and meet the challenges of the

rail transport, whereas the remaining 50% agree. Table 2 also revealed that a vast majority of respondents (73.3%) (43) disagreed that good corporate governance is practiced improving the corporate image and risk management. However, corporate governance is concerned with the structures and systems of control by which managers are held accountable to those who have a legitimate stake in an organisation (Barney & Feline, 2013). Hence, connecting stakeholder interests with management action is a vital part of strategy. Barney & Felin (2013) maintain that failures in corporate governance may result in calamitous strategic choices in many leading companies, even resulting in complete destruction of companies.

3.2 Strategic planning initiatives

As indicated in Table 3, the data collected revealed that there is a strategic plan in place to provide the future direction for the rail transport in Namibia. However, most of the respondents (66.6%) denied that there are any other additional plans in place to make TransNamib self-sustaining and profitable in the long run. The findings also revealed that the top management does not share the operational and financial challenges experienced with the shareholder and other stakeholders (See Table 3).

Table 3: Summary of respondents’ perception on strategic planning within the company

Strategic planning	Definitely not	No	Uncertain	Yes	Yes definitely	Total
	Percent (Frequency)	Percent (Frequency)	Percent (Frequency)	Percent (Frequency)	Percent (Frequency)	Percent (Frequency)
Strategic plan in place	3.3% (2)	3.3% (2)	5.0% (3)	45.0% (27)	43.3% (26)	100.0% (60)
Any additional plans in place	58.3% (35)	8.3% (5)	1.7% (1)	16.7% (10)	15.0% (9)	100.0% (60)
Operational and financial problem	45.0% (27)	20.0% (12)	21.7% (13)	5.0% (3)	8.3% (5)	100.0% (60)
Financially assistance	26.7% (16)	40.0% (24)	23.3% (14)	5.0% (3)	5.0% (3)	100.0% (60)
Performance measurement	35.0% (21)	43.3% (26)	10.0% (6)	3.3% (2)	8.3% (5)	100.0% (60)
Competitive advantage	31.7% (19)	33.3% (20)	3.3% (2)	16.7% (10)	15.0% (9)	100.0% (60)
Organisational structure	36.7% (22)	25.0% (15)	10.0% (6)	13.3% (8)	15.0% (9)	100.0% (60)

Source: Authors’ computation

It is assumed that it could be the reason why most of respondents (66.7%) denied the government does not do anything to financially assist the operations and projects in rail infrastructure. It is evident from the data collected that a vast majority of respondents (78.3%) (47) denied that there are any performance measurement systems in place to address organisational and employee performance issues. There is no belief that TransNamib will achieve competitive advantage in the near future. Most of the respondents (61.7%) (37) also feel that TransNamib does not have an appropriate organisational structure in place to optimise operational efficiency (See Table 3).

3.3 Cost, new technologies and process failures

According to the [Integrated Strategic Business Plan \(2018\)](#), TransNamib Holdings Limited is technically insolvent and is incurring ±N\$30 million losses per month. This situation was mainly caused by a steady decrease in volumes transported from 3.9 ton in

1980’s to 1.52 ton since 2016 as well as increasing operational costs. The rail transport sector also experienced a lack of funding for the maintenance of assets such as rolling stock and railway infrastructure throughout the years.

In this context, the data collected revealed that there are plans in place to reduce costs and improve revenue generation process in the rail transport industry in Namibia, whereas 33.3% of the participants denied that there are any plans in place. However, the findings revealed that 50% of the participants denied that there are any new technologies in place to address costs, process failures and operational deficiencies, whereas 36.7% agreed. 50% of the respondents indicated that the financial statements are not regularly presented to the government and other stakeholders, whereas 12% agreed and the remaining 30% are not sure. It is evident from the data collected (76.7%) (46) that there are no adequate resources and core competencies for value creation and provision of necessary services to meet customer needs. See Table 4.

Table 4: Respondents perception on costs, new technologies and process failures

Costs, new technology and process failures	No	Uncertain	Yes	Total
	Percent Frequency	Percent Frequency	Percent Frequency	Percent Frequency
Any plans in place to reduce costs and improve revenue generation?	33.3% (20)	25.0% (15)	41.7% (25)	100.0% (60)
Any new technologies in place to address costs, process failures and operational deficiencies?	50.0% (30)	13.3% (8)	36.7% (22)	100.0% (60)
Financial statements presented regularly to the government and other stakeholders?	50.0% (30)	30.0% (18)	20.0% (12)	100.0% (60)
Adequate resources and core competencies for value creation and provision of services	46.7% (28)	30.0% (18)	23.3% (14)	100.0% (60)

Source: Authors’ computation

Analysis indicated that there are deficiencies in operational and governance controls, poor management of internal and external strategic capabilities as well as limited action taken to reduce operating costs.

3.4 Best practices to enhance operational efficiency

According to Ryall (2013), the top management should develop communication strategies to ensure that the information they provide aligns with the project goals,

organisational objectives as well as their visions and missions. However, the data collected indicates the executives do not always communicate new system with the fellow employees (See Table 5). It was also found that the employees are never (35%) or rarely (20%) encouraged and assisted to upgrade their skills and knowledge in rail transport. The data collected revealed that TransNamib does never (30%) or rarely (28.3%) benchmark its operations and practices with rail industry leaders globally. See Table 5.

Table 5: Summary of respondents’ opinions on best practices

Best practices	Never	Rarely	Sometimes	Often	Always	Total
	Percent Frequency	Percent Frequency	Percent Frequency	Percent Frequency	Percent Frequency	Percent Frequency
Communication	40.0% (24)	11.7% (7)	16.7% (10)	16.7% (10)	15.0% (9)	100.0% (60)
Upgrade their skills/knowledge	35.0% (21)	20.0% (12)	13.3% (8)	18.3% (11)	13.3% (8)	100.0% (60)
Benchmarking of operations	30.0% (18)	28.3% (17)	21.7% (13)	18.3% (11)	1.7% (1)	100.0% (60)
Knowledge and knowledge management	40.0% (24)	20.0% (12)	8.3% (5)	15.0% (9)	16.7% (10)	100.0% (60)
Corrective actions taken	58.3% (35)	31.7% (19)	5.0% (3)	3.3% (2)	1.7% (1)	100.0% (60)

Source: Authors’ computation

In this regard, Dobusch & Schussler (2013) cited that benchmarking will help any organisation to develop capabilities and create value in the same way as the other companies globally in the industry and those offering best-in-class performance. Dobusch & Schussler (2013) maintain that during benchmarking, organisational capabilities are take into account to achieve a threshold level and competitive parity, but still the organisation has to move further and develop its own distinctive resources and capabilities. Skills can also be managed by generating new ideas through benchmarking. The findings also revealed that the importance of knowledge and knowledge management are never addressed within the rail transport industry. Gomes, Angwin & Melahi (2012) contend that the most important point is that the employees must be grounded in tacit knowledge,

which ensures that they are not easily documented, imitated by and transferred between competitors.

3.5 The causes of problems and poor performance in the rail transport sector in Namibia

The poor performance of the rail transport sector also requires the determination of long-term goals and objectives as well as adaptation of courses of action and allocation of resources necessary for optimizing operational efficiency (Witcher & Chau, 2018). In contrast, the findings revealed that a vast majority (91.7%) of respondents strongly agree that the lack of strategic direction and long-term objectives detrimentally affect the operational efficiency and performance of the rail transport sector in Namibia (See Table 6).

Table 6: Lack of strategic direction and long-term objectives to achieve operational efficiency

Lack of strategic direction and long-term objectives to enhance and achieve operational efficiency					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	55	91.7	91.7	91.7
	Agree	4	6.7	6.7	98.3
	Do not know	1	1.7	1.7	100.0
	Total	60	100.0	100.0	

Source: Authors’ computation

A vast majority (90%) of the respondents agreed that the decline in transported volumes and the lack of

operational efficiency creates problems and affect the profitability of the rail transport sector (See Table 7).

Table 7: Decline in transported volumes and lack of operational efficiency

Decline in transported volumes and lack of operational efficiency					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	54	90.0	90.0	90.0
	Do not know	3	5.0	5.0	95.0
	Disagree	3	5.0	5.0	100.0
	Total	60	100.0	100.0	

Source: Authors' computation

The [Integrated Strategic Business Plan \(2018\)](#) also confirmed that after independence, Namibia suffered a decline in volumes transported from South Africa due to the changes in import and rail transport legislation.

The data collected revealed that there is a lack of government funding, capital investment or financial assistance to the rail transport sector, which affects the performance of the sector (See Table 8).

Table 8: Lack of government funding, capital investment or financial assistance

Lack of government funding, capital investment or financial assistance to the rail transport sector					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	53	88.3	88.3	88.3
	Agree	7	11.7	11.7	100.0
	Total	60	100.0	100.0	

Source: Authors' computation

Table 9 indicates that a vast majority (83.3%) of the respondents strongly agree that there is a leadership crisis and a lack of leadership vision at TransNamib Holdings Limited. The [Integrated Strategic Business](#)

[Plan \(2018\)](#) also confirmed that the uncoordinated interaction between the shareholder, the board and management has detrimental impact on the operations and performance of the company.

Table 9: Leadership crisis and lack of leadership vision

Leadership crisis and lack of leadership vision					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	50	83.3	83.3	83.3
	Agree	7	11.7	11.7	95.0
	Do not know	2	3.3	3.3	98.3
	Disagree	1	1.7	1.7	100.0
	Total	60	100.0	100.0	

Source: Authors' computation

A vast majority (90%) of respondents strongly agree that rail infrastructure is aging and poor and that there is also poor skills management and development within the sector (see Table 10). TransNamib Holdings Limited was created as a state-owned enterprise responsible for rail transport services in Namibia but has inherited old and dilapidated railway infrastructure without sufficient funding from the government to

maintain and upgrade the rail infrastructure ([Integrated Strategic Business Plan, 2018](#)). Hence, the lack of refurbishment of the old railway infrastructure is affecting the operations, resulting in frequent derailment of trains and mandatory speed restrictions along significant sections of the railway lines. See Table 10.

Table 10: Aging and poor rail infrastructure as well as poor skills management and development

Aging and poor rail infrastructure as well as poor skills management and development					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	54	90.0	90.0	90.0
	Agree	5	8.3	8.3	98.3
	Do not know	1	1.7	1.7	100.0
	Total	60	100.0	100.0	

Source: Authors' computation

The rolling stock in terms of train and the railway are aging and have already passed its economic life. The systems, technology and equipment are archaic, needing considerable investment for upgrading to modern standards (Integrated Strategic Business Plan, 2018). TransNamib must focus on providing quality reliable freight and passenger rail services, maintaining, replacing and modernising its rolling stock and infrastructure through the engineering business

divisions and managing properties profitably (Witcher & Chau, 2018). This will require capital, which will be partially funded through recapitalisation of debt into equity, the sale of non-core assets, loans, Government subsidies and potential PPP agreements.

However, the data collected revealed that a vast majority (86.7%) of the participants strongly agree that there is a lack of value creation for customers as well as poor customer services delivery (See Table 11).

Table 11: Lack of value creation for customers and poor customer service delivery

Lack of value creation for customers and poor customer service delivery					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	52	86.7	86.7	86.7
	Agree	4	6.7	6.7	93.3
	Do not know	1	1.7	1.7	95.0
	Disagree	2	3.3	3.3	98.3
	33.00	1	1.7	1.7	100.0
Total		60	100.0	100.0	

Source: Authors' computation

Oliver (2018) contends that the value chain and value systems could be created and strengthened through the use and development of valuable resources and strategic capabilities to turn rail transport sector in a profitable industry in Namibia. Oliver (2018) maintains that this put more emphasis on analysing various categories of activities within the organisation, which create best customer services delivery and set of inter-

organisational links and relationships that are more fundamental and crucial aspects of customer services.

A lack of effective utilization and development of internal and external strategic capabilities was also identified as one of the causes of problems within the rail transport sector in Namibia by a vast majority of respondents (88.3%) (See Table 12).

Table 12: Lack of effective utilization/development of internal and external strategic capabilities

Lack of effective utilization and development of internal and external strategic capabilities					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	53	88.3	88.3	88.3
	Agree	6	10.0	10.0	98.3
	Disagree	1	1.7	1.7	100.0
	Total	60	100.0	100.0	

Source: Authors' computation

Burt, Kilduff & Tasselli (2013) argue that the available resources, skills and capabilities must be utilised effectively, which also includes assets management,

information, human and financial resources. They maintain that this is one of the best strategies to achieve competitive advantage in the sector.

Table 13: Lack of proper communication between management and employees about performance improvements, agreements and measures.

Lack of proper communication between management and employees about performance improvements, agreements and measures					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	47	78.3	78.3	78.3
	Agree	7	11.7	11.7	90.0
	Do not know	4	6.7	6.7	96.7
	Disagree	2	3.3	3.3	100.0
	Total	60	100.0	100.0	

Source: Authors' computation

It was found that there is a lack of proper communication between management and employees about performance improvements, agreements and measures (See Table 13). [Sytch, Tatarynowicz & Gulati \(2012\)](#) argue that effective communication is vital for the success of any organization. Hence, there is a need for proper communication between

management and employees about performance management systems.

It is inferential from the findings that a lack of performance agreements between the shareholder, Board of Directors and the top management is also one of the main causes of poor performance in the rail transport sector (see Table 14).

Table 14: Lack of performance agreements between the shareholder, Board of Directors and top management.

Lack of performance agreements between the shareholder, Board of Directors and top management					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Strongly agree	58	96.7	96.7	96.7
	Do not know	2	3.3	3.3	100.0
	Total	60	100.0	100.0	

Source: Authors' computation

According to the [Integrated Strategic Business Plan \(2018\)](#), this situation created serious performance problems, commitment and leadership crisis within the organization, which manifested and culminated in the lack of strategic direction, goal implementation, and performance monitoring within the company.

4. Conclusion and recommendations

In conclusion, this research assessed and analysed the operational efficiency in the rail transport industry in Namibia as well as the use and development of strategic capabilities to optimise operational efficiency in this sector. It is important to stress or reiterate that the strategic capability is concerned with providing products or services to customers that are valued and whether the organisation has necessary resources, competencies and strategies in place for value creation and effective service delivery ([Johnson, Scholes, Wittington, Angwin & Regner, 2017](#)).

The major findings of this research revealed that the strategic capabilities are not utilised and developed effectively within the rail transport industry in Namibia, especially at TransNamib Holdings Limited, which is solely responsible for delivery of rail transport services in Namibia as a state-owned enterprise. Although TransNamib Holdings Limited has developed few initiatives and put in place some plans to improve operational efficiency and increase profitability, it is evident from the data collected that the main cause of problems is never addressed by the top management. Very little has been done to turn around the current situation and to transform it into self-sustaining and profitable organization. This situation obviously requires additional strategies and plans to create a clear long-term objectives and competitive strategy for the company.

Therefore, it is recommendable that the strategic objectives should aim at restructuring and streamlining the business with a specific focus on core business,

secure funding, enhanced customer services, enhance value proposition for road-to-rail strategy, and enhancing stakeholder and shareholder relations. It is also recommended that TransNamib Holdings Limited must prioritize alignment of logistics services and operational processes to customer needs as well as expanding, upgrading and maintenance of rail infrastructure as part of its objectives. Other critical areas for focus are improvement of asset management, transformation of corporate image, enhanced operational safety, enhanced corporate governance and risk management as well as introduction of fit-for-purpose technology, systems and equipment. TransNamib must also consider creating a customer centric culture served by empowered, motivated and productive employees who are willing and committed to contribute towards development of performance-oriented and achievement-oriented culture within the company ([Bach & Allen, 2010](#)).

The rail transport sector in Namibia must concentrate on creating and providing value for its customers through improved rail transport services at the cost that would allow the organization to make acceptable returns. Furthermore, TransNamib will execute on a road-to-rail strategy, where a focused approach will be taken to enhance TransNamib's value proposition with respect to price, service and overall experience to best compete against road service providers.

This paper also proposes that TransNamib will have to change the culture and mind-sets of its executive management team and employees to a high-performance efficient railway business. This will require extensive change management, total business re-engineering of all its processes and an effective performance management system. This will be accompanied by a revamp of governance and risk management protocols as well as a skills development programme.

Lastly TransNamib will rebrand the company's image to an organisation which provides excellent and reliable rail services. SWOT analysis could be conducted to assist in providing useful information about how the strengths and weaknesses are explored in an analysis of resources and capabilities as well as the opportunities and threats explored in the analysis

of environment (Oliver, 2018). Benchmarking would assist at comparing organisation's performance or capabilities against best-in-class performance of other organisations in the rail transport industry. It may also help to challenge mindset of some managers that acceptable improvement in performance will result from incremental changes in resources or capabilities.

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Original Research Article

Knowledge, attitudes and practices towards COVID-19 prevention measures among private clinic patients in Windhoek, Namibia

Alexis Ntumba^{1,2}, Opeoluwa Oyedele³, Lawrence Kazembe^{3*}

¹Dr Alexis Ntumba Medical Practice, Windhoek, Namibia

²Khomas Medical Centre, Windhoek, Namibia

³Department of Statistics and Population Studies, University of Namibia, Windhoek, Namibia

*Corresponding author: lkazembe@yahoo.com

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ABSTRACT

In December 2019, the SARS-CoV-2 virus emerged in Wuhan, Hubei Province, China, and later spread rapidly to other parts of China and eventually across all countries around the world, including Namibia. Despite causing severe to fatal acute respiratory syndrome, there are no known cures for the SARS-CoV-2 virus, only preventive measures such as social distancing, hands sanitizing, hands washing, wearing masks, and full-dosed COVID-19 vaccination. For this reason, this study was aimed at assessing the Knowledge, Attitudes and Practices (KAP) towards COVID-19 prevention measures among private clinic patients in Windhoek during 1 October to 30 November 2021. A cross-sectional analytic study using quantitative method was used with data collected in a single round among patients visiting two private clinics in Windhoek. Results showed that more than half (62%) were females, 58.5% were single and 70% attended tertiary education and 71% were employed as of 30 November 2021. In addition, at least 90% of the participants knew each of the COVID-19 prevention measures, while more than three-quarters (79%) had comprehensive knowledge of the measures, with 65% of them knowing that one needs two shots of the COVID-19 vaccine for immune protection against the virus. At least 90% of the participants were in favour of practicing each COVID-19 prevention measure, while more than three-quarters (81.5%) had comprehensive positive attitude towards the measures in general. However, less than half (48%) of the participants believed that the COVID-19 vaccines can prevent one from the virus. Moreover, more than 95% of the participants were practicing each COVID-19 prevention measures, with 90% practicing all the prevention measures at the same time, with the exception of the COVID-19 vaccination as only 37% of the participants were vaccinated. Seeing as the participants had very good knowledge, attitudes and practices towards COVID-19 prevention measures, with barely more than a quarter of them vaccinated against COVID-19, the health education and awareness of COVID-19 in the country must continue in order to maintain the very good KAP of its prevention measures in Windhoek.

1. Introduction

In December 2019, a new virus (initially) called the 'Novel Coronavirus 2019-nCoV' (later renamed the SARS-CoV-2 by the World Health Organization (WHO) emerged in Wuhan, Hubei Province, China, and later spread rapidly to other parts of China and eventually across all countries around the world, despite China's massive efforts to contain the disease within Hubei in 2019 (Boulos & Geraghty, 2020). The SARS-CoV-2 virus, often referred to as the COVID-19 virus causes severe to fatal acute respiratory syndrome with no known cure for it, thus making it a global public health to date. According to the Worldmeter COVID-19 live

update, as of 16 February 2022, the world recorded a total of 416,326,701 COVID-19 cases globally, with 5,858,384 deaths and 339,213,703 recoveries. In South Africa, there were a total of 3,645,269 confirmed cases, with 97,431 deaths and 3,511,001 recoveries, while in Namibia, a total of 156,843 confirmed cases, 3,995 deaths and 152,182 recoveries were recorded. In addition, COVID-19 has caused over 15,000 residents to lose their jobs due to the national lockdowns and restrictions enforced by the president and national security forces of Namibia to curb

the spread of the virus in the country, while the months of June to August 2021 saw over 2,000 died as a result of COVID-19 among residents of Namibia, across different age groups with and without comorbidities.

Just like other countries in the world, The Namibian Newspaper on 23 December 2021 (pg. 6) stated that Namibia battled two COVID-19 variants (Beta and Delta) in 2021, while the less-known Omicron variant at the time was driving the country's fourth wave of infections. The drastic effect of the Delta variant saw the Namibian health system crack under pressure during the third COVID-19 wave as lack of hospital beds and oxygen tanks in both government and private health facilities left health workers with extremely difficult daily decisions to make due to the exponential increase in the daily rates at which residents infected with COVID-19 were rushing to health facilities across the country for medical assistances. In addition, the third wave was so ravaging that it resulted in a total of 67,525 new infections and over 2,400 deaths in just three months (June to August) in Namibia. The WHO first confirmed that this variant which was first discovered in India in June 2021, and later became detectable in a total of 98 countries globally. On 5 July 2021, the Ministry of Health and Social Services (MoHSS) confirmed the presence of the Delta variant in positive samples tested in the Khomas region of Namibia.

Moreover, in December 2021, Namibia confirmed the Omicron variant in the country, which later drove the country to the fourth wave outbreak. As of 21 December 2021, there were 10,643 active cases recorded in the country, with 3,593 COVID-19 deaths recorded since the beginning of the pandemic in Namibia in March 2020 (MoHSS, 2021). Just as done in other countries globally, the COVID-19 vaccination campaign in Namibia was launch in March 2021, with less than 25% of the population vaccinated by December 2021 (MoHSS, 2021). However, during December 2021, the daily vaccination rate increased by 10% compared to all other months since March 2021 (MoHSS, 2021).

According to MoHSS report in 2022, as of 16 February 2022, Windhoek alone recorded a total of 50,944 COVID-19 cases and 901 deaths. Therefore, this study was commissioned to assess the Knowledge, Attitudes and Practices (KAP) towards COVID-19 prevention measures among patients attending two private clinics in Windhoek and suggest recommendations to reduce the COVID-19 transmission.

2. Methods

A cross-sectional analytic study using quantitative method was used with data collected in a single round among patients visiting two private clinics in Windhoek. Considering the target population, a

systematic random sampling was used to select the sample members of 200- patients from 1 October to 30 November 2021. To be precise, every third patient visiting the selected private clinics was selected to participate in this study until the desired sample size (200 patients) was reached. The inclusion criteria of this study were all patients visiting the selected two private clinics in Windhoek aged at least 18 years.

The sample size of this study was estimated based on the average number of patients seen per month at the two selected private clinics in Windhoek using a two-stage procedure as follows. The first stage was to determine the target population, which was based on the monthly average of the patients visiting the two selected private clinics. On average, there were 985 visiting patients in one clinic and 840 patients in the second clinic, loosely translated to a total of 1825 patients per month in these clinics. The second stage was the sampling selection of the sample members to consider in this study, achieved by using the systematic random sampling, with every third patient visiting the clinics selected till the desired sample size of 200 was achieved. Afterwards, data were collected from the patients that satisfied the inclusion criteria of this study within the two private clinics in Windhoek, through the use of a structure questionnaire. This questionnaire consisted of two sections: the demographic section (age, sex, educational level, occupation and marital status) and the KAP towards COVID-19 prevention measures section. The total of 200 patients were selected for the purpose of the study based on the following assumptions: (i) 50% chance of finding patients with comprehensive knowledge of COVID-19 prevention measures; (ii) precision of 95% confidence interval; (iii) a 10% marginal of error between the target population and sample; and (iv) a design effect of 2 to capture clustering between the two clinics.

The collected data was extracted from the completed questionnaires and captured on a Microsoft Excel spreadsheet. The data were later analyzed using SPSS version 23. For the data analysis of this study, the descriptive statistics technique was used to showcase the Counts and percentage distributions of the patients' responses in figures and tables, while the chi-square tests for associations was performed to assess the crude associations between the KAP COVID-19 prevention measures against the patients' demographic variables, with a significant association occurring when p -value < 0.05 .

3. Results

3.1 Sociodemographic characteristics of the participants

Out of the 200 participants considered in this study, 124 (62%) were females while 76- (38%) were males as shown in Table 1. Majority (43.5%) of the participants

were aged 25 to 34 years old, followed by 22.5% aged 35-44 years old, while only 3.5% were aged 55 years and above. Likewise, majority of the participants were single, had tertiary education, employed and were students as shown in Table 1.

Table 1: Sociodemographic characteristics breakdown of the 200 participants

Characteristics	Counts	Percentage
Sex		
Male	76	38
Female	124	62
Age (in years)		
18-24	31	15.5
25-34	87	43.5
35-44	45	22.5
45-54	30	15.0
55+	7	3.5
Education		
Primary	4	2
Secondary	56	28
Tertiary	140	70
Occupation		
Unemployed	18	9
Employed	142	71
Students	40	20
Marital status		
Single	117	58.5
Married	72	36
Others	11	5.5

3.2 Knowledge of COVID-19 prevention measures

From this study, more than 90% of the participants knew that one can prevent COVID-19 by social distancing (92.5%), hands sanitizing (91.5%), washing hands (91%) and wearing masks (90.5%) as shown in Table 2. Moreover, the general symptoms of COVID-19 include fever or chills, headache, fatigue and muscle or body aches, with the respiratory symptoms including congestion or runny nose, sore throat, cough and shortness of breath or difficult breathing while the digestive symptoms included nausea and/or vomiting, and diarrhoea. Apart from these symptoms, new loss of taste and smell have been highly linked to COVID-19 infection diagnosis. From this study, 94% of the participants knew the general symptoms of COVID-19, while 97% knew the respiratory symptoms, 88% knew the digestive symptoms and 98% knew that new loss of taste and smell were symptoms of COVID-19 as shown in Table 2. In addition, 83% of participants knew that one can have COVID-19 without symptoms and 17% did not know. From these deductions, it can be concluded that the knowledge of COVID-19 symptoms and prevention measures were very good among the participants. In Namibia, as of 1 October 2022, there were mainly AstraZeneca and Sinopharm COVID-19

vaccines that needed two separate doses, each at different interval, for one to be fully immunized. From this study, 65% of the participants knew that one needed two doses of the COVID-19 vaccine to be protected, while, 91% believed that a person that was fully vaccinated against COVID-19 virus can still get infected with the virus and 78.5% knew that a person fully vaccinated against the virus will have minor symptoms compared to a person that was not vaccinated once infected with COVID-19 as shown in Table 2. In addition, 90.5% of the participants knew that a person vaccinated can still die from a COVID-19 infection, while 79.5% stated that a fully vaccinated person can still transmit the virus to others.

Table 2: Knowledge of COVID-19 prevention measures among the 200 participants

	Counts	Percentage
Knowledge of COVID-19 prevention measures		
Prevention by social distancing	194	92.5
Prevention by sanitizing hands	183	91.5
Prevention by washing hands	182	91
Prevention by wearing masks	181	90.5
Knowledge of COVID-19 symptoms		
General symptoms of COVID-19	188	94
Respiratory symptoms of COVID-19	194	97
Digestive symptoms of COVID-19	176	88
New loss of taste and smell	196	98
Knowledge of COVID-19 vaccine		
2 shots for COVID-19 prevention	130	65
Fully vaccinated can still get COVID-19	182	91
Vaccinated person will have minor than unvaccinated	157	78.5
Vaccinated person can still die from COVID-19	181	90.5
Vaccinated person can still transmit COVID-19	159	79.5

3.3 Attitudes towards COVID-19 prevention measures

Furthermore, looking at the participants’ attitude towards COVID-19 prevention measures, 91% of the participants stated that practising social distancing was necessary to prevent a COVID-19 infection, 94.5% stated sanitizing hands was necessary as part of the prevention measures, 89.5% stated that it was important to wash hands and 90% stated that it was important to always wear mask in public places to prevent COVID-19 as shown in Table 3. From these deductions, it can be concluded that most participants had a very good attitudes towards COVID-19 prevention measures. In addition, less than half (48%) of participants stated that COVID-19 vaccine prevents COVID-19 infection. All participants used self-medication or tried something different to prevent COVID-19 infection, with 87.5% of them using vitamins (immune booster), 95.5% used lemon, 78.5% used ginger, 77.9% used garlic, 95% used steaming, 81.5% used hot water/tea and 54.5% used honey as shown in Table 3. However, only 8% of the participants used Ivermectin as part of their COVID-19 prevention measures.

Table 3: Attitudes towards COVID-19 prevention measures among the 200 participants

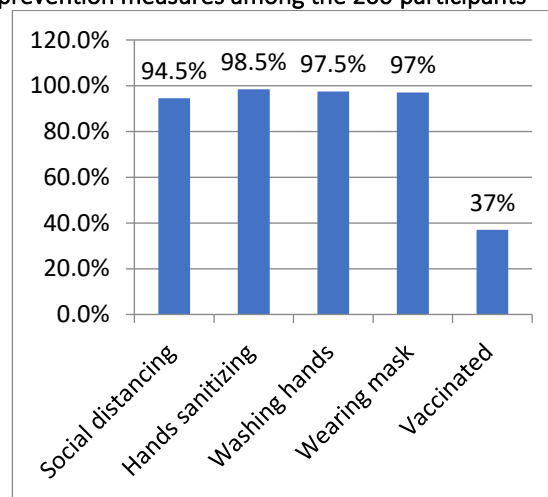
	Counts	Percentage
Attitudes towards COVID-19 prevention measures		
Think that social distancing is essential	182	91
Sanitizing hands is essential	189	94.5
Washing hands is essential	179	89.5
Wearing face mask is essential	180	90
Attitudes towards COVID-19 vaccine		
Think that COVID-19 vaccine prevents COVID infection	96	48
Think that COVID-19 vaccine prevents COVID-19 severity	159	79.5
Self-medication for COVID-19 prevention		
Vitamins/Immune Booster	175	87.5
Lemon	191	95.5
Ginger	157	78.5
Garlic	156	77.9
Steam	190	95
Hot water/tea	163	81.1
Honey	109	54.5
Ivermectin	16	8

3.4 Practices of COVID-19 prevention measures

The comprehensive knowledge on the prevention of COVID-19 considered in this study included social distancing, sanitizing hands, washing hands and wearing masks, as shown in Figure 1. The comprehensive knowledge of COVID-19 vaccine

assumed that the person knows that a COVID-19 vaccine exists, one needs two shots to be protected, a person fully vaccinated can still get COVID-19, a vaccinated person can get minor symptoms than the unvaccinated, a person fully vaccinated can still die from COVID-19 and a vaccinated person can still transmit COVID-19. More than three quarters (i.e. 79%) of the participants had comprehensive knowledge of COVID-19 prevention measures, with 38% having a comprehensive knowledge of COVID-19 vaccine, while 60% knew 5 of the 6 comprehensive COVID-19 vaccines. Moreover, regarding the attitudes and practices of participants towards COVID-19 prevention measures, 81.5% of the participants thought that all prevention measures must be adhered to while 90% of participants adhered to all four listed COVID-19 prevention measures.

Figure 1: Bar plot of the practices of COVID-19 prevention measures among the 200 participants



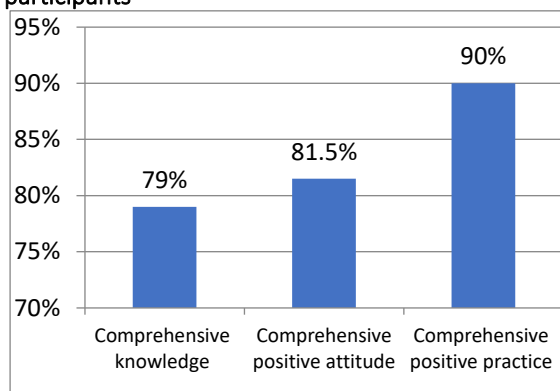
3.5 Comprehensive KAP towards COVID-19 prevention measures

Further a comparative analysis showed that 74.2% of the young adults aged 18-24 years (n=31) had comprehensive knowledge of COVID-19 prevention strategies, 80.6% had comprehensive positive attitudes and 96.8% had comprehensive positive prevention measures towards COVID-19. In addition, 73.6% of participants aged 25-34 years (n=87) had comprehensive knowledge of COVID-19 prevention measures, while 78.2% had comprehensive positive attitudes and 89.7% had comprehensive positive practices towards COVID-19.

Furthermore, 86.7% of the participants aged 35-44 years (n=45) had comprehensive knowledge of COVID-19 prevention measures, 86.7% had comprehensive positive attitude and 82.2% had comprehensive positive practice towards COVID-19. In fact, 86.7% of the participants aged 45-54 years (n=30) had

comprehensive knowledge of COVID-19 prevention measures, 80% had comprehensive positive attitude and 93.3% had comprehensive positive practice towards COVID-19. Finally, 85.7% of participants aged 55 years or more (n=7) had comprehensive knowledge of COVID-19 prevention strategies, all (100%) had comprehensive positive attitudes and all (100%) had comprehensive positive practice towards COVID-19.

Figure 2: Bar plot of the comprehensive KAP towards COVID-19 prevention measures among the 200 participants



3.6 Age and comprehensive knowledge, positive attitudes and positive practice

Furthermore, regarding sex and comprehensive knowledge, positive attitudes and practices towards COVID-19, 78.2% of the female participants (n=124) and 80.3% of the male participants (n=76) had comprehensive knowledge of COVID-19 prevention strategies as shown in Table 4. There was no difference between males and females with regard to comprehensive knowledge of COVID-19 prevention strategies. In addition, 78.2% of the female participants and 80.3% of the male participants had comprehensive positive attitudes towards COVID-19. There was no difference between males and females with regards to comprehensive positive attitudes towards COVID-19. Finally, 89.6% of the female participants and 93.4% of male participants had comprehensive positive practice of COVID-19. Also, there was no difference between males and females with regard to comprehensive positive practice towards COVID-19.

3.7 Crude associations between the KAP COVID-19 prevention measures against the patients' demographic variables

With regard to level of education, of the only 4 participants who attended primary education, 50% had had comprehensive knowledge of COVID-19 prevention measures, 85.7% of participants (n=56) who attended secondary education and 77.1% of

participants (n=140) who attended tertiary education had comprehensive knowledge of COVID-19 prevention measures. The difference was not statistically significant ($X^2=3.831$, p-value= 0.147) at a 5% level of significance. In addition, 75% of the participants who attended primary education, 83.9% of those who attended secondary education and 81.5% of those who attended tertiary education had comprehensive positive attitude towards COVID-19 p-value. The difference was not statistically significant ($X^2=0.388$, p-value=0.823). In fact, 75% of participants who had primary education, 91.1 % of those who attended secondary education and 90% of those who attended tertiary education had comprehensive positive practice towards COVID-19 prevention measures. The difference was not statistically significant ($X^2=1.071$. p-value=0.585).

Table 4: Distribution of the participants' sex and their comprehensive positive KAP

	Counts	Percentage
Sex and comprehensive positive knowledge		
Sex		
Female	97	78.2
Male	61	80.3
Otherwise		
Sex and comprehensive positive attitudes		
Sex		
Female	97	78.2
Male	61	80.3
Otherwise		
Female	27	21.8
Male	15	19.7
Sex and comprehensive positive practice		
Sex		
Female	109	89.9
Male	71	93.4
Otherwise		
Female	15	12.1
Male	5	6.6

4. Discussion

This study was conducted among patients aged at least 18 years attending two private clinics in Windhoek on KAP towards COVID-19.

Regarding the prevention measures of COVID-19 knowledge, this study showed that with regard to comprehensive prevention of COVID-19, knowledge

that includes social distancing, sanitizing hands, washing hands and wearing masks. Out of the 200 participants, 79% had comprehensive knowledge of COVID-19 prevention measures and more than three quarters had very good knowledge of COVID-19. This can be due to the explosive flow of information on all platforms, especially the media, social media and MoHSS continuous update. However, this is not consistent with the study conducted by Gebretsadik, Gebremichael and Belete (2021) in one health centre in the Northeast Ethiopia whereby of the 384 participants, 51.3% had good COVID-19 prevention measures knowledge. In addition, according to Hoque et al. (2021), the study conducted among pregnant women in one primary health care in South Africa, revealed that both knowledge and attitude mean of pregnant women were found to be low at 43.5% and 30% respectively. The South African study revealed that less than half of participants had good knowledge of COVID-19 prevention measures. This current study revealed that the participants visiting private clinics in Windhoek had better knowledge compared to those of Northeast Ethiopia and those in one primary health centre in South Africa.

Furthermore, regarding the attitudes of COVID-19 prevention measures, this study showed that more than three quarters (89.5%) of participants stated that it is important to wash hands to prevent COVID-19. This is consistent with the Akalu, Ayelign and Molla (2020) whereby less than three quarters (73.2%) of participants perceived that washing hands frequently for 20 seconds with soap or using sanitizer is very easy. At least these two studies have their majority in favour of frequent hand washings. This current study further showed that 91% stated that practising social distancing was necessary to prevent COVID-19 prevention measures, which is not consistent with the findings from Akalu, Ayelign, Molla (2020), whereby more than half (51.7%) of – the participants perceived that practicing physical distance is very difficult.

A systematic review and meta-analysis done of 13 studies conducted in Ethiopia in by Gebretsadik, Gebremichael and Belete (2021) on KAP practice towards COVID-19 showed that 69.1% of the participants had a good attitude towards COVID-19. This is consistent with this current study whereby 81.5% of participants thought that all prevention strategies must be adhered too. Although, more than three quarters in this study showed good attitudes as compared to less than three quarters in the meta-analysis, most participants showed good attitudes towards COVID-19 prevention measures. Thus, it is encouraging that the participants are in favour of respecting the barrier measures.

Moreover, this study showed that most participants (more than 90%) practiced each of the four prevention strategies. This is not consistent with the study

conducted by Gebretsadik, Gebremichael & Belete (2021) whereby the magnitude or level of poor practice among the participants visiting one health centre Northeast Ethiopia was found to be 41.7%. So, even in terms of practices, participants from the two private clinics in Windhoek adhered to barrier methods than those from one health centre in Northeast Ethiopia. This can be due to the fact that in 2021, a compulsory mandate of wearing masking, social distancing handwashing and sanitation made by the president of the country were strictly enforced throughout the country by national security and police forces across Namibia and became the requirements to entering into a business building.

In fact, according to Hoque et al, (2021), the study conducted among pregnant in one primary health care in South Africa on KAP towards COVID-19 prevention measures showed that their practice on the prevention of COVID-19 was good at 76%. At least three-quarters had good practices towards COVID-19, which is very good as compared to the 41.7% in Northeast Ethiopia. In this current study, the practices towards COVID-19 prevention measures were better compared to both South Africa and Northeast Ethiopia.

Furthermore, this current is consistent with the 2020 study conducted by Zhou et al among Healthcare Workers (HCWs) on knowledge, practices and attitudes regarding COVID-19, showed that of the 1357 HCWs across 10 hospitals in Henan, China, 89.7% followed correct practices with regard to COVID-19. It is encouraging that the participants in the two private clinics in Windhoek have very good KAPs towards COVID-19 prevention measures. This is among patients with medical aids and who have means to visit private clinics. So, this might be different from patients attending state hospitals. However, this can be addressed in another study would be interesting to see whether there are similarities or differences.

5. Conclusion

Seeing as the participants had very good knowledge, attitudes and practices towards COVID-19 prevention measures, with barely more than a quarter of them vaccinated against COVID-19, the health education and awareness of COVID-19 in the country must continue in order to maintain the very good KAP of its prevention measures in Windhoek and eventually throughout the country.

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Original Research Article

Comparative analysis of Namibia and Botswana's national innovation systems

J Sifani^{1*}, J Mugabe², K Matengu¹

¹Center for Innovation and Development, University of Namibia, Windhoek, Namibia

²Graduate School of Technology Management, University of Pretoria, Pretoria, South Africa

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ABSTRACT

The main aim of this study was to compare the performance of the two National Systems of Innovation for Namibia and Botswana and how they influence national economic development & competitiveness. A mixed method research approach was applied to conduct a comparative analysis of Namibia and Botswana's National Systems of Innovation for national economic competitiveness. The study target population was 839 of respondents from policy makers, academics researchers/heads of research, industries and civil society. Two phases were adopted, namely, quantitative research through which 209 survey questionnaires administered and 123 responses received and analyzed and qualitative research where semi structured interviews to 12 key informants purposefully sampled from phase one of the quantitative study using the 10% golden rule of sampling. The study found that the existence of evidence-based science, technology and innovation policies which outline well-defined university-industry linkages and funding framework for human & institutional R&D and innovation infrastructure supported by an education system that is responsive to industry demand and technology push leads to an effective national system of innovation that is economically competitive. Furthermore, the study managed to establish the following key policy recommendation and suggested areas of further research to build an effective and efficient National System of Innovation, which is economically viable and helps build a nation's competitive advantage.

1. Introduction

Botswana and Namibia are developing countries that face socio-economic challenges such high level of poverty, unequal distribution of wealth, income disparities and unemployment which warrants the development of evidence-based innovation policies for national economic development. Therefore, the proposed study presents a heavy scholarship on national innovation system and innovation policies explaining their relationship to national economic development and competitiveness of Namibia and Botswana. The effectiveness and efficiency of National Systems of Innovation (NSI) and National Economic Competitiveness (NEC) are regarded as crucial areas of research to government, policy makers, research and innovation agencies, administrators, industries, academic researchers, and innovators as well as local communities. This is because it helps in the maintenance and development of a nation's competitive advantage (Bartels,

Ritin, & Andriano, 2016). Scholars like Porter (1990) looked at the effective and efficiency of NSI from a linearity complexity of a knowledge-based economy based only on the factors of production whilst Bartela et al., (2016) dwelled on the non-linear complexity model of national innovation system which encompasses ICT as a key enabler for knowledge creation. Furthermore, Mugabe (2009) urges that realising the sustainability of innovation policies is dependent on how innovative organisations within an NSI are in achieving environmental sustainability.

To understand the above phenomena, it is required for nations to use technological and social innovations for institutional change as well as the capability to detect market failures that might hinder change in technology and innovation processes. Therefore, governments need to put in place mechanisms that support and promote innovation policy regimes to create a culture of innovation and innovativeness among its citizens by focusing on the

*Corresponding author: jsifani@unam.na, +264811653008

governance rather than on implementation of these policies (Mugabe, 2009).

2. Literature Review

The study found that the existence of evidence-based science, technology and innovation policies which outline well-defined university-industry linkages and funding framework for human & institutional R&D and innovation infrastructure supported by an education system that is responsive to industry demand and technology push leads to an effective national system of innovation that is economically competitive.

For Namibia, a country that aspires to become an industrialised, prosperous, and economically competitive by 2030, there is a need to consider the contribution of both the public and private sectors in an efficient and effective delivery of social and economic services to its citizens. This would require the production of skilled STI manpower needed to accelerate the implementation of innovation related policies to produce economically variable knowledge that can be transformed into STI wealth creation. It is against this background that the Namibian government through the Office of the Prime Minister has benchmarked with international norms and best practices from countries like Finland and Denmark in building a government-wide Public Service Innovation Policy. This policy aims at introducing new applications to inform practices, products, services, and organisational changes that create new value through improved service delivery.

On the overall STI landscape, the study found out that Namibia does possess good innovation related policies but the challenge lies in the implementation phase. This is due to there being a huge lack of social policy cohesion and a long policy gestation period. A good example is the period taken from the development of the first National Research Science and Technology Policy (1999) to the enactment of the Research Science and Technology Act, 2004. The Regulations were only developed in 2011 and yet the operationalization of the NCRST was only realised in 2013.

Secondly, on social cohesion and continuity, it has been a trend in Namibia that each minister appointed to head the STI portfolio always wants to start a new STI policy. For example, the review of the Research Science and Technology Policy of 1999 was started by the NCRST in 2015 but when the new Ministry of Higher Education Training and Innovation was created in 2015, the new Minister initiated a new review of Namibia's STI landscape with the assistance of UNECSO. This review recommended the development of a new STI policy framework to serve as an umbrella policy to all. This presented a parallel process to the one already initiated by the NCRST. This posed coordination challenges, resulting in much time spent

on developing policies and less time for implementation as political office bearers stay in office for a five-year period.

The Botswana Government on the other hand has introduced a presidential innovation award which is annually awarded by the President of the Republic of Botswana to outstanding achievers in championing innovation in the country. Furthermore, the last review of Botswana's NSI revealed that STI is a critical sector in guiding economic competitiveness. This is evident from the way Botswana managed to make use of its established hubs (innovation, education, diamonds, health, transport and agriculture) whose output helps to improve its ranking on the World Economic Competitiveness & Global Innovation Index and other international rankings (UNESCO, 2013).

3. Materials and Methods

The methodology used in this study was a mixed research method comprising of two phases, namely, quantitative and qualitative research approaches were used to conduct a comparative analysis of Namibia and Botswana's National Systems of Innovation for national economic competitiveness.

The study target population was 839 of respondents from policy makers, academics researchers/heads of research, industries and civil society. Two phases were adopted, namely, quantitative research through which 209 survey questionnaires administered and 123 responses received and analyzed and qualitative research where semi structured interviews to 12 key informants purposefully sampled from phase one of the quantitative study using the 10% golden rule of sampling.

Furthermore, the study used the following Likert scale (1 = strongly Disagree, 2=Disagree, 3=Neutral, 4= Agree and 5 Strongly Agree).

The results from this method were analysed using SPSS to determine the statistical inferences needed by the study to make conclusion on the quantitative data collected from the 12 key informants, purposefully selected from the quantitative phase (Creswell, 2014). The second phase of the research design was looking at qualitative data gathering by means of semi structured interviews done on the 12 key informants selected from phase one of the study who were sampled and interviewed to further explain the responses from phase one of the study (Creswell, 2014; Mabhiza, 2016).

This approach was used with an understanding that quantitative and qualitative methods employed during triangulation, complemented each other in providing enriched or detailed analysis that would not be available if only one method was used in the study. Thus, triangulation has been found to be more useful in providing comprehensive data that leads to an

increased validity and reliability of results (Bekhet & Zauszniewski, 2012).

The study presented the conclusions, policy recommendations with specific reference to major lessons drawn from the study and best practices on what the NSI for Namibia and Botswana should do to improve their Economic Development & Competitiveness.

4. Research questions

The study used the following research questions listed below to generate thematic research areas to further probe and confirm the assumptions from the empirical literature with the findings of the study, based on the responses given by the sampled of 84 from a population of 839.

- a) What are the key characteristics of an effective National System of Innovation?
- b) What are the characteristics of Namibia and Botswana’s innovation policies?
- c) To what extent have Namibia and Botswana implemented their innovation policies?
- d) How is University Industry Linkages critical building national systems of innovation?

5. Results

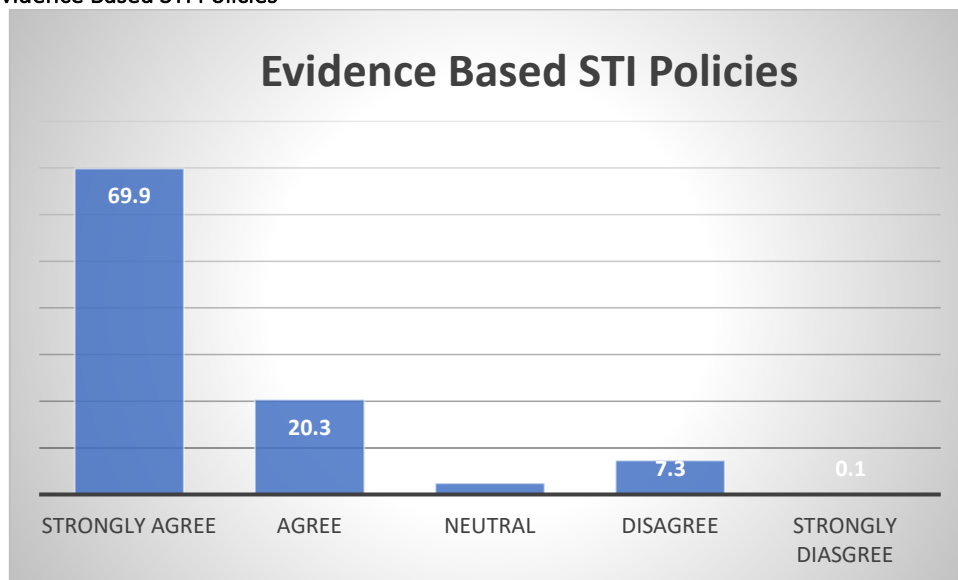
The study presents the results structured around the following research thematic areas generated from the main research questions used in study.

5.1 Characteristics of an effective National System of Innovation

Literature reviewed by the author showed that the effectiveness of an NSI is dependent on how strong linkages are created among policy-making bodies, universities, public research institutes, financial institutions, private enterprises and technology and innovation support agencies (Mytelka, 2016). Shorter turnaround time between policy formulation of STI evidence-based policies and its implementation is another attribute identified from literature as a characteristic for an effective and efficiency NSI (UNESCO, 2016 and UNESCO, 2013).

Respondents on the survey revealed that 7.3% were undecided whether the existence of evidence based STI policies can be a key characteristic of an effective NSI, 2.4 % disagreed whilst 20.3% of the respondents agreed and 69.9% strongly agreed that evidence based STI policies is a characteristic of an effective NSI as shown in the Figure 1 below.

Figure 1: Evidence Based STI Policies



5.2 Education Systems, Patent Registrations and Application Triple Helix Model

On the question of whether the education systems adopted by both countries is are likely to produce the required human resources equipped with requisite skills and knowledge to innovate and produce goods and services to meet the demands of industry. The

findings reveal that 65.9 % strong agree that having a good education system will lead to the development of a critical mass of skilled manpower needed by industry. The study reveals that 65.9% of the particiapants in the study strongly agree that have a large number of registered patents is a measure of an effectieve NSI, whilst 20.3% of the respondents only agreeing. The above responses resonants well with the literature

revealed. The rest showed that 10.6% were undecided and 2.4 or 0.8% disagreed.

Findings from the study revealed that 64.2% of the respondents strongly agreed and 25.2% agreed that application of a triple helix model of innovation where universities, industry and government are interconnected, interact and support each to promote innovation as a measure for an effective NSI. These results are supported by the suggestions of Leydesdorff (2005) on how to change knowledge based innovation systems using the interconnected dynamism that exist between the three players industries work closely with universities in internalizing its R&D functions by allowing universities to run its spin off companies and R&D (Etzkowitz, 2008) whilst governments creates enabling environments through committing investments in industrial policies and STI policies as well as provision of tax incentives to industries. Knowledge generated from universities supports government to make informed decisions backed by evidence generated through research from (Teixeira, 2013; Etzkowitz & Leydesdorff, 2000 and Aubert, 2004).

As posited by Lundvall et al. (2009) Human Resources is core to the development of an effective NSI. Results from the study shows that 68.3% of the respondents strongly agreed whilst 22.0% agreed that critical mass of skilled manpower in STI is critical for developing an effective NSI that is economically competitive.

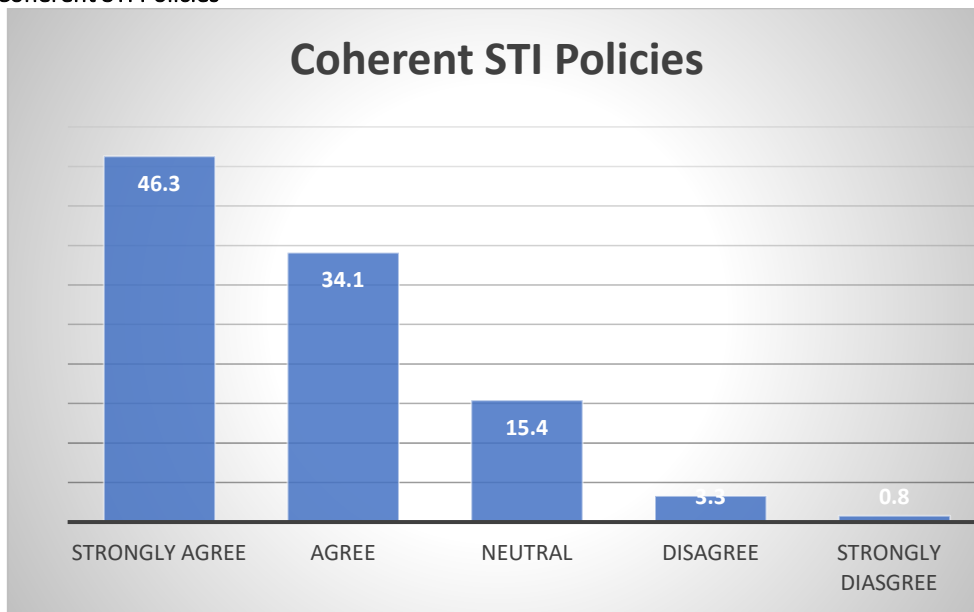
To overcome this challenge, the governments of Namibia and Botswana that committed themselves to

invest over 23% of the national budgets allocation to the education, science technology and innovation sectors (Government of the Republic of Namibia, 2012; Ministry of Finance & Development Planning, 2007). Secondly, the governments have vowed to adhere to the provisions of the SADC Protocol on Science, Technology and Innovation compelling all Member States to spend at least 1% of their GDP on R&D (SADC, 2008) and the African Union declaration to set aside 1% of GDP to be spend on R&D by Members States by 2020 (African Union, 2014).

5.3 Namibia-Botswana Science Technology and Innovation Policy (STI) Framework and Strategies

As indicated in the UNESCO report on Namibia review of its TVET, Higher Education and innovation policy (UNESCO, 2016) and the Botswana STI policy review (CSIR, 2005) done by the CSIR the STI policy frameworks and strategies are characterized with gaps and barriers hindering advancement of innovation and entrepreneurship. Developing policies that are coherent is identified as one of the mechanisms of addressing challenges encountered by Namibia and Botswana in implementing its STI policies and strategies. Results from Figure 2 below shows that the majority of respondents constituting 46.3% strongly agree followed by 34.1% who agrees that existence of coherent STI policies is critical for Namibia and Botswana to address challenges hindering advancement of research and innovation & economic growth for competitiveness.

Figure 2: Coherent STI Policies



The second machinery is for both countries to put in place mechanisms that are aimed at removing barriers

preventing the smooth introduction and application of innovation and entrepreneurship, engagement of

enterprises in skill formation and innovation development, having enhanced institutional linkages/partnerships with companies as well as having dedicated funding systems to support R&D and Innovation within their STI ecosystem. Respondents were asked whether removing barriers on innovation and entrepreneurship development, engagement of enterprises in skill formation and innovation development, having enhanced institutional linkages/partnerships with companies, having strong university industry linkages as well as having dedicated funding systems to support R&D and Innovation would create opportunities for innovators and entrepreneurs to innovate and contribute to economic growth and wealth creation.

Results from the study indicate that the majority, 39.8% of the respondents strongly agree that removing barriers on innovation and entrepreneurship contributes to economic growth and wealth creation. The study shows that 30.1% of the respondents strongly agree that engaging enterprises in skills formation and innovation whilst 35% of the respondents strongly agree that having enhanced institutional linkages with companies or communities reduce the risk of excluding the needs of companies or communities during STI development and implementation.

Strong university industry linkages as well as having a dedicated funding system to support R&D and Innovation are also some of the attributes Namibia and Botswana needs to integrate into their STI policies. Results the study indicates that 69.9% representing majority of the respondents strongly agreed and agreed that having a strong university industry linkage leads to an effective NSI as industry will finance R&D to improve its productivity and universities produces knowledge needed by industry to innovate. Furthermore, the study showed that 37.4% of the respondents strongly agrees & 33.3% agrees that a dedicated funding system to support R&D and Innovation is critical in achieving the commitments of realizing the 1% of GDP expenditure spend on R&D made by Namibia and Botswana at continental (AU level), regional (SADC protocol on STI) and nationally in the NDP 10 (Botswana) and NDP5 (Namibia: achieve 1% expenditure of GDP by 2020).

The study concludes that having coherent policies, removing barriers on innovation and entrepreneurship development, engagement of enterprises in skill formation and innovation development, having enhanced institutional linkages/ partnerships with companies, having strong university industry linkages as well as having dedicated funding systems to support R&D and Innovation as key indicators for developing and implementing effective STI policies and strategies.

5.4 Challenges in Implementing STI Policies and Strategies.

Namibia and Botswana were over the years not having dedicated ministries of science technology and innovation forcing their STI budgets to be channelled through ministries of education and planning where the portfolio had been attached. This has always caused a challenge in implementing STI polices and strategies.

Results from the study shows of the respondents 46.3% strongly agreeing and 32.5% agreeing that channelling of STI budgets through ministries of education and planning by Namibia and Botswana over the past years have resulted in overfunding of STI making the sector to effectively implement their STI policies. Furthermore, financing of STI activities in both countries as been fragmented due to the fact that allocation to STI activities is scattered over various ministries calling for a need of a centralised STI budget.

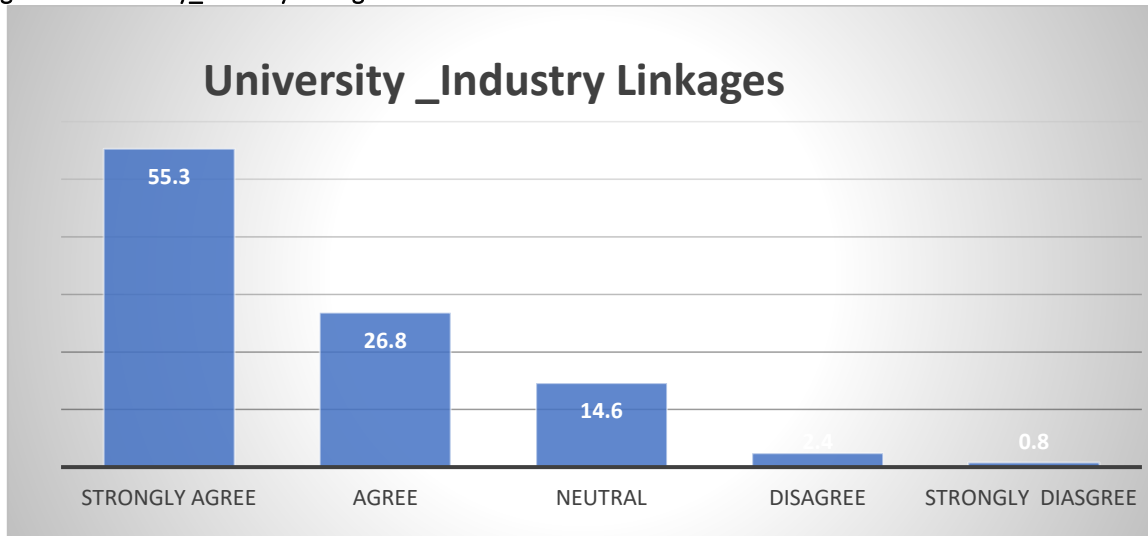
The study shows that 51.2% and 30.9% of the respondents strongly agree and agree that having a centralised budget for STI will ensure a well-coordinated and governance mechanism spearheads the realization of set targets in national research agendas. The study concludes that Namibia and Botswana need to strengthen their STI coordinating agencies (NCRST and BITRI) to overcome challenges in implementing STI policies and strategies and ensure coordination and structural governance.

5.5 University-Industry Linkages

Creating an enabling environment through policy interventions that supports national research and innovation funding bodies to provide matching funds for co-financing of collaborative joint R&D projects with global partners abroad, industries nationally and universities is a responsibility of government (Geuna, A, Salter, & Steinmueller, 2003). The study recognised the good model South Africa is currently practising through its R&D funding agency the National Research Foundation (NRF) where joint collaborative R&D projects with the European Union under the Horizon 2020 are co-financed through match funding or co-location (Grobelaar, Tijssen, & Dijkstra, 2017).

The Table below shows the results that 55.3% of the respondents strongly agreeing, 26.8% agreeing, 14.6% undecided, 2.4% disagreeing and 0.8 % strongly disagreeing of the respondents on the provision of matching funds to co-finance joint R&D to strengthen universities and industry are encouraged to set up research and innovation centres within campuses that will be capable of transforming the research and innovation outputs into products, processes and services required by industry to growth the market share and remain competitive.

Figure 3: University_Industry Linkages



6. Discussions of results from qualitative study

This section provides a summary of the key discussions based on the research themes from the qualitative study analysis,

6.1 Characteristics of an effective National System of Innovation

The respondents for the qualitative study, unanimously agreed that the existence of evidence-based science, technology, and innovation policies and well-defined industry-university linkages with strong R&D infrastructure manned by skilled STI personnel are key tools for countries to remain economically competitive.

6.2 Namibia-Botswana Science Technology and Innovation Policy (STI) Framework and Strategies.

The study found the need to address the problem hindering the development of coherent STI policies for Namibia and Botswana by avoiding the borrowing syndrome policy, but rather embarking on proper in-house environmental scanning to remove barriers to innovation and entrepreneurship. This could be done through the engagement of enterprises in skills formation and innovation development; ensuring the existence of enhanced institutional linkages/partnerships with companies & communities. Also, through forging strong university-industry linkages and having a dedicated funding system to support R&D and innovation.

6.3 Challenges in Implementing STI Policies and Strategies.

The study identified a long policy gestation period (policy adoption to implementation); lack of adequate supportive infrastructure; science, technology and innovation not embedded into national visions of the country; Science, technology and innovation not seen as a tool for economic growth and development. Furthermore, science, technology and innovation budgets channeled through ministries of education and planning and lack of centralized STI budgets as challenges faced by Namibia and Botswana in implementing its STI policies and Strategies.

The study further found out that understanding by different ministries and state agencies of the role of NCRST as a coordinating authority for the implementation of the research, science and technology policy of 1999 was limited due to diverging views on STI policy and competition for budgetary resources. The institutional status also led to rivalry between different R&D projects. The absence of science and technology incorporation in political parties' manifestos led to parliament not actively engaging in discourse that could accelerate the implementation of STI legal frameworks. For example, Namibia's RST Act provides for the President of the Republic of Namibia to be Patron of STI in the country, but this provision has not been implemented. Finally, the absence of the STI coordinating authorities (NCRST & BITRI) in either the Ministries of Education and of Higher & Tertiary Education and Innovation seemed to reduce their influence on sectoral ministries such as those of agriculture & water, energy & mining, fisheries, trade and industry, environment, finance and the National Planning Commission (NPC) was also

identified as a challenge hindering the implementation of STI policies and Strategies for Namibia and Botswana.

6.4 University - Industry Linkages

The National System of Innovation for developed countries like Switzerland, USA and UK is driven by a high intensity and quality of institutional linkages and collaboration among universities and research institutes. This is realised through a coordinated interactive approach involving public and private sector-based R&D institutions, universities, industry, public policy agencies and sectoral ministries for making a country's NSI functional and productive.

The quantitative research findings on university-industry linkages, indicates that most respondents agreed that the collaboration between industry and institutions is weak because most industries operating either in Namibia and Botswana are proxies of the R&D industries operating across the borders likes of South Africa and Britain.

In the case of Namibia, there is a need for the country to come up with an evidence based STI; a policy framework which aims at promoting such linkages and collaborations. Since the inception of Namibia's NSI, its R&D institutions have established different kinds of collaborations, through joint research projects and participation in regional and international programmes like the EU Horizon 2020 and STISA 2024.

In this regard, the University of Namibia and the Namibian University of Science and Technology in their quest to build a strong university-industry collaboration have been participating in several research programmes of the European Union (EU) such as the SAIS II & Demola with Finland, Phoenix project with Cardiff University, GIZ with Germany, TIKa with Turkey and DFID with the UK. They have bilateral cooperation arrangements with universities in South Africa through joint research chairs and collaborative projects of mutual benefit to both countries.

Whilst, Botswana on the other hand have reviewed its Science and Technology Policy for 1998 which include mapping its research and innovation with the assistance of UNESCO under the Global Observatory of Science, Technology and Innovation Policy Instruments (GO-SPIN) in order to strengthen its NSI. The review provided an opportunity for Botswana to strengthen its capability to develop the Policy on Research, Science, Technology and Innovation in 2011 (UNESCO, 2013). The Botswana National Policy on Research, Science, Technology and Innovation was developed by the Ministry of Infrastructure, Science and Technology through a consultative process which involved the participation of government entities, private sector, research sector, academia, development partners and civil society to as well as fulfilling the commitments

made in the SADC Protocol on Science, Technology and Innovation signed in 2008 and its Regional Indicative Strategic Development Plan (RISDP) that present science and technology as key driver for economic competitiveness (Republic of Botswana, 2011).

The University of Botswana (UB) on their research collaboration with NEPAD on the SANBio, SAIS II, the Square Kilometer Array (SKA) Radio Telescope research with South Africa, Botswana International University of Science and Technology (BIUST) with UK university on big data funded by the NEWTON FUND and the Botswana Open University (BOU) were collaborating with industry and government in developing human resources needed to spearhead the development and promotion of research, science, technology and innovation.

Furthermore, the responses from the key informants purposefully sampled from the quantitative research for this study reviewed that the national R&D institutions and universities are not adequately collaborating together, and university-industry collaboration being weak and further identified the following as main barriers hindering the strengthening of university-industry collaboration or linkages as:

6.4.1 Mismatch between R&D priorities of industry and those of universities. While industrial firms or enterprises need R&D that explicitly focuses on adding commercial value to their activities, most of the R&D activities at the universities are not organized in such ways as to target industrial needs.

6.4.2 Finding from government to universities as well as funding from international sources, tends to restrict the universities to R&D that is not focused on commercial interests or agendas. In some cases, funding is tied by grant stipulations or provisions that restrict university participation in industrial R&D;

6.4.3 Universities are just starting to develop an entrepreneurial culture and are only now formulating institutional policies that direct their R&D efforts to industrial or commercial ventures. Universities have limited internal capacities for collaboration with industry; and

6.4.4 Venture capital financing or funding for R&D is not easily available in Namibia; and government funding of enterprises is not adequately used to stimulate university-industry collaborations.

7. Conclusions

Innovation was for a long time a neglected topic in mainstream social science even though economists like Schumpeter had developed the theory of innovation a century ago that drives long term economic and societal change its intergration into research and science policies has been a challenge (Fagerberg, 2018). A case in point here is Namibia, which had developed a good STI policy (National Research Science

and Technology Policy, 1999) way back in 1999 but still the implementation of this policy was a challenge as compared to Botswana.

The long gestation period between policy formulation and implementation, i.e. Namibia took six years from 1999 to enact the Research Science and Technology Act, 2004 (Act 23 of 2004) and a further 13 years for the Research Science and Technology, Regulations 2011 to be gazetted. The proposed institutions mentioned in the policy like the National Commission on Research Science and Technology and the Research Science and Technology Fund were only established in 2013.

Whilst Botswana had its first S&T policy developed under the Ministry of Finance and Development Planning in 1996 which has undergone several reviews and new policy was development under the new Ministry of Infrastructure, Science and Technology. Furthermore, a comparative analysis on government expenditure on R&D as a percentage of GDP and the global innovation performance (GII) of top ten performing countries in the world, including Namibia and South Africa revealed that there is a strong correlation between the increase in GERD and the country's performance on the Global Innovation Index. Namibia scored low on Knowledge & technology output compared to Botswana, South Africa and Mauritius in the SADC region and Finland, Switzerland, and Singapore.

For Namibia to improve its ranking on the GII, there is a need to strengthen institutions tasked with knowledge creation and increase the government

expenditure on R&D as a percentage of GDP. The figure below indicates that Singapore, had the highest value of GERD at 2.185 percent and a GII score at 58.7 followed Finland, whose GERD as a percentage of GDP stood at 2.89 percent and GII scored for 2017 was 58.5 percent. South Africa's GERD expenditure stands at 0.765 percent of the GDP and GII score for 2017 was 35.8 percent in 2017 GII. Lastly, Namibia scored the least score of 27.9 percent in the 2017 GII report and had GRED expenditure of 0.35 percent according to the Namibia R&D survey report of 2014 (NCRST, 2016) .

8. Policy recommendations

This section proposes policy recommendations that Namibia needs to follow in order to improve its competitiveness and for Botswana, what the country must maintain in terms of the policy framework for her to remain highly ranked in Africa and the world at large. Therefore, the study extracts recommendations from the research findings on the selected research themes and proposes institutions responsible for implementation as well as providing what inputs are needed to ensure smooth implementation. Lastly the study suggests the appropriate strategies to realize the proposed recommendations from the findings.

Therefore, infrastructure development (equipment provision) should be regarded as an opportunity for retaining the qualified scientists who in return would play a pivotal role in growing the economy and creation of jobs.

Table 1: Policy Recommendations on characteristic of an effective NSI

Research Theme	Recommendations	Institutions responsible for implementation	Inputs needed	Strategies
Characteristic of effective NSI	Develop evidence-based science, technology and innovation policy	NCRST & BITRI Agricultural council, diamond hub, NCHE, NQA. BIPA, BBS, BIH. Ministries responsible STI from both countries. Ministries responsible for Trade and Industry from both countries. Universities. Chambers of Commerce	Financial resources. Human resources. STI Legal & policy frameworks.	Have an education system that responds to industry demands. Governments maintaining a strong political will in championing STI. Encourage high participation of SMEs in innovation and entrepreneurship development. Having a funding framework for R&D and Innovation. Invest in the developing of knowledge workers. Forge a strong university/government and industry partnership.

Table 2: (STI policy frameworks, challenges in implementing STI policies)

Research Theme	Recommendations	Institutions responsible for implementation	Inputs needed	Strategies
Namibia Botswana STI policy Frameworks and Strategies	Develop coherent STI policies	Ministries responsible STI from both countries. NCRST & BITRI	Financial resources. Human resources.	Remove barriers to innovation and entrepreneurship. Maintain a strong political will & leadership to drive STI. Forge a strong university/industry linkage.

			STI Legal & policy frameworks	Ensure a dedicated funding system to support R&D & Innovation
Challenges in implementing STI policies and strategies	Ensure strong policy coordination, coherence and political leadership	Parliament, Cabinet Ministries responsible for STI from both countries on the policy formulation and approval phase NCRST & BITRI on the execution phase	Implementation plans with clear monitoring and evaluation Human & Financial resources	Reconfigure the institutional mandates of STI coordination authorities to give them adequate authority to coordinate STI policies and promote policy coherence across the institutional terrain in order to avoid weak policy coherence. Ensure STI is embedded in the national visions of the country. Invest in R&D infrastructure to support research. Ensure national R&D Funds are established to provide funding to R&D and Innovation. Ensure STI budgets is centralized and channeled through these established R&D Funds. Ensure STI coordinating bodies are strengthened.

Table 3: Policy Recommendations on solutions to improve STI Policies and Strategies

Research Theme	Recommendations	Institutions responsible for implementation	Inputs needed	Strategies
Solutions to improve STI Policies and Strategies	Reduce long policy gestation period (i.e. time taken from policy development to implementation). Namibia had its first RST policy in 1999 it took 5 years to have the RST ACT in 2004, and another 9 years for NCRST to be established	NCRST & BITRI Namibia Research & Innovation Fund Botswana research science and innovation fund	Implementation plans with clear monitoring and evaluation Human & financial resources	Ensure STI policy harmonisation to avoid duplication. Ensure STI policy implementation plans are synchronized with NDP cycles. Provide incentives to researcher and scientists. Encourage the participation of SMEs in the Innovation value chain. Develop a critical mass of skilled manpower Maintain a strong political will and leadership that supports STI development. Encourage universities to establish R&I centers

Table 4: Policy Recommendations on University _Industry Linkages

Research Theme	Recommendations	Institutions responsible for implementation	Inputs needed	Strategies
University Industry linkages	Forge strong university/industry linkages	UNAM/NUST/UB/BUIST/industry	University research policies Financial and Human resources	Establish platforms that connects users with knowledge creators. Providing matching funds channeled through research centers within universities

8. Areas for further research

The key findings and recommendations presented in this study provides lessons to all stakeholders interested in learning about the role of national systems of innovation in driving national economic competitiveness. The study was comparing Namibia and Botswana’s national systems of innovation and how they influence their economic competitiveness by

leveraging on their ability to sustainably utilise its natural endowments for the promotion of investments in technology prospecting, acquisition, and technology commercialization of research output. Furthermore, the study identified a weak empirical information on the use of natural resources through technological innovation which could trigger further research to understand what is causing this anomaly.

The limited timeframe in which the study was conducted could not allow the researchers to cover a broader comparative analysis of NSIs of the entire SADC countries thereby having a holistic picture of the regional perspective. Another area seeking further

research is to look at the influence of having dedicated funding structures for STI in the SADC region compared to their European counterparts in relation to economic competitiveness.

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Original Research Article

The role of work engagement and work meaningfulness on turnover intention of nurses in Rundu, Namibia

S. Moyo¹, C.K. Hlatywayo¹, A. Murangi^{1*}

¹Department of Human Sciences, University of Namibia, Windhoek, Namibia

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ABSTRACT

Turnover, in the nursing profession seems to have negative consequences that could jeopardize the mandate of the Ministry of Health to deliver safe and effective care. Globally, the nursing sector is known to have a high turnover intention, resulting in actual turnover. The study investigated the role of work engagement and work meaningfulness on turnover intention of nurses in Rundu, Namibia. A quantitative, correlational research design was used. A convenience sampling technique was used to select the sample, and in the end, n=168 nurses formed the sample of the study. Correlation and regression analysis using SPSS was used to analyze the data. Findings revealed that there is a negative statistically significant relationship between turnover intention and work-engagement ($r=-0.173$; $p=0.026$) of nurses in Rundu, Namibia. Findings also revealed that there is no statistically significant relationship between turnover intention and work-meaningfulness ($r=-0.126$; $p=0.103$) of nurses in Rundu, Namibia. A positive and statistically significant relationship between work-engagement and work-meaningfulness ($r=0.587^{**}$; $p<.0001$) was confirmed. Additionally, work meaningfulness was statistically found to moderate the relationship between turnover intention and work engagement ($F = 43.589$; $df = 2$; $P = <.000$; $R^2 = 0.589$). Stakeholders concerned (.i.e. Ministry of Health and Social Services in Namibia) should devise strategies to enhance employees' level of engagement and work meaningfulness as engaged employees and those who find meaning in their work will have reduced chances of leaving the profession. The profession is facing a shortage of nurses and efforts should be diverted to reducing turnover intention.

1. Introduction

The health sector is considered important in contributing to a productive and healthy workforce in any country. Funds are reportedly being pumped into the health sector to upgrade and maintain the provision of equitable health services to citizens (Herholdt, 2015). Health and social well-being are considered fundamental pre-requisites to the socio-economic development strategies of any country (Mokoka, Ehlers, & Oosthuizen, 2011).

In a developing country such as Namibia, nurses are known to provide essential health care services to individuals, societies and communities. The services provided by nurses, amongst others, are preventative services, curative services and rehabilitative services (Mokoka et al. 2011). According to Herholdt (2015), nurses are considered to be "frontline" workers, whose key services are essential for meeting societal and national

development goals. Nurses, on a daily basis, "need to make life-and-death decisions and many nurses need to deliver negative reports to families" (Herholdt, 2015, p. 5).

Demanding and inflexible working hours, as well as overtime, are synonymous with the job description of nurses (Mokoka et al., 2011). As a result, the nature of nursing work is characterised by high workloads and stress (Levert, Lucas, & Ortlepp, 2000). This is even more critical for public sector hospitals as they need to cope with brain drain and must remain competitive without compromising on quality healthcare (Zweifel, 2016). In the developed world, the health sector is characterised by gross underfunding, yet the sector caters for a high quantity of patients (De Simone, et al., 2018).

Vesgund (2014), identified high turnover as a huge problem among nurses, which inevitably could be detrimental to the delivery of equitable health care in any

country. Nurses turnover is a rapidly-growing human resource problem currently affecting the health sector world-wide (Vesgund, 2014). De Simone et al. (2018) declares that the turnover in the profession is worrying. The rate of turnover among nurses across the world is considered high, ranking from 4%-68% (De Simone et al., 2018). This shortage could inevitably pose a threat to the delivery of health services across the globe.

Work engagement and meaningfulness are factors internal to an employee and could, at individual level play a huge role in reducing turnover intentions, which if high, might result in actual turnover. The ideal situation is to have nurses who are engaged and who find meaning in their work, in efforts to curb turnover intention among nurses. The study, sought to contribute to the already limited literature on turnover amongst health care professionals, with specific reference to Namibia.

1.1 Definition of key terms

1.1.1 Turnover intention

According to Sousa-Poza & Henneberger, (2004), turnover intention refers to an intent, by the individual employee to change his or her job. Literature asserts that turnover intention is a prerequisite for turnover (Sousa-Poza & Henneberger, 2004). Kitura (2015) defines turnover to be the rate at which an employer gains and loses employees. This in turn implies the percentage of employees who within a particular period of time opt to leave the company or business for other companies. When employees leave, the company is forced to replace them with new employees which could present additional costs to the organisation and thus cripple the organisation's production (Tracey & Hinkin, 2008). The additional costs include the cost for hiring new employees, training them, their bonus packages and managing the role when it is not yet filled.

1.1.2 Employee engagement

Kahn (1990, p. 694) defines employee engagement as "the harnessing of organisational members to their work roles, where the organisation's members employ and express themselves physically, cognitively and emotionally during role performance". The nature of nursing work is demanding and exhaustive. It could therefore, be argued that nurses who are engaged in their work will opt to remain in work, rather than have intentions to leave (turnover intention) or leave (turnover).

1.1.3 Work meaningfulness

Work meaningfulness refers to the experience of positive emotion at work, and refers to the feeling of

self-worth accompanied by self-fulfilment and experiencing contentment in what one does (Morrison, Burke, & Greene, 2007). When an employee experiences meaning in their work, they tend to feel more valuable and fulfilled by the values and purposes at work (Morrison et al., 2007; Pattakos, 2004; Lee, 2015). Thus, meaning spell out why work is important to employees in relation to how they feel, thrive and still remain intact with authenticity (Rothmann & Hamukang'andu, 2013). It could therefore be argued that employees who find their work meaningful, will rather opt to stay than have intent to leave (turnover intention) or leave their work (turnover).

1.2 The relationship between work engagement and turnover intention

Research by Hallberg and Schaufeli (2006); Schaufeli and Bakker (2004) reveals that employees who possess high level engagement are less likely to leave the organisation in comparison to those with low levels of engagement. Harter, Schmidt & Hayes, (2002); Robyn & Du Preez, (2013) argue that engaged workers are reported to be more committed to their organisations and thus less likely to feel the need to leave the organisation in search of other employment opportunities.

Smola and Sutton (2002), suggests that in order to lower the levels of turnover intention, employers have to increase employee engagement, which will consequently weaken the feeling of intention to quit. In addition, Mangi and Jalbani (2013) in their study of occupational psychology in higher educational institutions found that work engagement is significantly and negatively related to turnover intention. Based on the aforementioned literature discussions, it is hypothesised that turnover intention has a negative relationship with work engagement.

1.3 The relationship between work meaningfulness and turnover intention

Rothmann and Hamukang'andu (2013) in their study of callings, work role fit, psychological meaningfulness and work engagement among teachers, explain that employee's sense of work meaningfulness is driven by how they feel about their production (output) after spending their time and effort on a task (input). This could be attributed to being intrinsically motivated. Intrinsically motivated employees are said to have less intentions of leaving their organization (Cho & Lewis, 2012; Hackman & Oldham, 1976). Wright and Bonett (1992) conducted a study on the effect of turnover intention on work satisfaction and mental health among social welfare employees and confirmed that employees who found their work meaningful had less

turnover intentions. In addition, [Steger, Dik and Duffy \(2012\)](#) confirmed that there is a relationship between work meaningfulness and turnover intention, which implies that a high turnover intention, will negatively tax on employees' level of meaningfulness in their work role and will eventually lead to turnover ([Scroggins, 2015](#)).

Based on the aforementioned literature discussions, it is hypothesised that work meaningfulness has a negative relationship with turnover intention.

1.4 The relationship between work engagement and work meaningfulness

[May, Gilson and Harter \(2004\)](#) in their study on work meaningfulness and engagement found that there is a significant positive relationship between the two constructs. [Kock \(2010\)](#) identified seven key drivers of employee engagement (i.e. meaningfulness, resourcefulness, self-awareness, teamwork and co-workers, organization connectivity, job identity and supervisor relations), of which meaningfulness was the most significant. Several other research studies ([Van der Westhuizen, 2014](#) ; [Vuori, San & Kira, 2012](#); [May et al.2004](#)), show consensus on the fact that when an employee perceives his/her work as meaningful he or she remains engaged and vice versa. These authors conclude that there is a positive relationship between work meaningfulness and work engagement. Based on the aforementioned, it is hypothesised that work meaningfulness has a positive relationship with work engagement.

Using the Social Exchange Theory (SET) as a theoretical framework, [Redmond \(2015\)](#) explains that social behaviour involves social exchanges, through which people get motivated to attain a reward. When rewards are greater than the costs, people are most likely to be motivated to engage in certain actions. Where there is no balance in the exchange relationship, there is no interest in performing a certain act. Consequently, if risks weigh more than benefits the social relationships are terminated and if the benefits weigh more than risks the social relationships are kept intact and they are reinforced ([Redmond, 2015](#)).

Linking this theory to turnover intention among nurses, it could be argued that nurses who are beneficial to the organisation because of their skills and knowledge, and who in turn also enjoy the benefits they get from the organisation tend to stay and their desire to continue to work for the organisation is reinforced accordingly. These nurses tend to stay in the organisation for longer, primarily because behaviour is fostered by how the organisation takes care of them and in turn, how the organisation benefits from them. The nurses who seem to not perform well by effectively delivering their knowledge and skills, it is

likely that the organisation will neglect them, thus creating more reason for employees to have turnover intention and turnover.

2. Research Methodology

The relationships between turnover intention and work engagement; turnover intention and work meaningfulness have been studied widely in several other work sectors. To study the three constructs among nurses, the following hypothesis were formulated:

H₁: Work engagement has a negative relationship with turnover intention among nurses in Rundu, Namibia.

H₂ Work meaningfulness has a negative relationship with turnover intention among nurses in Rundu, Namibia.

H₃ Work engagement has a positive relationship with work meaningfulness among nurses in Rundu, Namibia.

H₄ Work meaningfulness acts as a moderator in the relationship between work engagement and turnover intention among nurses in Rundu, Namibia.

A cross sectional correlation survey design was used, employing a questionnaire to collect data on the biographical details of employees, turnover intention, work meaningfulness and work engagement. A survey battery consisting of the biographical, turnover intention, work meaningfulness and work engagement questionnaires was administered to the participants. The participants were from the hospitals and clinics spread out in Rundu, Namibia. Through the use of convenience sampling, a total of n=168 nurses participated in the study, although 250 questionnaires were distributed. Nurses participated voluntarily and had the choice to opt out of the study at any point during the research process, without any negative consequences.

The Turnover Intention Scale developed by [Sjoberg and Sverke \(2000\)](#) was used to measure intention to leave work. The items were measured on a 5point Likert scale with 1 representing 'never' and 5 'always'. An example of an item is "To what extent is your current job satisfying your personal needs". The Cronbach alpha for this scale was 0.831, indicating acceptable reliability.

The Employee Engagement Scale developed by [May et al. \(2004\)](#) was used. A sample item is "I exert a lot of energy performing my job". A 5-point Likert scale ranging from 1 "strongly disagree" to 5 "strongly agree". The Cronbach alpha for this scale was 0.90, also indicating acceptable reliability.

The Work and Meaning Inventory by [Steger et al. \(2012\)](#) was used to measure work meaningfulness. The

scale has five items that are measured on a 5-point Likert scale. An example of the item is, "I know my work makes a positive difference in the world". The measurement properties of the scale was assessed using item analysis with the use of SPSS version 23. The Cronbach alpha for this scale was 0.70, which shows the scale is reliable for use in the Namibian context.

3. Results

The following socio-demographic data were collected: age, gender, qualification and number of years worked. A total of (52%, n= 87) are female respondents, while male respondents comprised 48% of the study sample (n = 80). The majority of the respondents (39%, n = 65)

are in the age group 20-30 years, while 33% (n=55) are between the ages of 31 – 40 years. Ages 41-50 years contain n=40 respondents (24%) and ages 51-60 years has n=5 people in total which is (3%). The age category of 61+ years has no respondents. The majority of employees (41%; n=69) had work experience that ranged from 1-5 years, 35% (n=59) and from 6-10 years, 17.2% (n=29) had work experience that ranged from 11-15 years, 4.6% (n=6) had work experience that ranged from 16-20 years.

From the Table 1, it can be observed that Turnover intention (SD=4.3; mean=17.28); work engagement (SD= 6.58 mean=17.58); work meaningfulness (SD= 3.12 mean= 8.15).

Table 1: Descriptive statistics

Item	Mean	Std. Deviation	N
Turnover Intention	17.2798	4.27067	168
Work Engagement	17.5868	6.58242	168
Work meaningfulness	8.1548	3.12032	168

Table 2: Correlation

		Turnover	Work engagement	Work meaningfulness
Turnover	Pearson Correlation	1	-.173*	-.126
	Sig. (2-tailed)		.026	.103
	N	168	167	168
Work engagement	Pearson Correlation	-.173*	1	.587**
	Sig. (2-tailed)	.026		.000
	N	167	167	167
*. Correlation is significant at the 0.05 level (2-tailed).				
**. Correlation is significant at the 0.01 level (2-tailed).				

As shown in Table 2, Pearson correlation coefficient found that turnover intention negatively and significantly correlated to work engagement (r=-0.173; p=0.026); there is a negative relationship between turnover intention and work meaningfulness (r=-0.126; p=0.103); work engagement is significantly and

positively related to work meaningfulness (r=0.587**; p<.0000). The linear regression model (Table 3) yielded a significant level of F statistics (F = 43.589; df = 2; P = <.000). Table 2 shows, that the overall R² is 0.589, revealing that the resultant model can explain 58.9% of the variation on dependent variable

Table 3 Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	8.173	.196		41.639	.000
	Z-score(work-engagement)	1.846	.198	.592	9.337	.000
	Z-score(turnover)	-.169	.198	-.054	-.858	.392

4. Discussion

Firstly, the results indicates that there is a significant negative relationship between turnover intention and work engagement among nurses at Rundu, Namibia (r=-0.173; p=0.026). These results concur with [Juhdi, Pa'wan and Hansaram \(2013\)](#) who found that work engagement is a significant predictor of turnover intention, such that when work engagement is high, it significantly impacts the degree and extent to which

employees experience turnover intention. In addition, [Robyn and Du Preez \(2013\)](#) indicated that engaged employees are more committed to their organizations and are less likely to leave their organizations. Lastly, [de Lange et al. \(2008\)](#) and [Harter et al. \(2002\)](#) found that turnover is a result of unengaged employees. As a result, H1 is supported in the present study.

Secondly, the results of the study showed that there is a negative relationship between turnover and work meaningfulness (r=-0.126; p=0.103). Findings by

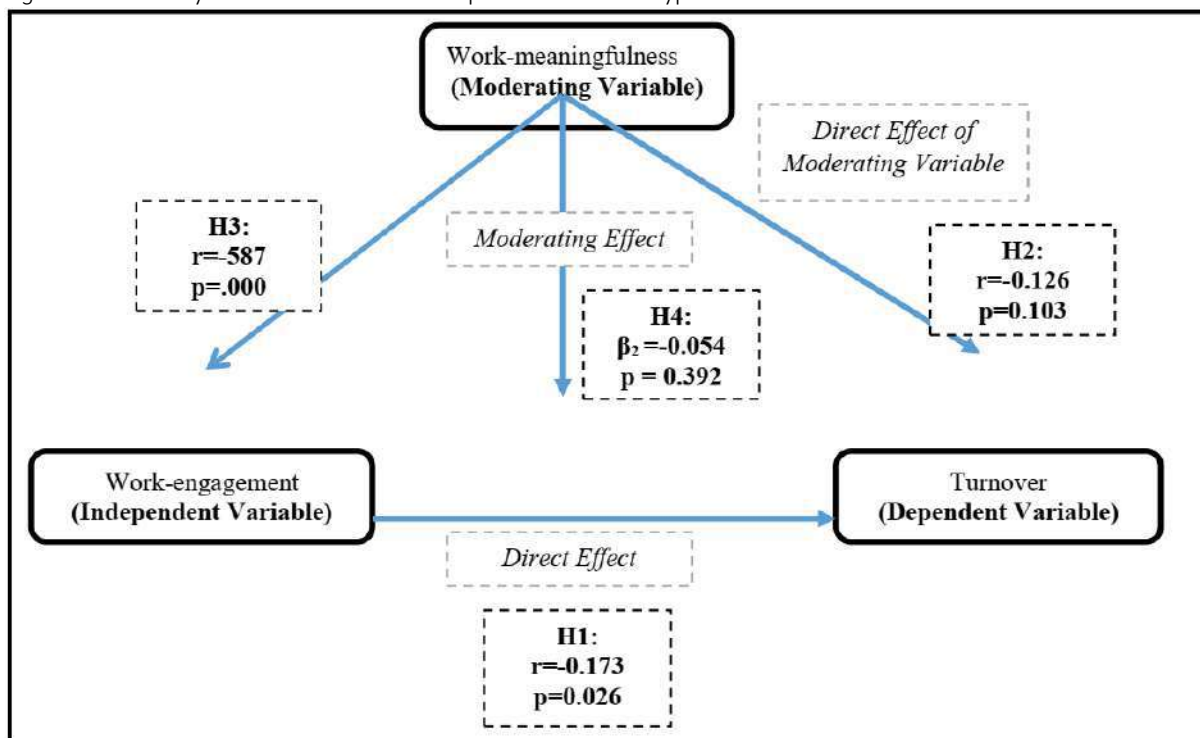
Rothmann and Hamukangandu (2013) reveal that employees who find meaning in their work are less likely to think about quitting their jobs. H2 is supported for the present study.

Thirdly, the results of the study showed that there is a positive significant relationship between work meaningfulness and work engagement amongst nurses at Rundu, Namibia. Based on this research finding, it could be concluded that high work meaningfulness is associated with a high level of work engagement and vice-versa ($r=0.587^{**}$; $p<.0001$). Both work meaningfulness and work engagement have a significant influence on the model ($\beta_1 = 0.592$; $p <.000$ and $\beta_2 = -0.054$; $p = 0.392$ respectively). The

finding corroborates with May et al. (2004), who found that work meaningfulness affects the degree to which employees are engaged and vice-versa. This resonates with findings by Rothmann and Hamukangandu (2013), Hackman and Oldham (1976); Cho and Lewis (2012) who found that engaged employees experience their work as meaningful. As a result, hypothesis 3 of the study is supported.

Lastly, the results showed that work meaningfulness is a significant moderator of work engagement and turnover among nurses in Rundu, Namibia. Even though no research findings could corroborate with the findings of the present study, hypothesis 4 was supported for the present study.

Figure 1: Summary and results of the conceptual model and hypothesis



As shown in Figure 1 above, the findings of the study suggests that the relationship between work engagement and work meaningfulness can be used as basis for intervention development tailored to enhancing work engagement or work meaningfulness. Literature argues on the importance of having employees who have meaning at work and who are engaged. Even though the hypothesised relationship between turnover intention and work engagement; turnover intention with work meaningfulness was not found to be statistically significant, we can argue from literature that work meaningfulness and work engagement inevitably produces work outcomes that will want to make employees stay rather than leave the organisation. By focusing on nurses' work engagement

and work meaningfulness, turnover intention and actual turnover can possibly be reduced.

The findings of the study suggest that organisations should work on fostering work meaningfulness in their employees because employees with high work meaningfulness are more likely to be engaged, committed and be content with their work (Geldenhuys, Laba & Venter, 2014).

5. Recommendations

Firstly, management should make sure that employees have a good working environment that allows nurses to execute work duties without strain. As such, employees should be afforded opportunities where they get are vested with the autonomy they need to

complete their tasks, give employees decision making power, promote work-life balance and provide financial security. Employees who feel taken care of, reciprocate with engagement in their work (de Lange, De Witte & Notelaers, 2008).

It is important that in a work setting such as hospitals, that nurses are reminded of the crucial role they play in any society. This could be done through pamphlets, appreciation workshops etc., to instil meaning in their work and to further motivate them to give their best. It is easy, to get swamped with work, that you forget the value of the work you do.

Fourth, it is vital that nurse's cry for reduced working hours, reduced working load, increased salaries and better working conditions are not only taken note of but becomes implemented. This will show, to nurses, that it is not only the work they do that is seen as important, but also that they are regarded and treated as an extremely important profession.

As such, the creation of meaning and engagement in the nursing profession is reliant on the continuous needs assessments conducted, in efforts to investigate

how employees feel as far as their work is concerned, and what they consider meaningful aspects of their work for continuous improvements to ensure that they remain engaged and have meaning in their work.

6. Conclusion

The constructs of meaning at work and work engagement are vital for functioning of employees in any sector. The techniques employed to enhance employees meaning and engagement will be different, depending on the nature of work. In the Namibian context, more factors, that influence turnover intention and turnover of nurses, exist and should be investigated to allow for holistic understanding.

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Original Research Article

A critical analysis of the impact of research in education: A systematic review

Kelvin M. Katukula^{1,2*}, Linus Kambeyo³

¹Centre for Research on Evaluation, Science and Technology, Stellenbosch University, South Africa

²Centre for Grants Management and Resource Mobilisation, University of Namibia, Windhoek, Namibia

³School of Education, University of Namibia, Windhoek, Namibia

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approaches

ABSTRACT

Many studies have demonstrated the impact of research in many spheres of life. With the scientific knowledge on the rise, we postulated that the impact of research is evident in different scientific fields, which includes education. It is not easy to provide a scholarly definition of the term impact of research as it lacks a standard definition and has various applications. Its use ranges from measuring specific measures to measuring different phenomena. However, the impact of research is a demonstrable contribution outside academia. It is a benefit that society gets because of research activities, and one way of archiving this benefit can be through the addition of value and improvement of the quality of life because of research. From the education perspective, the meaning of the impact of research may include developing skills, knowledge, values, and cultural norms of a people. It equally alludes to the ability to transform the art of teaching, which might lead to valuable lessons that explain the curriculum to the benefit of the students. The impact of research can also mean the ability to modify educational policies to align them with the global educational trends. This critical systematic review addresses the gap in knowledge about the impact of research in basic education. It further provides a broader understanding of how the research impact affects teaching approaches, education policy, and how it influences education management. The authors carried out a systematic literature review of peer-reviewed journal articles about the impact of research. It has been demonstrated from the reviewed literature that research impacts teaching approaches, education policy, and education management.

1. Introduction

Many studies have demonstrated the impact of research in many spheres of life. These studies show that research has the potential of initiating an evolution of how things can be done and or pursued. With the scientific knowledge on the rise (Gustafsson, Wolf, and Agrawal, 2017; Bolisani and Bratianu, 2018), we can postulate that impact of research can be evident in different scientific fields. However, before we proceed to analyse the impact of research, it is necessary to provide a scholarly definition of the term impact of research. Sadly, it is not easy to give a detailed description of the term as it has pretty diverse meanings. Since the impact of research lacks a standard definition, Harris, and Clayton (2010) contend that reasons for this are perpetuated by how the impact of research is used. It

ranges from measuring specific measures to measuring different phenomena.

According to Jones and Grant (2013), the impact of research is a demonstrable contribution outside academia. Penfield, Baker, Scoble, and Wykes, 2014, p. 21) define the impact of research as a benefit that society gets because of research activities. One way of achieving this benefit can be by adding value and improving the quality of life because of research. Through research, positivity is added and or altered on culture, services, and public policy. Impact of research attempts to establish how research affects or affects specific changes or benefits, especially outside academia (Penfield et al., 2014). Banzi, Pistotti, Facchini, and Liberati (2011) define the impact of research as any output of research, which can have a positive return.

The use of research in policy formulation and possible management intervention is a developing trend aligned with evidence-based research. However, as argued by [Harris and Clayton \(2010\)](#), research, policy, and management practice exist as three distinct cultures, which are pretty different from each other. Moreover, these cultures seem to conflict with the formulation and implementation processes, especially in the light of the consequence of research evidence. The contention is furthered much because the policymaking process has several considerations to make, especially in education. Some of these considerations are political; some are international as education systems do not operate in silos ([Watson, 2007](#)).

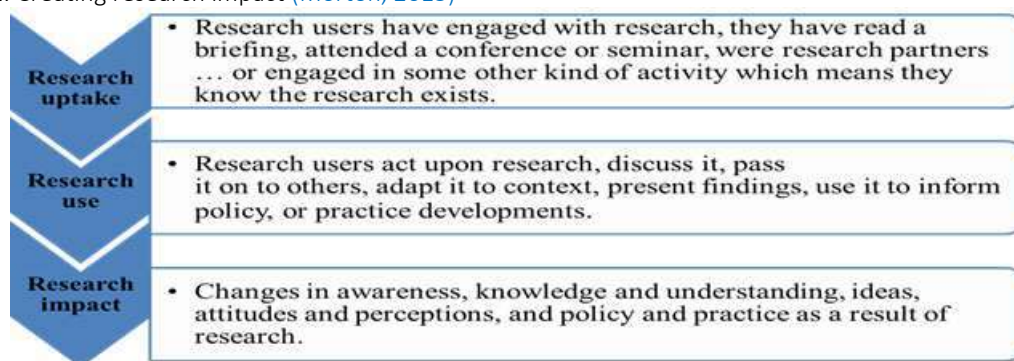
From the education perspective, the meaning of the impact of research may include developing skills, knowledge, values, and cultural norms of a people ([Rymer, 2011](#)). It can equally allude to the ability to transform the art of teaching, which might lead to valuable lessons that explain the curriculum to the benefit of the students. The impact of research can also mean influencing the modification of educational policies to align them with the global educational trends ([De Jong, Barker, Cox, Sveinsdottir, and Van Den Besselaar, 2014](#)). This definition expands the argument by [Beacham, Kalucy, and McIntyre \(2005\)](#), who defined the impact of research as the effects and consequences of the results of knowledge utilisation.

These effects and outcomes include the value and benefits that educational research brings to the effective functioning of schools.

A brilliant example of the impact of educational research is how various educational systems change to adopt policies that align them with the sustainable development goals of the United Nations ([Yamada, 2016](#); [Bebbington & Unerman, 2018](#)), how education systems took the universal policies of ending corporal punishment ([Mortorano, 2013](#)). How educational systems adopted student-centred teaching strategies into policy as discussed hereafter. The periodic transformations that occur affect the educational policies and teaching strategies and effect change in educational management, especially in schools. Additionally, the revision and changing of national curriculums, which every education system embarks on periodically, can realign the educational policies, teaching strategies, and educational management.

The changes that take place in basic education are necessary and appropriate in the daily lives of students, for they maximise the required explanation of the curriculums ([Ottevanger, Akker & Feiter, 2007](#)). Figure 1 below demonstrates the flow of research in the process of policy formulation. The process flows from research uptake (*engagement*), research use (*actions*), and research impact (*changes*) in people, organisations (*education systems*), and other societal groupings.

Figure 1: Creating research impact ([Morton, 2015](#))



The impact of research in education that enables changes in curriculums, education policies, and management produces and transforms knowledge ([Penfield et al., 2014](#)). In the process, the education system(s) get transformation, which in return benefits the society at large. These happenings can be alluded to the impact of research in education as research informs the education system(s) about those which students should be able to achieve as teachers interpret the curriculum ([Alberts, 2009](#)). In pursuit of scientific knowledge, educational research should be able to appraise and produce research-based practices

as it engages scholarly discourses ([Cobern, Schuster, Adams, Applegate, Skjold, Undreiu, & Gobert, 2010](#)).

When it comes to educational management practices, the impact of research acts as the informant and influence, even though the main driver into practice lies else way. The main driver of educational practices is the political regime of the day, as it has the operational mandate ([Harris and Clayton, 2010](#)). The availability of resources in schools, including human resources, is also the other influencing factor. Like any other field, disseminating research output to all the relevant users is essential if the research impact is

realised. However, as argued by (Estabrooks, Derksen, Winther, Lavis, Scott, Wallin, and Profetto-Mcgrath, 2008), putting policy to use is not a natural act in basic education. Some of the hindrances in ensuring that the research uptake takes place include the theory-practice gap due to the failure of educational professionals to adopt evidence-based practices, which has the potential of changing behaviour.

It is also essential to note that research can identify issues the system(s) might not be aware of for possible correction and/or reaffirmation. For instance, Awe and Kasanda (2016) and the Ministry of Education (2009) both observed that Namibian teachers dominate the actual pedagogical practices in classes as opposed to the dictates of the student-centred teaching approach. This is quite thought-provoking because the curriculum policy underscores the application of a student-centred teaching approach, which seems to be rarely implemented in classroom practices. Therefore, it is evident in this scenario that research not only advances scientific knowledge but can also reaffirm and or correct the previously adopted policies. Equally, knowledge advances as the practitioners of the profession can realise the impact of research (Ebadi and Schiffauerova, 2016; Fursov, Roschina, & Balmush, 2016).

Remember, research implies different things for different people. Therefore, in trying to elucidate as much academic argument as possible, three central areas in education have been identified. Furthermore, these identified areas seem to be affected by the impact of research the most. These are the impact of research on teaching approaches, the impact of research on education policy, and the impact of research on education management practices.

This critical systematic review addresses the gap in knowledge about the impact of research in basic education. This may lead to a broader understanding of how research impact, affects teaching approaches, education policy, and policy formulation and how it influences education management. This further advance the significance of this study as it can contribute broadly to the pool of knowledge about the influence impact of research has in basic education.

In this systematic literature review, the main research question of the impact of research in basic education is subdivided into three research questions:

- What are the impacts of research on teaching approaches?
- What are the impacts of research on education policy?
- What are the impacts of research on education management practices?

2. Research methods

In an attempt to answer the research questions, we conducted a systematic literature review. There are fourteen types of reviews, and among them, we chose a systematic review approach. According to Grant and Booth (2009); Lim, Antony, and Albliwi (2014), a systematic review has several advantages. Among them includes the ability to bring together all identified realities about a subject of study in this case (the impact of research in basic education) and systematically examine these realities (Grant and Booth, 2009).

Systematic literature review utilises the application of randomised control – which unfortunately has been criticised by other academics that it has the potential to confine and control a study (Grant and Booth, 2009; Ham-Baloyi and Jordan, 2016). To the opposite, confinement and control make it more appropriate because it summarises known realities about a subject of study (Lim et al., 2014). The criteria of trustworthiness, which are credible, transferable, dependable, and confirmable, are equally validated through the application of a series of steps in the implementation process (Anney, 2014; Cypress, 2017). Microsoft Academic and Google Scholar were the primary databases used to obtain the needed possible articles for a systematic literature review. Reviewed articles were restricted to those published from 2009 to 2020 as generated by Microsoft Academic. Each article had an equal probability of being selected (Creswell and Creswell, 2018), but a randomised purposeful selection was applied to select the articles for review (Creswell and Pot, 2018). In this paper, we considered broadly all articles that argue about the impact of research in basic education. Therefore, the findings might have the potential of being generalised across the basic education systems.

3. Findings of the review

In this chapter, the findings of this systematic literature review are presented. The result presentation follows the format of the research hypotheses. After that, a detailed critical analysis of the findings is presented. This makes the results to be combined with the discussion.

3.1 The impact of research on teaching approaches

The hypothetical ideologies, views, and standards that reinforce the pedagogical processes are referred to as teaching approaches (Katukula, 2018). Sometimes, these hypothetical ideologies, opinions, and measures might be unambiguously and reinforced by research. Nonetheless, they can also be spontaneous interpretations, which a teacher might not even be

explicitly aware of. Therefore, various education theories have classified these approaches into two main categories: student-centred and teacher-centred.

It is from these two teaching approaches that, generally, all teaching methods are informed. However, according to [Katukula \(2018\)](#), there are disagreements about which of the two teaching approaches is more effective. However, from the look of things, the student-centred approach seems to be the most preferred by various education systems. The main reason for this could be the perceived understanding that it provides students with an opportunity to build new knowledge under the supervision of the teacher ([Tracey and Morrow, 2012](#); [Schrenko, 2016](#)). Hence, the supposed established knowledge becomes more significant to students as it allows them to learn practically. [Katukula \(2018\)](#), on the other hand, argues that the teacher-centred approach seems to be less favoured. This is because of the assumption that it places teachers in the position of know-it-all beings with the ability to determine which students need to learn and achieve ([Gurses, Demiray, and Dođar, 2015](#)).

Opponents of the teacher-centred teaching approach argue that students do not get accorded enough opportunities to engage with the learning materials during the learning and teaching process. They further contend that this has the potential to negatively influence students in undesirable ways because it lacks novelty in knowledge construction ([Tracey and Morrow, 2012](#); [Schrenko, 2016](#)). However, the pro-teacher-centred teaching approach contends otherwise. They argue that it is a teaching philosophy that avails explicit directives that openly clarify intended concepts and skills required for the students during the teaching and learning process ([Clark, Kirschner, Sweller and Clark, 2006](#); [Kirschner and Sweller, 2012](#); [Gurses et al., 2015](#)). Sometimes referred to as the *traditional way of teaching*, [Kirschner et al. \(2006\)](#) further argue that it is a teaching approach that is more suitable for basic education students, as basic education mainly deals with the early stages of schooling.

[Clark, Kirschner, and Sweller \(2012\)](#) states that a teacher-centred teaching approach consists of a series of steps that students have to follow as they solve well-defined problems. With their teachers readily assisting and taking students through the process, learning becomes more meaningful. The support in this regard can be through different classroom-based activities, which could range from *direct instruction* (lecturing), *practical activities* (presentations, practical demonstrations, and modelling), *computer-based activities* (video and audio clips) ([Kirschner et al., 2006](#)).

The advocates of the student-centred teaching approach further argue that students learn by constructing knowledge with minimal guidance from the teachers ([Kirschner et al., 2006](#); [Westwood, 2008](#); [Sweller, 2009](#); [Clark et al., 2012](#)). Advocates of the teacher-centred teaching approach contend that learning in this approach occurs when a change occurs in long-term memory ([Sweller, 2009](#)). This is mainly induced by the fact that teachers dutifully dictate how the pedagogical process takes place and provide complete guidance to students as opposed to minimal guidance of the student-centred approach.

The different views that emanate from these two teaching approaches have an impact on teachers when selecting specific teaching methods as various educational systems have adopted and implemented theories of ([Piaget, 1926](#); [Vygotsky, 1962](#); [Bruner, 1960](#); [Wood, 1986](#)). These philosophies dictate that students are active participants in knowledge acquisition. Therefore, many resources have been ploughed into the study and expansion of constructivism theories and student-centred teaching approaches to the negligent of the teacher-centred teaching approach.

This impact produced a considerable body of literature on student-centred teaching approaches and student-centred teaching methods. Different educational systems recommended several student-centred teaching methods as the impact of research was realised as academics argued the importance of these methods. This resulted in almost all the education systems adopting student-centred teaching methods with the main emphasis being that the approach enables students to experience learning with hands-on as they mould learning and understanding according to the philosophies of [John Dewey \(1933\)](#), [Jerome Bruner \(1961\)](#), and [Jean Piaget \(1983\)](#).

The interesting observation is that even though the student-centred teaching approach has been adopted in various education systems, its implementation seems not to have been impactful. Scholars have observed that teachers have perpetuated the teacher-centred teaching approach. For instance, in the Finnish education system, [Lavonen \(2009\)](#) and [Juuti, Lavonen, Uitto, Byman, Meisalo \(2010\)](#) contend that Finnish basic education teachers still favour teacher-centred teaching approach as compared to the student-centred teaching approach. Finnish students themselves also confirmed this according to a study conducted by [Juuti et al. \(2010\)](#). Remarkably, Finnish students prefer to be taught using the teacher-centred approach (p. 619).

In Namibia, [Awe and Kasanda \(2016\)](#) argue that, to some extent, teachers do not even know the meaning and interpretation of a student-centred teaching approach. They say that Namibian teachers interpret student-centred teaching approach as “group work”

(p. 43). An earlier report by the Ministry of education equally mentioned that Namibian teachers dominate their classrooms as students attentively “sit back and copy down the lesson summaries” (MoE, 2009, p. 11). The envisaged impact of the student-centred teaching approach seems to have equally failed to be realised in South Africa, Tanzania, the USA, and Turkey (Spreen and Vally, 2010; NRC, 2011; TIE, 2011; Anangisye and Fussy, 2014; Gurses et al., 2015; Tilya and Mafumiko, 2018).

The lack of a generalised impact evaluation framework makes impact evaluation pose a significant challenge (Chowdhury, Koya, and Philipson, 2016). Nonetheless, the argument presented by these various scholars bears evidence of the impact of research in teaching approach. Even though several teaching methods have been developed under the umbrella of the student-centred approach, advancement in research enabled academics to realise several misconceptions. Using the guidelines for Research Evaluation Framework (REF 2014) and the standard evaluation protocol (SEP), these scholarly publications and arguments can be of necessity and relevant to the education environment. Remember, impact is a measure to assess the quality of research (Parker and Van Teijlingen, 2012). It is also a measure of an identifiable benefit or influence that research has towards the public (Penfield et al., 2014; Bayley and Phipps, 2019).

In this case, this research’s influence is in basic education, especially with the teaching approaches. The impact is beneficial to teachers as they are now questioning the best strategies to apply when explaining the curriculum to the students explicitly. This impact has the potential of improving the performance of students. It can be regarded as the spilling over of the original novelty in the sense that as teachers adjust their teaching approaches as informed by research, their interpretation of the curriculum becomes enhanced.

Some academics have argued on the inadequacies of the teaching methods originating from the student-centred teaching approach (Tilya and Mafumiko, 2018; Spreen and Vally, 2010; Gurses et al., 2015). Unfortunately, it seems little research has been conducted on how to improve teacher-centred teaching methods even though it appears that many teachers continue to apply teacher-centred teaching methods in practice (Awe and Kasanda, 2016; Gurses et al., 2015).

3.2 The impact of research on education policy

In pursuant to achieving national academic goals, educational systems periodically have to develop and or adopt educational policies as guiding tools towards success. The most fundamental basic education policy

is the national curriculum. It must also be noted that the implementation of these policies sometimes is autonomous to individual states, provinces, regions, and or municipalities. Nevertheless, several curriculums seem to have a few similarities in the sense that they all emphasise the importance of quality, efficiency, equity, equality international in nature (Ministry of Education, 2006; Ministry of Education 2009). For some identified aspects the curriculum policies need to have, the impact of research in education policy must permeate through policy formulation processes.

Just as evidence-based medicine in health and clinical practitioners is about changing the “behaviour of clinical practitioners from opinion-based practise to evidence-based practice” (Sackett, Rosenberg, Gray, Haynes & Richardson, 1996), so are also education policies. Changing educational policies can also be seen as a part of instructional practices through which an education system reconciles the global educational policies. This is demonstrated through the fact that the formulation of policies is influenced by the impact of research in education that is evidence-based. This also applies to the revision and or adoption of policies; it is always influenced by evidence-based research.

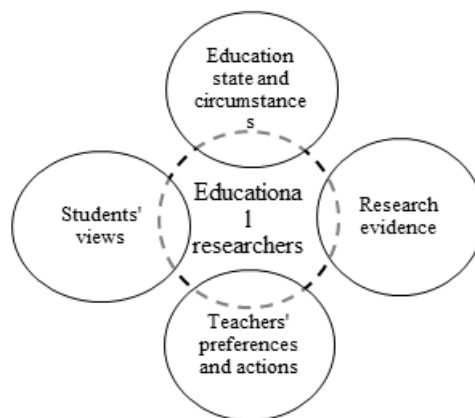
Following the arguments from education theories of Dewey (1933), Bruner (1961), Piaget (1983), and Vygotsky (1962), educational systems formulated and implemented policies that were more focussed on student-centred teaching approach. This equally qualifies the impact of research in influencing educational policies, as argued from the payback framework. Payback framework is a tool for examining the impact of research (Hanney, Packwood, and Buxton, 2000; Donovan and Hanney, 2011). These authors argue that the payback framework applies a particular case of identified research impact to ‘tell the story’ of that impact. Therefore, as demonstrated above, the framework serves to structure the story in various academics’ arguments regarding the teaching approaches.

One aspect that needs emphasis is the unappreciated impact of basic education in society. Education policy is the most critical impactful element yet often unrecognised as an element of societal change. In formulating education policies, the significance of research is essential to policymakers. It helps them in understanding the preferences and actions of teachers and students. The processes of policy formulation need to have the basis of evidence-based mainly from the views of teachers and students (Thomson & Walker, 2010). From this background, it is evident that educational research impacts the formulation and implementation of education policies. Figure 2 below demonstrates the complex interface of the aspects involved in the policymaking process and how educational research impact the process.

Even though Bailey (2010) seems to oppose the fact that governments tend to possess and control policy prowess, government policy experts base their decision-making on research. They rely much on studies from research institutions, especially universities and schools. Reasons why their decision-making is influenced by educational research, are that the policies have much effect on the universities and the operation of schools. Schools, in return, produce prospective university students. The involvement of teachers, university researchers (*lecturers*), and

policy-makers makes the formulated educational policies quickly disseminated and accepted by the users of the research. It must be noted that the involvement of all these characters influences the dissemination of the research output. This is because researchers do not necessarily struggle to research the audience in the policy formulation process as the (*audience*) also participates in the process (Harris and Clayton, 2010). Figure 2 below demonstrates how education research bears an impact on education policy formulation.

Figure 1. Education research and educational systems (Adapted from Sackett et al., (1996)



As argued by Morton (2015, p. 40), “people accept information more readily from researchers they trust;” in this case, the involvement of university researchers and schoolteachers. Schools and teachers, in this case, become the disseminators of research, as they are the leading policy implementers. They use it and benefit from its use, which then translates into the needed societal change and awareness, knowledge, and understanding (Morton, 2015). As Rymer (2011) argues, those outside the research system mainly influence the impact of research. These are those directly affected by the outcome of the research, in this case, schools and teachers. Additionally, these might be passive participants in research or may not necessarily form part of the research process (Boswell and Smith, 2017).

3.3 The impact of research on education management practices

School management, which comprises school managers, teachers, and students, is not an easy job or task, especially for those in management position(s). As instructional leaders, these managers have the mandate of building positive school culture through the implementation of educational policies. Mainly, schools, by default, become the implementation phase where the success of the formulated educational

policies rests with the educational management practices. From this background, it is essential to analyse the impact of research in educational management practice.

One of the vital policies for implementation is the teaching approach. According to Master, Steiner, Doss, and Acheson-Field (2020), effective teaching is one of the most critical aspects of education management. This is because students’ achievement is directly affected by how schools implement the envisaged policy that has to do with effective curriculum content delivery. It is also from effective teaching that measurements for educational outcomes, both national and international, which include (PISA, TIMSS & SACMEQ), are assessed from (Biesta, 2009).

The fact that education systems do not operate in silos (Watson, 2007) gives educational managers pressure to keep themselves abreast of the latest educational research. Thus, utilising research to implement desirable management in schools accelerates the dissemination of research (Knott and Wildavsky, 1980). Furthermore, due to the nature of the education policies and research, governments consistently devise awareness dissemination programs through workshops and periodic training of school managers (Knott and Wildavsky, 1980). The rationale of dissemination is to help policymakers simplify policies for the implementers. In this case, school

managers become agents of change in the process of research use. Therefore, school managers and teachers are forced to infuse in further research in the interpretation and implementation of policies by the nature of their positions. Remember, research use implies the different stages of use and various types of applications (Boshoff, 2014a).

4. Conclusion

The study intended to review the impact of research in education, systematically concentrating on three main areas. These included the impact of research on teaching approaches, education policy, and education management. It can be argued that the study has met its purpose as it is concerned with the critical analysis of the impact of research in education, specifically in basic education.

Even though the 2014 Research Excellence Framework assessment (REF, 2014) provides specifications of defined periods of measurement for the impact of research, it can equally take many years to be achieved (Hughes and Martin, 2012). Therefore, the impact of research can occur beyond the period of (7 to 20 years). This is evident, as Hughes and Martin (2012) further contend that impact of research can be defined as an intentional generation and monitoring of 'what counts' and 'what does not count towards a societal benefit (p. 2). Equally, this is proven by the arguments of (Kirschner et al., 2006; Sweller, 2009; Clark et al., 2012), who have demonstrated after many years that there was nothing wrong with teacher-centred teaching approach.

4.1 The impact of research on teaching approaches

Various authors argued mainly from a position of opposition to the teacher-centred teaching approach with more profound criticism. As Katukula (2018) noted, less research has been conducted to establish and improve the teacher-centred teaching approach. This is further proven by the fact that teachers are still using teacher-centred teaching methods as opposed to student-centred methods (Gurses et al., 2015; Awe and Kasanda, 2016). Therefore, there is evidence of the impact of research in teaching approaches as there lies a corpus material in research that argues as to which method is best. The impact is more vivid to the fact that several educational systems bought into the idea of a student-centred teaching approach at the expense of the teacher-centred teaching approach (Ottander and Ekborg, 2012).

The provision of clear and concise research findings to the appropriate audience and users increases the levels of trust between researchers, users, and implementers of the policies. It equally improves policy communication and knowledge transfer to achieve

national academic goals. This is what is generally observable during the formulation of education policies. As a result, educational systems develop ways in which they can reach a bigger audience and sensitise them about the prospects of the intended changes.

As argued by Yamada (2016) and Bebbington and Unerman (2018), teachers and other educational specialists are generally involved in this extensive consultation process during a prospective curriculum revision and amendments. This, of course, excludes international policies, which their implementation is of the global interest. An example of these international policies includes adopting policies that align with the sustainable development goals of the United Nations. Therefore, politics do not necessarily influence the dynamics, which govern educational systems as per the claim of Boswell and Smith (2017, p. 4), but of course, have a higher level of influence.

4.2 The impact of research on educational policy

In educational policy, the claim of Boswell and Smith (2017) that "knowledge shapes policy" is plausible (p. 3). This is because factors involved in the formulation of educational policies include the consideration of international agreed-upon policies. Education is universal, and the national curriculum needs to maintain global similarities, especially in the contents of specific courses. At the same time, it qualifies the relevance of the theories of co-production in education policy. Co-production posits that the impact of research in education has a gradual influence on policy formulation according to how the perceptions of the actors involved are modified (Boswell and Smith, 2017, p. 4).

From this position, the impact of research on education policy can easily be assessable. In education, there are international assessments, which nations use to assess the impact of research in education policies as a measure to inform government(s) for possible readjustments. These assessing bodies include the OECD's Programme for International Student Assessment (PISA), the Southern and Eastern Africa Consortium for Monitoring Educational Quality (SACMEQ), the Trends in International Mathematics and Science Study (TIMSS) (Katukula, 2018). Contrary to what some academics might contend that this type of impact of research can be spurious, it is further from being unauthentic. Educational research has quite a well-established accountability process and a general understanding of the research (Penfield et al., 2014).

4.3 The impact of research on education management

In educational management, the impact of research is quite apparent. It is the phase of research utilisation where research-based knowledge moves into practice

(Boshoff, Esterhuysen, Wachira-Mbui, Owoaje, Nyandwi, & Mutarindwa, 2018). It is from education management, where research knowledge progressively alters the thinking and perceptions of the knowledge users. The exciting aspect of education management is that the disseminators of research knowledge are at the same time the knowledge users of research. As argued by Boshoff et al. (2018), educational research allows teachers and school managers to have a broader understanding of educational concepts and theories. Through productive interaction during workshops, researchers academically interact with stakeholders (teachers and

school managers) as they take them through on how to implement the policies.

According to (Molas-Gallart and Tang (2011), research impact takes place when stakeholders (teachers and school managers) start doing things according to the formulated educational policies. Mainly, this happens after they have had a productive engagement with the researchers and or when they have understood the implementation process of the policies.

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Original Research Article

Qualitative approach in evaluating service delivery in Namibia: The case of the decentralized Khomas Basic Education Directorate

Sitali. B. Lwendo^{1*}, Albert Isaacs¹

¹School of Education, University of Namibia, Windhoek, Namibia

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ABSTRACT

Decentralisation, in the Namibian public sector, was aimed at improving service delivery by regional and local authorities to the communities in Namibia. This research paper evaluates accountability of service delivery in the educational sector of the Directorate in Khomas Regional Council. This research paper used the qualitative approach and followed a triangulated method of data collection by using open and closed ended questions only. The findings of the research revealed that the understanding of the decentralisation policy and concepts are different among the participants. The paper recommends more sensitization, advocacy and training on the purpose and benefits of decentralisation

1. Introduction

As failure in implementing a public policy warrants a scientific study to explicitly determine the actual causes of the failure, this paper focuses on studying why the delegated education functions to the Khomas regional council, demonstrates poor service delivery and little accountability, while the expectation was to ensure that, the delegation of functions yield the intended policy objectives.

Before Namibia's independence, the country's education system was designed to reinforce apartheid rather than provide the necessary human resource base to promote equitable social and economic development. It was fragmented along racial and ethnic lines, with vast disparities in both the allocation of resources and the quality of education offered (MURD, 2011). There was a vast disparities between the education system designed for the black majority and that of the white minorities, in Namibia, in terms of both the allocation of resources and the quality of education offered. As such, this system had a great negative impact on the quality of education of the country.

The newly elected government in 1990 reaffirmed its commitment to decentralisation as promised in the SWAPO Party's 1989 Election Manifesto (SWAPO, 1989). Aiming at narrowing the gap between the black and white education systems in Namibia.

Government started developing the policy and legal framework upon which decentralisation would rest, such as; the Regional Councils Act, 1992, the Local Authorities Act, 1992 as well as the Decentralisation Policy, 1997. The government also set up institutional arrangements that would facilitate the implementation process. The decentralisation policy was adopted in 1997, and it has been one of the cornerstones of government since independence with the expressed purpose of bringing government closer to the people. In support of the decentralisation policy a Practical guide to the decentralization Enabling Act was introduced in the year 2008.

The aim of the decentralisation policy in Namibia is "to provide people at grass roots level with the opportunity to participate in decision making that affect their life and to extend democracy based on national ideas and values" (Decentralisation Policy, 1998). The implementation of

*Corresponding author: sblwendo@unam.na

decentralization Policy in Namibia aims to decentralize functions from line ministries to the Regional Councils and local authorities first by delegation and ultimately devolving the delegated functions, power, and authorities to local and regional governments. Thus, bringing government closer to the people.

Coupled to the above, the Government of the Republic of Namibia (GRN) set about to create one unified structure for education administration, from the previous eleven fragmented, ethnically based departments. English replaced Afrikaans as the nation's official language. English was also chosen as the medium of instruction in schools and other educational institutions. A new, learner-centred curriculum for Grades 1 to 12 was developed and introduced, which was completed in 1998. It received recognition beyond Namibia's borders and included an adapted Cambridge IGCSE programme for senior secondary level.

It is against this background that the Government of Republic of Namibia has undertaken ongoing reform initiatives, with the view to further strengthen and transform the system of education in the country, while taking cognisance of the importance of decentralising its services to the regions.

In June 1998, the Cabinet Secretariat issued a circular about a cabinet memorandum to Permanent Secretaries (PSs) to start with the preparations for the implementation of the decentralisation policy as per the Cabinet Decision of March 1998 (MRLGHRD, 2007). This led to the organisational structures of regional councils to be expanded and fine-tuned to accommodate the new functions to be decentralised. The Directorate of Education was then established under the regional council structure as the first step towards decentralisation.

The Ministry of Education, Arts and Culture (MoEAC) chose to delegate the functions of Primary and Secondary Education to regional councils with effect from the 01 April 2009 as per the Cabinet Decision No. 5th/17.03.09/004. The handover of these functions to the individual regional councils took place between 06 October 2009 to 24 November 2009 to explain and agree on how the functions and activities would be carried out (MRLGHRD, 2012). The Ministry of Education seconded all staff members attached to the above-mentioned functions to all the Regional Councils. The new Government of the Republic of Namibia (GRN) set about to create one unified, but decentralised structure for education administration. Currently, Namibia allocates more than 20% of its national budget to education. This represents six to seven percent of Namibia's total GDP and is one of the three countries with the highest percentage of GDP directed toward education in the world (MoE, 2011).

Decentralisation was supposed to improve, among others, the personnel and its services in regions,

However, this is far from being achieved. There are internal and external factors that affect effective delivery of education services. For example, regional jobs are not always done in time, which indicates that there is a problem with what the decentralised personnel who is supposed to carry out these duties. The paper is significant because it serves as a guiding tool to future research who would wish to conduct research on decentralisation and service delivery. It is expected to inform educators of the factors, benefits and challenges that affect decentralised education and exploring ways of addressing them to enhance efficiency in education service delivery. It also provided sound information to the policy makers and decision makers to come up with possible strategies to address these shortcomings and to come up with possible solutions before the implementation of the devolution phase. The paper also recommended improvement measures that will help other Education sector and the regional councils to improve their performance.

2. Methods

The research paper used a qualitative approach to evaluate service delivery in the basic education sector; hence open-ended questionnaires, observation and desk study approach were adopted. The researcher further studied relevant documents on decentralisation, i.e. Regional Council, Ministry of Educations Arts and Culture, Ministry of Urban and Rural Development reports, manuals guidelines, policies and Acts.

The researcher classified similar responses and put them into themes and categories. This helped the researcher to examine the interview transcript and documentary notes before identifying the pattern and organising the data into categories. A thematic analytical approach was adopted to analyse data for this paper. Data were presented through tables and charts and was interpreted in a narrative form. Face to face interviews were recorded and then transcribed.

3. Results

This research paper is organised according to major themes such as biographic data of respondents, general knowledge of decentralisation policy, coordination of delegated activities, human resources management under delegation phase, service delivery, monitoring and evaluation as well as readiness for devolution.

3.1 Gender of the respondents

The researcher wanted to establish whether Khomas Regional Council is gender conscious in terms of

staffing. The paper found that out of the 30 respondents, 18 are male and only 12 are female. From the 10 senior management respondents, only 2 are female and both females are from Ministry of Education Arts and Culture. Most senior and middle management respondents from Khomas Regional Council are male and most operational staff respondents are female. Despite the call for gender balance in management positions in government, it is clear that this is not adhered to since most senior management positions are still occupied by men. Women continue to occupy positions like secretaries, nurses, pre-primary and primary schools teaching since these positions were seen as being more suitable for women.

3. 2 Working years of experience of the respondents

The research paper further looked at the job experience of respondents to see various experiences of staff members. The paper revealed that the years of experiences of the research participants varied from two years to 35 years of working experience (Table 1). Those who spend two years in their positions are new recruits and those who have been recently promoted in the new positions. The table below presents the findings on working experiences of the thirty research participants.

Table 1: Working years of experience of the respondents

Research participants	Years of experiences
Regional Council staff members	2 – 22 years
Education Directorate staff members (Regional Council)	4 – 35 years
Constituency Councillors	3 – 10 years
Ministry of Education (Headquarters)	5 – 20 Years
Ministry of Urban and Rural Development (MURD), Directorate of Decentralisation staff members	2 – 18 years

3.3 General knowledge on Decentralisation

The research paper findings reveal that respondents interviewed have different understanding and knowledge of decentralization as they were all giving different views on the definition of decentralisation. It is evident from the various responses that decentralisation means different things to different people.

Further analysis of the findings revealed that the understanding of the decentralisation policy by one respondent from Khomas Regional Council who indicated “that decentralization is the process of negotiation between the Line Ministries and the Regional Councils” was found to be in relation with the definition of decentralisation as defined by Regmi (2013).

A respondent from Ministry of Urban and Rural Development indicated that “it is a policy that advocates for inclusiveness and promote participatory democracy which anticipates the end results as accelerated service delivery down to the grassroots”. Several others responded that decentralisation was a process of bringing government services closer to the people, which is the slogan of decentralisation in Namibia, and it appears on almost all decentralisation material. Some responded that decentralisation is the transfer of powers from central to sub-national governments.

The research paper also found that the targeted community members were not really well informed about the concept of decentralisation as they both indicated that they did not know the meaning of decentralisation. Although many respondents tried to provide answers on their understanding of the decentralisation policy in their own way, it was evident that the decentralisation policy is not well known and not clear to many people. This is a clear indication that the ministry responsible for coordinating decentralisation in Namibia is not doing enough in terms of advocacy and sensitisation of the community members on the decentralisation policy.

The findings showed that the arguments point that the decentralisation policy is not well known, and not clear to all staff members was further supported by four operational members of staff from the Khomas Regional Council. The researcher also found that most staff members at the top and middle management levels who were interviewed understood decentralisation very well. The study found that the policy of decentralization is well understood at senior and middle management levels. Many respondents indicated that more sensitisation and advocacy on the policy of decentralisation were needed for the policy of decentralisation to be well understood by all. The researcher agrees with most respondents who pointed out that it was impossible to implement a policy that was not well understood or known by the majority of people.

Findings on the question whether it was a good idea to implement decentralisation policy in Namibia reveals that most respondents felt that it was, indeed, a good idea to implement the policy. Even the respondents who seem not to understand the policy so well-articulated the same sentiment. One respondent from MURD indicated that *“it was a good idea to implement the decentralisation policy because services should reach down to the people who are in need”*.

3.4 Coordination of delegated activities

This section presents and analyses the results on the perception of participants regarding the coordination of delegated activities between Khomas Regional Council and MEAC seconded staff in terms of planning and human resources management. The Directorate of Education is headed by a Director, and according to some respondents efforts are being made to ensure proper integration of education staff in the regional structures. See table 2 below.

Table 2. Inter-organisational collaboration and coordination

Institution	Position	Yes	No
Regional Council Staff members including Councilors	Senior management	0	1
	Middle management	1	2
	Operational staff	1	2
Seconded staff members	Senior management	0	1
	Middle management	1	2
	Operational staff	1	2
Ministry of Education, Arts and culture	Senior management	1	0
	Middle management	2	1
	Operational staff	2	1
Ministry of Urban and Rural Development	Senior management	1	1
	Middle management	2	3

The research paper found that there is a lack of inter-organizational collaboration and coordination with regard to the management of delegated education activities. Mostly operational and middle management respondents from the MEAC indicated that there is inter-organizational collaboration and coordination. However, a respondent from the RC middle management indicated that the planning of educational activities is done separately from that of the regional council.

Findings revealed different perceptions of respondents regarding the coordination of activities at regional level. A middle management respondent from Khomas Regional Council stressed that the education staff were reporting their Information Technology problems to their Director of Education, instead of to the responsible systems administrator in the Directorate of General Services in the regional council, and these caused delays in rectifying these problems. This perception was also confirmed by a senior manager from the RC who stated that *“the seconded staff members refused to follow the correct reporting lines and continued to do their activities like they used to before delegation phase”*.

The paper found that a Regional Development Coordinating Committee (RDCC) was established in Khomas region for the purpose of effective regional development planning and coordination. This

committee is composed of all regional heads of various sector ministries represented in the region and chaired by the Chief Regional Officer. Among other responsibilities, this committee looks at the overall developmental needs of the region, prioritises and makes recommendations to the regional council. Constituency Development Committees (CDCs) were established in all constituencies for the effective coordination of the planning and development of the region at the constituency level. The CDCs are chaired by the constituency councillors. Settlement Committees are also established in settlement areas for the purpose of effective coordination of the administration and development of the settlements. These committees identify, assess and evaluate community needs / problems to be considered for development proposals / plans by the Regional Council. The committees generally monitor the delivery of services within their area and report to the Regional Council (MURD, 2016).

A respondent from Khomas Regional Council Education Directorate was of the opinion that the role of planning was not well understood by most staff members in the planning directorate of the Khomas Regional Council and that the planning directorate was not aware of what was going on in education planning. Another respondent from Ministry of Education, Arts and Culture argued that the regional council was

considered to be crucial in the planning of education activities and as a result, the management of the regional council are always invited by the Ministry of Education, Arts and Culture to be part of the education directorate planning sessions.

A senior management respondent from Ministry of Education, Arts and Culture revealed that a joint education planning workshop between Ministry of Education, Arts and Culture and the Regional Councils was held in 2014 and was co-facilitated by International Institute for Education Planning / UNESCO and NIPAM to address the issues of planning and coordination. Despite this, challenges of lack of coordination are still present.

Two Regional council respondents expressed the need to be involved in the budgeting and planning process of Education to ensure inclusiveness of regional needs and to ensure better understanding plans and implementation process.

The paper found that Education Planners are part of the Directorate of Planning and Coordination Services and that the Education Directorate personnel are

always part of the Regional Council’s planning processes and have been participating in the planning process. The research paper further found that there is joint planning, implementation, monitoring and evaluation of Regional Capital Projects. However, the experience on the ground is different from what is written in various reports. Lack of office accommodation was said to hamper effective integration and customer service due to location of delegated staff.

3.5 Human Resources Management under Delegation Phase

Findings on the question whether the RC was involved in the recruitment of vacant positions of the delegated structures of education directorate revealed that all respondents from Khomas Regional Council and Ministry of Education, Arts and Culture answered in the affirmative. Only two respondents from Ministry of Urban and Rural Development said they were not sure. See table 3 below.

Table 3. Involvement in the recruitment process

Institution	Yes	No	Not sure
Regional Council Staff members Including Seconded staff	12	0	0
Councilors	1	0	1
Ministry of Education, Arts and culture	7	0	0
Ministry of Urban and Rural Development	4	1	2

All respondents answered yes to the question of whether the RC had an induction programme in place. However, most respondents were not sure as to whether this induction programme was really followed. One respondent from Khomas Regional Council senior management indicated that all seconded staff members were inducted, but he was not sure about other RC staff members.

All respondents were asked whether the RC has the capacity to manage delegated functions. Two respondents from Khomas Regional Council senior management indicated that the Regional Council was understaffed compared to the work carried out on a daily basis. The Human Resources Practitioners at the Ministry of Education, Arts and Culture was said to be overloaded. The study further found that a lack of proper communication makes the Human Resources Division sometimes unaware and unable to be involved in some misconduct cases. One respondent indicated that although the RC has the capacity to manage delegated education functions, there was a degree of unwillingness from staff members. Another respondent from Ministry of Urban and Rural Development indicated that the ministry was

continuously capacitating the RC especially the development committees.

One respondent from the Regional Council operational staff indicated that she appreciated the good working relationship they had with delegated Line Ministries (specifically Education and Works Ministries). However, she said *“there were still few things where cooperation was needed from both parties such as coordinated recruitment between the Regional Council and Ministry of Education Arts and Culture needed to be strengthened”*. Furthermore, it was emphasized that delegated education offices are distant from the Regional Council Head Quarters, and this has been hampering the effective day to day coordination between the parties. Regional Council respondents indicated that there was a need to conduct annual meetings between the Regional Council and all delegated ministries for efficient and effective planning.

Other issues raised were cases of misconduct by the seconded staff that were reported to the Regional Council but where no action was taken against the offenders. A senior management respondent from RC revealed that a number of misconduct cases were pending and mostly lapse with time, especially getting

the preliminary report from principals / supervisors takes too long. One respondent recommended that all HR staff and principals need to be trained in misconduct proceedings to enable better handling of misconduct cases. A Ministry of Education, Arts and Culture respondent also highlighted the issue of delay on costing by the Department of Works which hampered the renovation of Ministry of Education, Arts and Culture infrastructures in the region.

The research paper found that there was a poor interpretation of relevant legislations such as Decentralization Enabling Act and Public Service Act by the Regional Council and the delegated Line Ministries in terms of human resources issues. The issue of overloaded Human Resources Practitioners at the Ministry of Education, Arts and Culture was indicated as well as the unavailability of a Chief Human Resource Practitioner on the structure, which renders the Senior Human Resources Practitioner to perform extra duties. It was also highlighted that the Secondment Agreements for the seconded staff members expired already and there was a need for renewal of the same as a matter of urgency.

The files of the Ministry of Education, Arts and Culture seconded staff are kept at their respective offices. A RC respondent indicated that the Regional Council produce reports on updated personnel files on an annual basis.

3.6 Capacity Development under Delegation Phase

With regards to capacity development the paper found that the Regional Council has an Induction Programme in place for all staff members including delegated staff members. But for promotional posts, induction is mostly done informally by immediate supervisors while formal induction was conducted annually or every second year.

The research paper further revealed that there is a Training Committee in place comprising of Regional Council and delegated Line Ministries' representatives

and they meet on an ad-hoc basis. The Regional Council and Ministry of Education, Arts and Culture Directorate have Training Plans that determine staff's development needs. The Training Committee has the responsibility to submit training reports.

The research paper further found that there is a compiled list for annual training depending on annual training needs assessment but the budget is not enough to send all staff members for training. Mostly staff are sent to sponsored courses. One senior manager from the RC revealed that some managers attended NIPAM trainings. The researcher also found that the Human Resources Division has developed a form which is sent out to heads of divisions to fill in the name of a trainee and kind of trainings attended in order to keep record of all trainings done annually.

3.7 Service Delivery

3.7.1 Factors affecting performance

Lack of motivation was among the factors that most respondents listed to be affecting their performance. Senior management respondents from Khomas Regional Council argues that the director of planning is overloaded since most delegated functions were placed under the planning directorate. One respondent observed that it was very confusing and more stressful. They have acquired more responsibilities, but the salary remains the same. The research paper also found that some seconded staffs were not cooperative. A lack of adequate resources was also said to be another factor that was affecting their performance.

3.7.2 Changes in Service delivery

Table 4 below shows the respondent's views on service delivery. They had to respond to a question on whether there were any changes in services delivery since the education functions were delegated.

Table 4. Changes in Service Delivery

Institution	Yes	No	Not sure
Regional Council Staff members (including seconded staff members)	7	2	3
Councilors	2	0	0
Ministry of Education, Arts and culture	5	1	1
Ministry of Urban and Rural Development	7	0	0
Community members	0	0	2

With regard to the changes in service delivery in the education sector in Khomas Regional Council, most respondents focussed on the achievements / improvements after delegation and some also

highlighted the challenges. Few respondents from both the Khomas Regional Council as well the Education Head Office were of the opinion that the following services have improved since the education

functions were decentralised. For example, there were no more delays in payments of service providers, problems experienced can be attended to on the spot and resolved, documents can be traced easily because no documents are sent to Head Office for payment, and that better planning is in place since they are controlling their budgets themselves. For instance, a respondent from Khomas Regional Council revealed that *“with the transfer of funds for delegated functions, payments are done on time”*.

The above achievements are in line with Winkler's (2005) argument that decentralization has the potential to improve service delivery and education quality, if designed and implemented well. An expression from one middle management respondent from Ministry of Urban and Rural Development is that regional governance will promote participation and effectiveness of service delivery and greater local team initiative will encourage innovation and creativity. According to a senior manager from Khomas Regional Council, the regional Director of Education is very central to ensuring that decentralisation is a success and their analysis of the process and outcome is critical.

The research participants were also asked how decentralisation benefited education management and service delivery. The research paper found that the educational activities are carried out smoothly and delivered on time while the rest of the respondents differed. The analysis of the findings revealed that there was some acknowledgement of notable improvement of certain activities which are delivered on time according to those three respondents. According to MURD (2014), Decentralization gives regions an opportunity to take full responsibility for development in the region by using resources optimally to attend to specific needs of the region.

The paper also found that in terms of the effectiveness and efficiency in service delivery the budget has been transferred and procurement system has improved. Payments to suppliers are done on time. A senior management respondent from the MEAC stated that *“decentralized education is a noble task with benefits recognizing the role of community structures, parents, school boards, school management and capacitating them to be more effective”*. According to the official, this has the potential to promote community participation, ownership and management of educational services.

This was supported by a respondent from MURD who said that *“the decentralized functions address critical community needs and local leadership has a strategic role in enabling the communities and families to assume their role and collaborate with the regional directors and school management. Therefore decentralization is practically a process of returning the educational function to the communities with the*

Ministry as the key partner in shaping the future of our children”. The respondent further stated that decentralization must be seen as a Community Public Private Partnership process (CPPP).

A middle management respondent from Khomas Regional Council responded that *“decentralisation is good for local democracy, equal economic, cultural and socio-economic development and to improve public service provision in the region, education being one of it.”*

Despite the various improvements and benefits identified by the respondents, some challenges were also highlighted. Office Accommodation was one of the major challenges highlighted by at least 14 respondents. The research paper also found that Ministry of Urban and Rural Development, with the Finnish support to the Decentralization Process in Namibia, contracted a consultancy to carry out a study of the office accommodation needs for decentralisation purposes. The research paper was completed and the findings are available for planning and budgetary purposes, or to source funding from development partners. At least 11 respondents noted that there was a lack of clarity and application of guidelines on delegated functions.

The research paper also found that there is a lack of synergy at regional level due to the slow pace of decentralisation by other sector ministries. It was recommended that the education function will require other services like health, rural water supply and rural electrification, the functions which have not yet been decentralised, especially in the Khomas Rural Constituency. Inadequate financial resources, lack of full appreciation of the benefits of decentralization by some key stakeholders, Confusion of de-concentration (regional presence) as it is sometimes viewed as decentralization by some line Ministries, resistance to change due to the fear of the unknown by mostly the affected staff members and the technocrats, inadequate planning for decentralization by some line Ministries, and lack of capacity at the level of development committees were among the challenges identified.

A concern was raised by an operational respondent from Khomas Regional Council that the impression people got is that decentralisation was going to make things easier, but to their surprise things are taking longer than expected. This view is contrary to the views expressed by most respondents that decentralisation improved service delivery despite some challenges experienced. Staff members were concerned regarding decisions they have to make when it comes to emergencies and the fact that they have to wait from the CRO for approval to do anything.

3.7.3 Policy Consistency

Respondents were asked whether policies made at national level addressed real issues at sub-national level. One respondent stated that *“it depends, if the policy was grafted after consultative evidence gathering, then they might respond to the needs of the local / regional level”*. Another respondent indicated that the implementation of Decentralization Policy strengthened regional governments since these levels of governance are now better capacitated to render improved services to their constituents.

The Ministry of Education through the Education and Training Sector Improvement Programme (ETSIP) has identified equity and efficiency in the educational outcomes between regions, schools and learners as an important objective for education financing reform in Namibia. Pursuant to this ETSIP’s objective of promoting quality education through equitable distribution of resources, the Ministry of Education (MOE) has committed itself to developing a policy on per capita funding for effective and efficient delivery of educational outcomes across the nation. Per capita financing in education, for both public and private schools in the regions, has become an important priority for effective implementation of ETSIP programme. This policy vision is also in line with the Namibian decentralisation policy, approved by the Cabinet in 1996 and adopted by the National Assembly in 1997. The decentralisation policy envisions significant devolution of social services to be performed at regional level, through the development of a formula-based grant system (MoE, 2008).

The paper also found that there is conflicting responsibilities and claiming of rights due to co-existence of Public Service and Decentralization Acts. Senior Managers have not engaged in dialogue.

3.8 Monitoring and Evaluation

On how often the Ministry of Education, Arts and Culture and Ministry of Urban and Rural Development monitor delegated functions, the respondents had mixed feelings. Some respondents indicated that the Ministry of Education, Arts and Culture conducted readiness assessment using their Sector Specific Service Delivery Standards (SSSDS) during 2016, while the Ministry of Urban and Rural Development only conducted readiness assessment in 2013. One respondent from Khomas Regional Council indicated that *“the Ministry of Urban and Rural Development being the coordinating and parent ministry of the regional council should conduct more readiness assessments if the Ministry really wants devolution to happen any time soon”*. Another respondent also from Khomas Regional Council indicated that both the Ministry of Education, Arts and Culture and the

Ministry of Urban and Rural Development conduct readiness assessments together. However, another respondent from the Ministry of Education, Arts and Culture revealed that *“the Ministry of Urban and Rural Development only conduct SSSDS readiness assessment with the Ministry of Education Arts and Culture because they are part of the Education Decentralisation Task Force, but when they are conducting assessments on generic readiness criteria they do not involve Ministry of Education Arts and Culture”*. The respondent further recommended that the Ministry of Urban and Rural Development involves the Ministry of Education, Arts and Culture when conducting readiness assessments on the generic criteria since education also delegated generic functions apart from their specific education functions.

The researcher also found that the implementation process is being spearheaded and monitored at the highest level of government, being the Prime Minister’s Office through the Secretary to Cabinet who is the chairperson of the Decentralization Policy Implementation Committee (DPIC). This committee meets on a monthly basis to look at the progress of decentralisation.

The research paper also established that a High Level Generic Readiness Audits of the Regional Councils to determine their readiness to receive and execute the delegated functions were conducted in 2008/09. The audits were done prior to the delegation of the education and maintenance functions. All thirteen regional councils audited met the generic readiness criteria.

The research paper further revealed that the Ministry of Urban and Rural Development conducted a Readiness Assessment on all Regional Councils during April and May 2013 to ensure that Regional Councils maintains the state of readiness to receive and execute decentralised functions. The assessment was aimed at determining the institutional capacity and progress made with integration of delegated Education and Maintenance Functions with the aim of identifying capacity gaps and the assistance needed to prepare the regional councils to receive more functions and execute the delegated functions.

The research paper also found that all staff members from the Education head office directorates and regional education directorates were trained in monitoring and evaluation techniques and tools with MCA technical support. Despite all systems that were put in place, most respondents from the RC and MEAC felt that the Directorate of Decentralization Coordination did not do much to monitor and evaluate the delegated functions and these have left delegated LMs in despair and not knowing what to do with the decentralization process. According to them, Line Ministries and Regional Councils were left at their own peril, and whenever they reported challenges through

the few workshops that were held, these challenges were seldom attended to. *“No guidance whatsoever came forth from MURD which is supposed to integrate, address challenges and prepare RCs and LMs for the next Phase of Devolution”*, one respondent indicated.

3.9 Readiness for Devolution

A top management level official from Khomas Regional Council indicated that despite challenges, especially of office-accommodation and long overdue legislation harmonization, the Khomas Regional Council is ready

for devolution. However, the official stressed that the directorates within the ministry (MURD) should coordinate their activities as all plan to implement activities in the region and that Regional Council should be involved. As a result, KRCs sometimes have to postpone their own planned activities, thereby delaying the implementation of their own projects and programmes.

From the various respondents, it is clear that they are all of the opinion that KRC is ready for devolution as indicated in the table below.

Table 5. Readiness of Khomas Regional Council for devolution

Institution	Ready for devolution	Not ready for devolution	Not sure
Regional Council Staff members including Education Directorate	12	0	3
Councillor	1	0	0
Ministry of Education, Arts and culture	5	2	0
Ministry of Urban and Rural Development	4	0	0
Community members	0	0	2

4. Discussion

This research paper reflected on different opinions from different interview participants. The main issue raised seems to be the lack of understanding of the decentralisation concepts by most participants as well as the lack of integration of the delegated functions into the Khomas Regional Council. Another important issue raised was the reporting lines that were not adhered to and which hampered proper communication. Despite the above-mentioned challenges, most respondents indicated some improvement in service delivery due to delegation of functions to Khomas Regional Council.

The findings revealed different understanding and knowledge of decentralisation. It is very clear that there are some confusions or little understanding of the decentralisation policy. The study observed that senior and middle management level staff were more knowledgeable about decentralisation compared to operational staff members. The same sentiment was also found in the study conducted by Petrus (2014) in Ohangwena Regional Council. Petrus (2014) stated that this disparity of knowledge of decentralization policy among these levels of participants could imply that management levels are more knowledgeable because they are involved in decision making.

Chikulo (2000) is of the opinion that decentralisation is a means to penetrate rural people. He argues that decentralisation enables people to participate in the socio-economic development process, thereby

softening resistance to the profound social changes entailed by the process.

The researcher is of the opinion that more advocacy and sensitisation on decentralisation can increase the knowledge on the decentralisation policy.

In this paper, the researcher observed that delegated powers are not effectively implemented in areas of appointments, training, and cases of misconduct etc. This results in causing delays, as it was found that the lack of proper communication makes the Human Resources Division sometimes unaware and unable to be involved in some misconduct cases. This shows that a top-down approach continues to dominate. There is a tendency to confuse delegation of powers to field administration of central government with regional councils and to keep both of them heavily dependent on the centre by creating hierarchies.

The findings revealed that the lack of capacity has caused problems in planning and implementing increased responsibilities. Chikulo (2000) states that effective implementation of the decentralisation activities needs the transfer of qualified and experienced manpower to sub-national levels of government. Chikulo argues that management capacity needs to be strengthened to enhance administrative performance and to enable the provision of managerial, technical and financial resources to development schemes within their areas of jurisdiction.

Mugabi (2000) argues that technically competent staff are lacking in many local governments. Mugabi

states that one of the reasons for this is the lack of resources to remunerate staff. The researcher agrees with Mugabi's views because certain key positions (e.g. deputy director, technical services and others) on the structure of the regional council are not filled due to lack of resources. Mugabi further argues that the problems of weak capacity are historical in the sense that they precede the current decentralisation efforts. The findings show that despite some operational challenges, service delivery has improved since the education functions were decentralised to Khomas Regional Council. According to [Shaningwa \(2012\)](#), there are notable improvements of certain education

activities which are delivered on time. Shaningwa's findings are similar to the findings of this researcher. [Ahmad and Brosio \(2006\)](#), argue that even when it is not explicit, improving service delivery is an implicit motivation behind most decentralised efforts. Decentralisation in education in Africa has been gaining momentum in search of efficiency in service delivery ([Winkler, et al., 2003](#)).

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Original Research Article

Rethinking the implementation of the revised history curriculum: challenges faced by teachers, learners and principals in selected public secondary schools in Khomas region, Namibia

Ndinelao N. Mothowanaga^{1,2*}, Bhebhe Gladwin¹

¹Department of Education, Curriculum Studies, Great Zimbabwe University, Masvingo, Zimbabwe

²Immanuel Shifidi Cluster, Khomas, Windhoek, Namibia

*Corresponding author: nelaomotho@gmail.com

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ABSTRACT

The purpose for this study was to rethink the implementation of revised History curriculum in Namibia focusing on the Khomas regions, Windhoek. In line with qualitative research the study adopted an interpretivism paradigm, qualitative approach and case study research design. The targeted population consisted of school principals, history teachers and learners in three selected schools in Immanuel Shifidi cluster. Purposeful sampling technique was used to select teachers with three and more years of experience as history teachers. Cluster sampling was used to select learners from School A, B & C. Face to face interviews, non-participant observation and document analysis were used as data collection methods and thematic analysis was used to analyse data collected using these instruments. The study revealed that training and workshops were conducted on the implementation of revised history curriculum but the majority of participants did not attend the in-service training and workshop because only few teachers were selected to be part of the training. The study also revealed that some teachers lacked knowledge in some history topics and concepts which affected the implementation of the curriculum. The challenges faced in the implementation of the revised curriculum were overcrowded in classrooms, lack of textbooks, inadequate resources such as libraries, lack of government funds and lack of time management. The study recommended teachers should make an effort to collaborate with other history teachers in the Immanuel Shifidi circuit. The collaboration forums are intended to aid them in sharing subject knowledge and assisting one another in teaching diverse historical themes and topics. The school administration should seek funding from various companies in Namibia to help create libraries, purchase textbooks for students, and purchase classroom desks. NIED should hold regular training and workshops in various circuits and have a follow-up system in place to ensure that the trainings are effective. This will aid teachers in understanding the varied expectations of the new curriculum as well as staying current on curricular revisions. The study further recommends that future researchers should focus on training topics that need to be covered during curriculum in-service trainings and workshops for efficient delivery of revised history curriculum.

1. Introduction

There is a lengthy history of international initiatives to change national education systems. The World Conference on Education for All (EFA) in Jomtien, Thailand, in 1989 was perhaps one of the first worldwide attempts to take action on education and set goals (Fleisch, Gultig, Allais & Maringe, 2019). Goal 4 of the SDGs aims to "provide inclusive and equitable quality education for all and promote lifelong learning opportunities for all," according

to the United Nations General Assembly (UNGA, 2015). Goal 4 shines out as being particularly relevant to education. Importantly, education is at the heart of development and is required to achieve all of the proposed SDGs (UNESCO, 2016).

Many governments consider improving education quality to be a top priority in order to support long-term economic development (Rogan & Grayson, 2003). In the last two decades, there have been various initiatives in sub-Saharan

Africa to alter educational techniques in order to increase education quality (Altinyelken, 2010). We live in a time where educational reforms are becoming more and more prevalent. Curriculum reform, as a type of important educational transformation, has been occurring in a wide range of academic areas (Nakanyala, 2020). According to Nkosi (2014), the educational system has undergone numerous modifications in curricula in an effort to enhance and address concerns such as inequality and a lack of quality in the educational system.

Since independence, the Namibian government has changed education three times through the ministry of education. The first revisions were made in the 1990s, then again in 2005 and 2006, and finally in 2016, which were implemented in 2017 for grade 8, 2018 for grade 9, 2019-2020 for grade 10-11, and finally in 2021 for grade 12 AS. Namibia's educational system is being restructured to meet the objectives of Vision 2030, the country's long-term national goal (National Institute for Educational Development, 2013). When the new curriculum was first unveiled, teachers and principals had conflicting opinions about it. Some principals praised the new curriculum, but others worried that teachers and learners, particularly in Grade 8, would struggle to meet the higher expectations (Shapwanale, 2017).

Government and funding agency actions in the development of curriculum are frequently too concentrated and confined, while the intricacies of how the curricula will be implemented at the school level are frequently disregarded (Rogan & Grayson 2003). Teachers who are involved in classrooms and apply the curriculum on a daily basis are, first and foremost, those who are responsible for executing the curriculum for effective teaching and learning. It has also been found that when implementing a new curriculum, teachers confront difficulties, particularly in terms of assistance and training (Haruthaithanasan, 2017). Teachers play a significant role in the success or failure of any adjustment in their teaching method. They frequently require additional time to comprehend what change entails and its significance for their teaching practice (Raselimo & Wilmot, 2013). The role of a teacher and their professional development is a problem in curriculum implementation (Estad and Voogt, 2018). Teachers are expected to have a variety of concerns about the new curriculum and how it will be implemented in schools. The success or failure of such an innovation will be determined by the teachers' concerns (Handler, 2010). Kelly (2009) claims that if the curriculum is not thoroughly grasped, it not only lowers academic standards but also lowers behaviour and attitude. Because teachers are the ones who provide curriculum content, this realisation highlights the necessity of

incorporating teachers in curriculum preparation. If teachers are excluded from curriculum creation and, by chance, get the curriculum wrong, the objective of achieving successful curriculum implementation is assumed to be a phantom (Kelly, 2009). Furthermore, due to their experiences and the management situations in their schools, teachers may have differing perspectives on the implementation of the new curriculum (Tafai, 2017).

As a result, effective curriculum implementation is critical, especially for high-quality teaching and learning. The curricula must be dynamic in order to satisfy the changing needs of the times (Hewitt, 2006). Furthermore, according to Van der Nest (2012, p. 5), "a change in curriculum demands a change in the teacher's function." Teachers must not only focus on changing content knowledge, but also on changing educational knowledge, which presents various problems in the effective implementation of CAPS as the new curriculum." Factors such as teachers' lack of sufficient training to effectively apply the curriculum could have a detrimental impact on implementation. As a result, proper training and induction must be facilitated in order to increase instructors' capacity to properly execute the new curriculum.

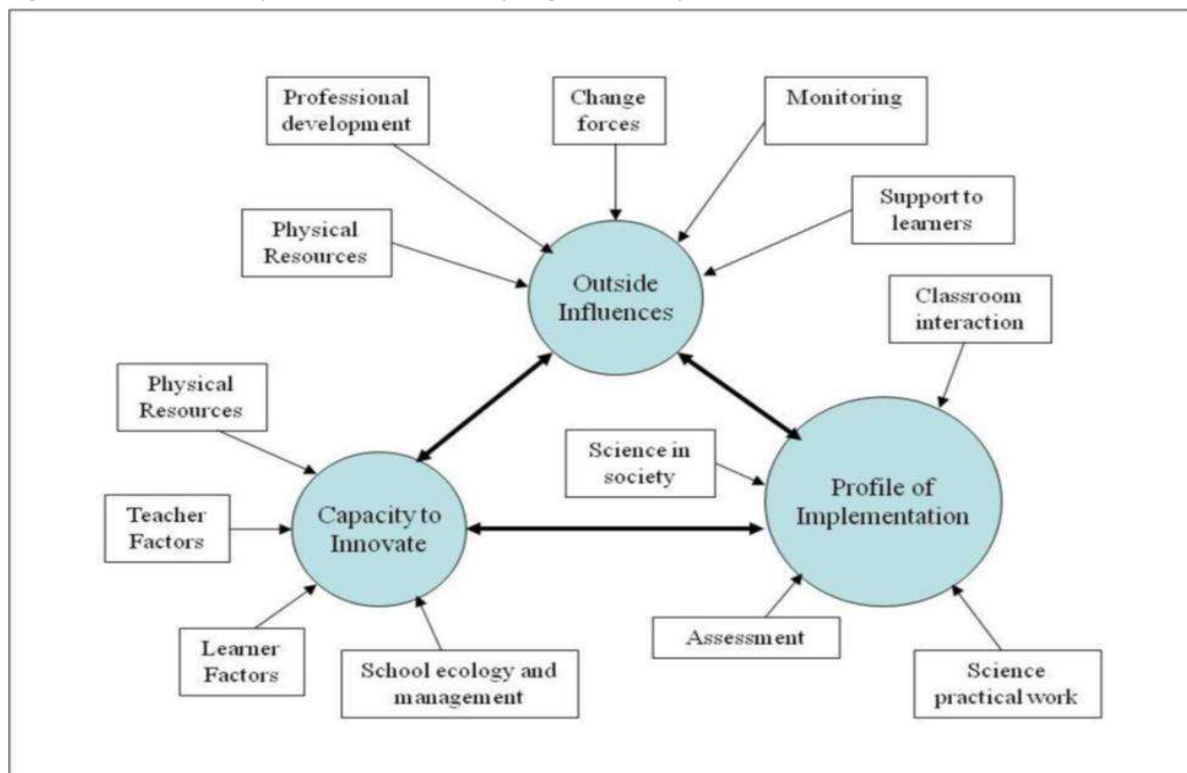
This study focused on the implementation of revised History curriculum in Namibia focusing on the Khomas regions in Windhoek, thus the objective was to establish challenges faced by teachers, learners and Principals in the implementation process of the revised History curriculum. History's importance as a teaching subject in nation-building cannot be overstated, as it is one of the mediums used to communicate the government's intents or national educational goals, as well as instill patriotic values in the younger generation (Lowenthal, 2000). According to Fogo (2014), history is a subject that should be included in a school curriculum since it helps students learn more about themselves by fostering their understanding of their past, both internally and externally.

2. Literature review

2.1 Theoretical framework

A theoretical framework is a set of interconnected ideas, similar to a theory but not as well developed (Frederic, 2011). Rogan and Grayson's (2003) curriculum theory drove this research project, which focused on the implementation of the redesigned History curriculum for grades 8-12 in Namibia. The implementation process, which included teachers and learners, served as the foundation. This idea provides more information on the teacher's role in the curriculum implementation process. The Rogan and Grayson (2003) curriculum implementation hypothesis is depicted in Figure 1 below.

Figure 1: Curriculum Implementation Model by Rogan and Grayson (2003)



Source: Rogan and Grayson (2003)

2.2 Theory of curriculum implementation

The effectiveness of curriculum implementation can be determined using sub-constructs and assigning levels of operation, according to Rogan and Grayson's (2003) hypothesis. Furthermore, the theory provides a useful framework for investigating teachers' experiences in the classroom and facilitating data interpretation. This theory of Curriculum Implementation and change is based on three main components, namely the Profile of Implementation (PI), Capacity to Innovate (CI) and Outside Influences (OI). The Profile of Implementation focuses on teachers' classroom practices in terms of pedagogical and subject abilities, whereas the Capacity to Innovate includes factors that either help or hinder the implementation process, as well as the problem-solving skills teachers employ to overcome obstacles: as discussed below.

2.2.1. Profile of Implementation (PI)

Rogan and Grayson (2003), define the Profile of Implementation as a term used to describe how teachers implement and practice a new curriculum in the classroom. It recognizes that teachers differ, resulting in a variety of approaches to adopting a new curriculum. Classroom contact (including teacher and learner action), what learners do on their own, and teachers' use of the practical component of a subject

are all sub-constructs of the Profile of Implementation (Rogan and Grayson, 2003).

2.2.2 Capacity to Innovate (CI)

The second construct, the Capacity to Innovate, is described in Rogan and Grayson (2003) as a means of attempting to comprehend and explain in detail the aspects that can help or hinder the adoption of a new curriculum in a school. Because of differences in socioeconomic circumstances, location, resources, and teacher availability, not all schools have the physical resources and support to implement a curriculum properly and to the same level. The availability of physical resources, teacher factors, learner factors, and school ecology and management are the four sub-constructs under the Capacity to Innovate component (Rogan & Grayson, 2003).

2.2.3 Outside Influences (OI)

The third and last construct, the Support of Outside Agencies is described by Rogan and Grayson (2003), as other organisations, such as education departments, that communicate with a school in order to foster innovation. The new curriculum implementation is the most interesting innovation. Professional development, which is focused on implementing change rather than simply providing information to

curriculum implementers, should be delivered as one progress through the stages. This is to better equip teachers and prepare them to implement the curriculum effectively (Rogan & Grayson, 2003).

This theory was chosen as the basis for this research since it considers all stakeholders as well as other materials such as resources (textbooks), facilities (Classrooms), teacher preparedness, and socioeconomic issues. All of these factors have a significant impact on Namibia's adoption of the updated History curriculum. As a result, this study looked at different areas such as teacher preparedness, abilities, knowledge, and obstacles faced by teachers during the history subject's curriculum implementation process, demonstrating its relevance.

2.3 Curriculum implementation

Curriculum implementation entails putting into action what has already been developed in order to get pupils to perform as outlined in the curricular goals (Suyanto, 2017). Curriculum implementation also means putting the officially prescribed courses of study, syllabuses, and subjects into practice. The procedure entails assisting the student in gaining information or experience. It is critical to remember that curriculum implementation is impossible without the participation of the learner. As a result, the learner is at the centre of the curriculum implementation process (Chaudhary, 2015).

The use of physical facilities as well as the use of relevant pedagogical tactics and methodologies are all part of curriculum implementation. Curriculum implementation is heavily influenced by the availability and quality of resource materials, as well as the availability of appropriate facilities (Chaudhary, 2015). When implementing curriculum, particularly newly revised curriculum, an educator must be able to assess it so that early problems can be identified. Determining what problems a teacher encounters during curriculum implementation can have a positive impact on curriculum success (Karakus 2021a). As a result, a teacher should be able to understand and implement curriculum effectively. The greater a teacher understands of curriculum, the more effectively she or he can develop, design, and administer it. If curriculum innovation compels teachers to assume new roles, Muleya and Mbewe (2018) claim that they typically lack confidence in their own expertise, identity, and classroom mastery. According to Kafu (2010), more training is needed for teachers to be able to deal with new obstacles in the implementation of new curriculum innovations. Bishop (2015) claimed that in order for a curriculum to be successful teachers must have the necessary tools. There must be available and ongoing support services, such as the provision of

appropriate and adequate teaching/learning materials and the establishment of local centres where educational personnel can gather in seminars and workshops to discuss and enhance the new curricula.

2.4 Challenges faced by teachers in implementing revised curriculum

2.4.1 Inadequate financial resources and funding

According to Mkandawire (2010), a lack of financial resources and inadequate finance can have disastrous consequences for curriculum implementation. When the educational system's financial resources are inadequate, it is extremely difficult to successfully implement a curriculum. Financial resources can be used to improve facilities, compensate teachers, launch new projects to aid in the implementation of the curriculum, and schools can make progress toward the goal. Underfunding has a slew of other ramifications for curricula (Mandukwini, 2016).

2.4.2 Lack of professional development and support

Mandukwini (2016) claimed that all changes in education, including curriculum modifications at all levels, necessitate teachers expanding their knowledge and skills. Professional development is most effective when it is a continuous process that involves appropriate, well-planned learning programs and personalized follow-up via supportive observation and feedback. If this isn't done correctly, it will have an impact on the curriculum's effectiveness. The majority of the time, teachers lack training and hence are unable to successfully apply the curriculum.

2.4.3 Insufficient Teaching and Learning Resources

The lack of resources required for effective teaching and learning might stymie curriculum implementation. Textbooks, teacher's reference materials, and the availability of technology equipment are only a few examples of these resources. By providing vital materials, teachers may concentrate on educating their students rather than looking for materials they don't have (Mandukwini, 2016). According to Mkandawire (2010), the lack of or insufficiency of teaching and learning materials can be a major roadblock to curriculum implementation. In schools, these resources are hard to get by and are few. Books, writing materials, chalk, science gear, and an inadequate or out-of-date library are all in short supply or not available at all (Kelly 1999). The textbooks and reference books offered did not represent the current syllabus, according to the teachers. Furthermore, the textbook content lacked clarification on how to

instruct pupils in accordance with CBC standards (Makunja, 2016).

2.4.4 Lack of technology

Technology, according to Erstad & Voogt (2018), can be one of the contributing causes to inadequate curriculum implementation. "Technology is seen as critical to the implementation of 21st-century courses." As a result, as societies are becoming increasingly digital in all aspects of social life, technology as a social component is interwoven in the preconditions and arguments for new curriculum improvements. As a result, technology might be a difficult barrier to overcome because curricula cannot function well without it. Technology is used to conduct the assessment. The idea was that technology has the capacity to change educational evaluation, particularly towards formative assessment methods, and so help the development of critical 21st-century skills (Estad & Voogt, 2018).

2.4.5 Inadequate Learning facilities

Classrooms, libraries, resource centres, offices, desks, school halls, and other school facilities and equipment are unavailable. The government's underfunding of the education sector has a severe impact on the availability and quality of learning institutions' facilities (Mkandawire, 2010). The lack of teaching and learning tools in schools suggests that curriculum implementation is impeded (Tambulukani, 2014).

2.4.6 Overcrowded classrooms

Overcrowding in the classroom was noted as a barrier to curriculum implementation. During group discussions, overcrowded classrooms have a negative impact on teacher-student and student-student interactions (Tambulukani, 2014). Teachers, for example, neglected to pay attention to individual pupils with learning disabilities. Teachers' workload was also raised as a result of overcrowding in the classroom (Makunja, 2016).

2.4.7 Poor Conditions of Service May Affect Curriculum Implementation

Another hindrance to curriculum implementation is poor service conditions for curriculum implementers. When curriculum implementers have lower income, no housing units, uncertain job security, bad transportation, and generally terrible working conditions, it can be a severe hindrance to curriculum implementation since they will resort to looking for resources to support their families (Mkandawire, 2010).

2.4.8 Poor monitoring and evaluation of schools

According to the findings, most Zambian schools are rarely visited by school administrators to check that standards are upheld (Mkandawire, 2010). Educational officials should visit schools to ensure that standards are maintained and to remind school administrators of their primary responsibility in the education area.

3. Findings and Discussions

Challenges faced by teachers, learners and Principals in the implementation process of the revised History curriculum

3.1 Overcrowded classrooms

The study revealed classrooms are overcrowded, which has an impact on learners' performance in class. Also, because there is no movement in the classroom, teachers are unable to access some learners and evaluate their progress or provide them particular attention. In literature, the same was noted by various authors. Tambulukani, (2014) reported that during group discussions, overcrowded classrooms have a negative impact on teacher-student and student-student interactions. Teachers, for example, neglected to pay attention to individual pupils with learning disabilities. Teachers' workload was also raised as a result of overcrowding in the classroom (Makunja, 2016). As a result, they are needed to address overcrowdings in schools so as to assist the revised history curriculum.

3.2 Lack of Textbooks

The study revealed that teachers and learners are facing textbook shortages, as some teachers do not have a copy of the textbook and the ratio of learners to one textbook prevents others from having access to or sufficient time with the textbook. Similarly, in a study of Suyanto (2017) reported that the scarcity of learners and teacher textbooks contributed to the schools' insufficient preparation to apply the C13 Curriculum. The author further indicated that curriculum implementation relies heavily on learning materials such as textbooks (Suyanto, 2017). Hence by providing vital materials, teachers may concentrate on educating their students rather than looking for materials they don't have (Mandukwini, 2016). As a result failure of effective implementation of revised History curriculum is attributed by lack of textbooks to use by teachers and learners.

3.3 Inadequate resources

The study revealed that supporting supplies such as libraries and classroom tables are insufficient; posing a teaching and learning problem that has an impact on curriculum implementation because certain learners will not have access to a library or a conducive learning environment. While in literature it has been noted that curriculum implementation is heavily influenced by the availability and quality of resource materials, as well as the availability of appropriate facilities (Chaudhary, 2015). In literature, it was noted that lack of teaching and learning tools in schools suggests that curriculum implementation is impeded (Tambulukani, 2014). As a result, schools should strive to have necessary resources so as to smoothen the curriculum implementation process.

3.4 Lack of government funds

The study revealed that the government was expected to support trainings and workshops on the implementation of the updated curriculum, but the government lacked the funds to do so. In Literature, Mkandawire (2010) reported that lack of financial resources and inadequate finance can have disastrous consequences for curriculum implementation. When the educational system's financial resources are inadequate, it is extremely difficult to successfully implement a curriculum. Hence, there is need for government of Namibia to avail funds for implementation of new curriculums and these funds should be availed for regular trainings and workshops in regions of Namibia.

4. Recommendations

Before implementing revised or updated curriculums, the Ministry of education should make resources available, and subject experts such as teachers should be involved in the design of these materials. NIED through the directorate of Education in the ministry, needs to develop resources, such as Learning and Teacher Support Material (LTSM), textbooks and

teachers' guides with practical advice for teachers regarding ways to implement the revised curriculum effectively in the classroom. These resources must be designed to assist teachers with what and how best to teach; furthermore, each learner should have his or her own textbooks.

The Ministry of education and NIED should collaborate to hold workshops and trainings to provide teachers with the information and skills they need to apply the new curriculums. Any material regarding the implementation of the curriculum should be supplied to all schools by the Directorate of Education, Arts and Culture. Follow-up workshops should be conducted to ensure effective progress of the implementation of the revised curriculum. Proper training of all teachers is needed to provide teachers with clarity regarding what is expected of them in the implementation of the revised curriculum.

5. Conclusion

The research uncovered a number of obstacles to effective curriculum implementation in understudy schools. One of the issues raised by participants was overcrowding in the classroom. This has an impact on the teacher's workload as well as the amount of time spent checking on each learner's progress. The lack of textbooks has been identified as a barrier to the implementation of the updated history curriculum, particularly in grade 12. Other grades have textbooks, but the ratio of texts to learners is high, thus some students did not have enough time to use the textbook.

Inadequate resources, such as libraries, were also mentioned as difficulties in the schools that were being investigated as a result of the implementation process being hampered. The government's lack of funding to conduct trainings was also mentioned, as the government, through NIED, must provide monies to train all Namibian teachers. Teachers' inability to manage their time resulted in a lack of syllabus coverage, which hampered the complete implementation of the updated history curriculum.

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Original Research Article

Investigating the role of emotional intelligence to mitigate the impact of burnout on employees in the Khomas region, Namibia

Ingo, S.¹, Fernandes, A.¹, Ndove, E.¹, Pieters, W.R.¹

¹Department of Human Sciences, University of Namibia, Windhoek, Namibia

*Corresponding author: ingoselma80@gmail.com/fernandesalicia814@gmail.com/ebbaiyaloo@gmail.com/ wpieters@unam.na; +264612063056

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ABSTRACT

Employees are faced with constant changes and those with higher emotional intelligence are likely to remain calm and be less affected by these changes. The aim of this study was to investigate whether emotional intelligence has an influence on burnout of employees in the Khomas Region. The Emotional Intelligence Questionnaire (EQQ) was used to measure emotional intelligence and the Maslach Burnout Inventory (MBI) was used to measure burnout. Making use of SPSS, the data was analysed to assess the relationship. The study made use of availability sampling and a total of 191 employees participated in the study. The results showed that a negative correlation exists between emotional intelligence and burnout ($r = -.32, p < 0.05$; medium effect). This study recommends organisations to host seminars and workshops which can equip their employees with ways on how to cope with stress and challenges, ensuring that the employees' workload is reasonable and have regular mental health check-ups. Using emotional assessment as part of the recruitment process may ensure that the workforce is able to handle stressful work and be resilient despite experiencing difficult working conditions.

1. Introduction

We live in a world that is constantly changing, where there is an increase in the level of responsibilities and stress which affects an employees' performance (Richards & Barry, 2010), these different kind of stressors can lead to burnout (Chen & Chen, 2018). There is a significant amount of research exploring the relationship between emotional intelligence and burnout but limited research on these variables on Namibian employees. Employees with high emotional intelligent levels are able to keep their emotions under control when faced with uncertainties but it can be an emotional burden if these uncertainties are continuous which can lead to burnout (Chen & Chen, 2018). Lee and Chelladurai (2017) found that employees with low levels of emotional intelligence have coping strategies that are dysfunctional while employees with high levels of emotional intelligence have functional coping strategies.

Emotional intelligence characteristics such as self-awareness, social skills, self-regulation, motivation and empathy are significant qualities which are needed by

individuals and teams as an engagement process that will help transform the organisation (Hess & Bacigalupo, 2010). When there is good support from co-workers and supervisors there is low levels of burnout which leads to employees becoming more satisfied with their jobs (Charoensukmongkol, Moqbel, Gutierrez-wirsching, Shankar, & Shankar, 2014). Managing the levels of burnout is significant since it can affect an employee's attitude and importantly their performance (Kim, Ra, Park, & Kwan, 2017). Organisations need to understand the role of burnout to be able to achieve higher levels of performance, satisfaction and optimal productivity (Kim et al., 2017).

Most of the Namibian workforce is concentrated in the Khomas region (Namibian Statistics Agency, 2019). The researchers focused on the employees in the Khomas region, aiming to sample the most employees within the limited time while generating data for this exploratory study. According to the Office of the President, National Planning Commission (2012), Namibia needs to invest in

the development of human capital for an excellent labour force that can meet the demands of the economy and to address any issues regarding human resource skills across all sectors. While maintaining this, employees are experiencing different stressors that are impacted by COVID-19. Understanding the influence of emotional intelligence on burnout will help determine ways to increase the commitment and effectiveness of employees to help develop the quality services and help employees manage the change brought by the pandemic. The purpose of this study is to investigate whether emotional intelligence has an influence on burnout.

2. Literature Review

2.1 Burnout

Burnout condition can affect a lot of employees' quality of life, and the outcome of their services (Vlachou et al., 2016). When an employee starts to feel physically, psychologically and behaviorally tired, this describes symptoms of burnout (Louw, George, & Esterhuysen, 2011). Burnout is a psychological syndrome that involves reduced personal accomplishments, emotional tiredness, depersonalization, helpless feelings and attitudes that are negative in regards to life and work (Dubale et al., 2019). Burnout is the natural response of the body being physically and mentally worked up after experiencing continuous stressful events (Năstasă & Fărcaș, 2015). Burnout occurs when there is a lack of emotional intelligence, as it can help one to cope with their emotions during stressful situations and a person can develop burnout at any level of their careers (Huang, Chan, Lam, & Nan, 2010).

Interpersonal skills, career satisfaction, performance and psychological health are negatively affected by burnout (Dubale et al. 2019). According to Louw et al., (2011) burnout occurs in any profession, but it is common for professionals who help individual's cope with their daily life demands. Recent studies show that women are more prone to experience burnout than men, because they are more under pressure (Eysselein, 2012). According to Louw et al. (2011) biographical variables such as gender, age, work experience, level of education and marital status can influence burnout. Burnout usually occurs in environments full of pressure, where employees' have high workloads (Gong, Chen, & Wang, 2019). Effective interventions and prevention programs can help in dealing with burnout (Louw et al., 2011).

According to Pieters and Matheus (2020) having a balance between job resources and demands will decrease burnout levels and enhance performance in the work environment. Therefore, working conditions that can support an employee's performance should be an employer's focus (Awases, Bezuidenhout, & Roos, 2013). Vlachou et al. (2016) suggested that

improving an employee's emotional intelligence can enhance their level of coping with burnout which will improve their performance. Another effective way to reduce burnout is by managing and controlling potential stressors (Chen & Chen, 2018).

2.2 Emotional intelligence

As the world evolved, it was found that an individual's success and the success of the organisation is dependent on how well employees understand someone else's emotion and use that knowledge to react accordingly (Shih & Susanto, 2010). This ability to decipher another person's emotions and use that knowledge relevantly is a concept that was first introduced by Mayer and Salovey (1993). Emotional intelligence is the ability to identify the emotions of other people as well as one's self and acting accordingly to this acquired knowledge. Emotional intelligence is not new to the Industrial Psychology domain as it was found to be an antecedent of different leadership styles (Barbuto, Gottfredson, & Searle, 2014). A good and effective leader is said to be self-aware, self-regulatory, motivated, empathetic and socially aware (Sadri, 2012). Emotionally intelligence in leaders has been found to be one of the greatest predictors of success (Yukl, 2012). It will enable leaders to effectively manage their teams and improve the performance levels within the organisation (Oakland, 2012). Emotionally intelligent leaders will also be better equipped to handle different employees and different situations (Amanchukwu, Ololube, & Stanley, 2015). This will increase the communication skills within the organisation and improve productivity.

The concept of emotional intelligence has evolved, as a new aspect of the ability to control and express one's emotions was added (Côté, 2014). Therefore, emotional intelligence can be defined as the ability to interpret and control one's emotions as well as understand the emotions of others and use the awareness in the appropriate context (Nelson & Low, 2011). The definition by Nelson and Low (2011) will be used to define emotional intelligence in this study.

Self-awareness, self-regulation, motivation, empathy and social awareness have been found to be constructs of emotional intelligence (Serrat, 2017). Self-awareness is one's ability to be aware of one's feeling and emotions; while self-regulation is the ability to control these feelings and emotions (Shih & Susanto, 2010). Motivation can be described as one's encouragement to reach and achieve one's goals; and empathy is the ability to understand and relate to the feelings of other's and social awareness is to be aware of the other's feelings (Vago & David, 2012). The concept of emotional intelligence emerged years after the theory of social awareness was developed by Edward Thorndike in 1920 (Weis & Süß, 2005). Social awareness is the ability to understand the emotions of

others and use this knowledge in appropriate settings. Mayer and Salovey (1993) found that social awareness is part of a group of competencies found in emotional intelligence. These five constructs of emotional intelligence have been found to be of crucial importance as the development of these constructs determine the levels of emotional intelligence (Serrat, 2017). The more self-aware and self-regulated one is, the easier it is to determine how a certain situation will effect one's emotional state and the easier it is to find ways to combat and prevent these situations (Vago & David, 2012). This can be the same in social situations, as the more socially aware one is, the better one would be at having harmonious relationships as well as having positive relationships with co-workers (Côté, 2014). Emotional intelligence is an important aspect in the life of an employee, it is beneficial in their lives through fostering better relationships, enabling them to better control their emotions, improve job performance, work engagement, increase intrinsic motivation and decrease burnout (Choi, Kim, & Mohammad, 2019).

2.3 The relationship between burnout and emotional intelligence

Social scientists have recently looked at the relationship between emotional intelligence and burnout (Vlachou et al., 2016). The study done by Gong et al. (2019) indicated that employees' emotional intelligence has a negative correlation with burnout. This was also found by Vlachou et al. (2016) who indicated that emotional intelligence reduces burnout. Mérida-López and Extremera (2017) found that an emotionally intelligent individual is more resilient and better equipped to handle burnout. Individuals that developed higher levels of self-awareness and self-regulation enable them to better understand their own feelings and take the necessary precautions to feel better (Shih & Susanto, 2010).

A negative correlation between burnout and emotional intelligence was also reported amongst sport teachers (Côté, 2014). People who are more emotionally intelligent are better equipped at controlling their frustrations as higher emotional intelligence levels are linked with heightened levels of self-awareness (Gutierrez & Mullen, 2016). Individuals who are more in-tune with their emotions are more likely to find ways to prevent themselves from being in states of constant stress and frustrations (Choi et al., 2019). Having higher emotional intelligence enables one to have a higher sense of control on one's emotions as well as one's surroundings; therefore, one would feel more likely to be able to control the situation (Huang, Chan, Lam, & Nan, 2010).

3. Research methodology

3.1 Research design

This study used a non-experimental cross-sectional research design, specifically a quantitative approach which is using numerical data from a selected subgroup of a population (Maree, 2016). Online and hard copy questionnaires were used to assess and explore the influence of emotional intelligence on burnout.

3.2 Population and sample

The study is focused on the employees working in the Khomas Region with a total labour force of 241 321 (Namibia Statistic Agency, 2019). The random sampling technique was used which means any individual working in the Khomas region had an equal opportunity of becoming part of the study and anyone willing can participate. A total of 480 employees were targeted in this study. The challenges related to the Covid-19 regulations made data collection more challenging with only 191 questionnaires being completed for analysis.

3.3 Research instrument

A self-administered questionnaire composed of three sections was used. The first section contained the respondent's demographic characteristics such as age, gender, job tenure (years), marital status, number of dependents, highest qualification obtained and management level. The second section had the revised *Emotional Intelligence Questionnaire* (EQQ) developed by Daniel Goleman (Sulianti et al., 2018). It is based on the clusters of emotional intelligence which are self-awareness, self-regulation/management, social skills, motivation and empathy (Boyatzis et al., 2000). This study focused on social-awareness and social skills only. This questionnaire consists of 20 items which are rated from 1 (does not apply) to 5 (always applies). Example items included 'I am an excellent listener' (social skills) or 'I usually recognise when I am stressed' (self-awareness). Killian (2012) found internal consistency of social awareness (.83) and social skills (influence 0.78, mentor 0.85, networking 0.80).

The third section looks at the *Maslach Burnout Inventory* (MBI) developed by Maslach et al., (1996). It focused on the three dimensions of burnout which is emotional exhaustion, personal accomplishment/ professional efficacy and depersonalization/ cynicism (Srivastava et al., 2019). It consists of 16 items and a seven point Likert scale from 0 (never) to 6 (every day). It assesses exhaustion with 5 items (*I feel used up at the end of the work day*), cynicism with 4 items (*I have become less enthusiastic about my work*) and professional inefficacy with 7 items (*In my opinion, I am good at my job*) (Marias, Mostert, & Rothman, 2009). Fong and Ng (2012) found reliability of 0.86 for exhaustion, 0.81 for cynicism and 0.77 for professional efficacy. Srivastava et al. (2019) showed a total internal consistency of $\alpha = 0.95$.

3.4 Procedure

(depending on the participant) were completed. Employees were expected to complete the questionnaires after working hours to avoid disruptions at work. The responses were entered into SPSS for analysis, the results reported and the data stored on Google drive and the questionnaires is stored in a secure cabinet for five years.

3.5 Data analysis

The SPSS software was used to analyze the data. The Cronbach alpha was used to measure the reliability of the instruments, while Pearson correlation examines the relationship and strength of the variables.

After participants' consent to participate, the printed questionnaires and electronic questionnaires

4. Results

The total sample consisted of 191 respondents and 125 (65.4%) were female while 63 (33%) were males. Only 14 respondents were below 24 years old (7.3%), 41 were aged between 24-28 (21.5%), 23 were aged between 29-31 (12%), 30 were aged between 32-35 (15.7%), 33 respondents were aged between 36-40 (17.3%), 19 respondents were aged between 41-45 (9.9%), 16 reported being 46-50 (8.4%) and 15 reported being 51 and older (7.9%). The rest of the biographical details can be seen in Table 1.

Table 1: Biographical details of sample

Category:	Item:	Frequency:	Percentage:	
SEX:	Male:	63	33.0	
	Female:	125	65.4	
	Missing values:	3	1.6	
AGE:	Below 24:	14	7.3	
	24-28	41	21.5	
	29-31	23	12.0	
	32-35	30	15.7	
	36-40	33	17.3	
	41-45	19	9.9	
	46-50	16	8.4	
	51 and older	15	7.9	
	JOB TENURE:	Less than 1 year	27	14.1
1-2		24	12.6	
3-4		33	17.3	
5-6		24	12.6	
7-8		18	9.4	
9-11		14	7.3	
12-15		20	10.5	
16 and more		29	15.2	
MARITAL STATUS:		Single	108	56.5
		Married	72	37.7
	Divorce	9	4.7	
	Widowed	1	0.5	
	Missing values	1	0.5	
NUMBER OF DEPENDENTS (children):	None	67	35.1	
	1-2	82	42.9	
	3-4	30	15.7	
	5-6	9	4.7	
	7-9	1	0.5	
	10 and more	2	1.0	
HIGHEST QUALIFICATION OBTAINED:	Grade 12	17	8.9	
	Certificate	7	3.7	
	Diploma	25	13.1	
	Degree	36	18.8	
	Honours Degree	60	31.4	
	Master's Degree	32	16.8	
	PHD	14	7.3	
	MANAGEMENT LEVEL:	Non-management staff	117	61.3
		Mid-level management	61	31.9
		Senior management	13	6.8
TOTAL:		191	100.0	

4.1 Descriptive Statistics

The table above shows that Social skills reported a standard deviation of 7.28, mean = 33.62 and reliability (α) = .80. Self-awareness reported a standard deviation of 5.17, mean = 35.07 and reliability (α) = .69.

Table 2: Descriptive Statistics, reliability and Pearson correlation

Item:	TOTAL		α	1	2	3	4	5	6	7
	MEAN	SD								
EQ_SS	33.62	7.28	.80	-						
EQ_SA	35.07	5.17	.69	.59++	-					
EQ_TOT	68.69	11.13	.84	.93++	.85++	-				
BO_EX	16.97	8.40	.91	-.20*	-.07*	-.17*	-			
BO_PIEF	12.72	6.13	.75	-.26*	-.40*+	-.35*+	-.00	-		
BO_CYN	12.41	6.04	.73	-.24*	-.13*	-.21*	.68++	-.13*	-	
BO_TOT	42.10	14.93	.83	-.32*	-.25*	-.32*+	.84++	.46*+	.84++	-

* Statistically significant: $p \leq 0,05$

+ Practically significant correlation (medium effect): $0,30 \leq r \leq 0,49$

++ Practically significant correlation (large effect): $r \geq 0,50$

- EQ_SS= Emotional Intelligence (Social Skills)
- EQ_SA= Emotional Intelligence (Self-awareness)
- EQ_TOT= Emotional intelligence total
- BO_EX= Burnout (Exhaustion)
- BO_PROFF= Burnout (Professional inefficacy)
- BO_CYN= Burnout (Cynicism)
- BO_TOT= Burnout total

Emotional intelligence total reported a SD of 11.13, mean of 68.69 and alpha of .84. Exhaustion revealed a standard deviation of 8.40, mean = 19.97 and reliability (α) = .91. Professional inefficacy revealed a standard deviation of 6.13, mean = 12.72 and reliability (α) = .75. Cynicism revealed a standard deviation of 6.04, mean Social skills reported a relationship with self-awareness ($r = .59, p < 0.05$; large effect), with Emotional intelligence total ($r = .93, p < 0.05$; large effect), with Exhaustion ($r = -.20, p < 0.05$; small effect), with Professional inefficacy ($r = -.26, p < 0.05$; small effect), with Cynicism ($r = -.24, p < 0.05$; small effect) and Burnout total ($r = -.32, p < 0.05$; medium effect). Self-awareness reported a correlation with Emotional intelligence total ($r = .85, p < 0.05$; large effect), Exhaustion ($r = -.07, p < 0.05$; small effect), with Professional inefficacy ($r = -.40, p < 0.05$; medium effect), with Cynicism ($r = -.13, p < 0.05$; small effect) and Burnout total ($r = -.25, p < 0.05$; small effect).

= 12.41 and reliability (α) = .73. Burnout total reported a SD of 14.93, mean of 42.10 and Cronbach alpha of .83.

4.2 Inferential Statistics Analysis

Emotional intelligence total reported a correlation with Exhaustion ($r = -.17, p < 0.05$; small effect), with Professional inefficacy ($r = -.35, p < 0.05$; medium effect), with Cynicism ($r = -.21, p < 0.05$; small effect) and Burnout total ($r = -.32, p < 0.05$; medium effect). Exhaustion reported a correlation with Professional inefficacy ($r = .00, p < 0.05$; no effect), Cynicism ($r = .68, p < 0.05$; large effect) and Burnout total ($r = .84, p < 0.05$; large effect). Professional inefficacy reported a relationship with Cynicism ($r = .13, p < 0.05$; small effect) and Burnout total ($r = .46, p < 0.05$; medium effect). Cynicism reported a correlation with Burnout total ($r = .84, p < 0.05$; large effect).

5. Discussion

The study focused on two dimensions of emotional intelligence, namely; social skills and self-awareness as well as three dimensions of burnout, namely; exhaustion, professional efficacy and cynicism. The study revealed that there is a positive relationship between social skills and self-awareness. This means that the more self-aware an individual is; the better social skills they may possess. He/she would be able to interact in a healthier manner with others since they know who they are, how they feel, why they experience these feelings and their own likes/dislikes. [Huang et al. \(2010\)](#) also found that people with higher levels of emotional intelligence are able to control their own emotions, surroundings and situations.

This study found a negative relationship between social skills and exhaustion, professional inefficacy, cynicism and burnout total. This means that when employees have the ability to interact with others (healthy interactions) these relationships/interactions would act as a resource to reduce stress. As explained by the Job demands-resources theory, support from colleagues may act as a resource, reducing burnout and enhancing levels of work engagement ([Bakker & Demerouti, 2007](#)). Healthy interactions at work and understanding each other encourages colleagues to share work and reduce exhaustion or feel open enough to ask for help from a fellow employee.

Social skills reported a positive relationship with professional inefficacy (reversed- *In my opinion, I am good at my job*). Having good social skills allows you to form healthy relationships, forming healthy relationships can act as a resource where employees can learn from each other and develop. [Bakker and Demerouti \(2014\)](#) indicated that job crafting, relying on colleagues for growth and development opportunities, enhances job resources and work engagement while at the same time reduces job demands and exhaustion of employees. Having colleagues to provide open and constructive feedback enhances employees' ability to effectively judge their own abilities but at the same time colleagues can act as a motivating force and enhance confidence (praise).

Social skills reported a negative relationship with cynicism and Burnout total. When employees don't experience healthy relationships at work, they doubt themselves and become pessimistic about their own abilities thus experiencing more burnout. This relationship was also supported when relatedness reported a positive relationship with competence ([Pieters, van Zyl, & Nel, 2019](#)). Employees that lack the necessary confidence in their ability and the role they fulfil are less likely to take on new tasks or believe that they would be able to successfully execute a work task. A positive relationship was found between competence and vigour, dedication and absorption (work engagement) ([Pieters et al., 2019](#)).

Self-awareness reported a negative relationship with exhaustion, professional inefficacy, cynicism and burnout total. Knowing how one feels, why you feel that way and being able to manage these feelings/emotions is a rare skill that needs to be fostered. This level of awareness ensures that we let go of concerns when needed, reducing exhaustion about futile or irreconcilable matters. Mastering this kind of awareness, employees would be able to know what they are capable of, know what role they play at work and what their areas of development are. This relationship was also supported by [Ugur, Constantinescu and Stevens \(2015\)](#) that indicated that people with higher levels of self-awareness are likely to experience higher levels of personal growth. Having self-awareness also ensures that employees have better social skills (emotional intelligence) and ultimately experience lower levels of burnout ([Shih & Susanto, 2010](#)).

This study also confirmed a negative relationship between emotional intelligence and burnout. Numerous studies also found similar results ([Cotè, 2014](#); [Gong et al., 2019](#); [Vlachou et al., 2017](#)). Experiencing higher levels of self-awareness, knowing yourself, can influence how you interact with other people at work and in social settings. Having higher levels of self-awareness and social skills (emotional intelligence) reduces employees' feelings of exhaustion since these qualities act as a resource at work. Self-awareness via social skills improves work relationships thus allowing for feedback/guidance from colleagues as well as motivation from these colleagues (reducing levels of professional inefficacy and cynicism).

6. Recommendations

For many years, burnout has been perceived as a negative commodity. It has gained this reputation by all the negative connotations associated with it, such as physical and mental issues ([Mérida-López & Extremera, 2017](#)). Trials and tribulations are inevitable in life. The key is to not see burnout as a completely negative thing, but to identify how one can use it to grow. The researchers recommend that individuals strive to see the positive aspects of challenges to help them cope with burnout. Organisations can host seminars and workshops which can equip their employees with ways on how to cope with stress and challenges. Stress management courses and/or seminars are also recommended in order to help employees get the necessary emotional strength to fight and minimise stress levels which could cause burnout. Burnout can push one to make healthy decisions, that one would typically avoid making under normal circumstances.

It is recommended that leaders be also sent for emotional intelligence training since this can filter

through to the employees. Yukl (2012) also found that the emotional intelligence of leaders is an effective predictor of organisational success. Emotionally intelligent leaders are better equipped to handle stressful work situations, their employees and ultimately increase organisational performance (Amanchukwu et al., 2015; Oakland, 2012).

Organisations can help curb employee burnout through ensuring that the employees' workload is reasonable. Organisations can benchmark workload policies while consulting their employees.

Organisations can ensure that their employees' mental health is well through regular check-ups. This study also suggests that employees be honest with how they are feeling. They need to be able to say if they can't handle their workload or if there are other factors that could prevent them from effectively carrying out their role. At time, employees may have underlined issues that could be adding to their work stress and cause burnout. Therefore, the study recommends that employers invest in the emotional intelligence training of their employees. Providing employees with tools through workshops, seminars and information sharing could help increase the emotional intelligence within their employees (Testa & Sangganjanavanich, 2016). Emotionally intelligent employees are more aware about their feelings and how they feel in certain situations (Landa, & López-Zafra, 2010). Being self-aware is essential in understanding why one reacts to situations a certain way. This could drastically decrease burnout as they manage to mitigate their stressors (Mérida-López & Extremera, 2017).

Having group activities could also help improve the emotional intelligence of employees as they learn how to interact with their co-workers which increases their social skills. Listening is a social skill and listening within a group can help build an organisational team and have group members work better together (Pence, & Vickery, 2012). Team building sessions can also enhance social skills of employees and improve group cohesion. The researchers also recommend that organisations invest in wellness programs that continually help employees improve on their psychological and emotional health, both of which play a role in how these variables affect the employees. Learning about yourself through reflection and counselling sessions improves self-awareness, social skills and ultimately reduces burnout.

7. Conclusion

Self-awareness reported a positive relationship with social skills. Employees that know who they are, how they feel and why they feel that way are more likely to function better at work or within social settings. Self-awareness and social skills acts as a resource at work, through improving relationships, improving the working environment, reducing cynicism, professional inefficacy, exhaustion and collectively, burnout. When an employee experiences high levels of emotional intelligence it reduces their levels of burnout. By reducing burnout, employees would be able to live healthier lives and become more productive employees. Experiencing lower levels of burnout also enhances employees' attitudes towards life (Dubale et al., 2019).

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Original Research Article

Macroinvertebrate diversity in a Subtropical High-Pressure Zone (SHPZ) man-made lake: Goreangab Dam, Windhoek, Namibia

E. Omoregie¹ and S. Ngatajosi¹

¹Department of Natural and Applied Sciences, Namibia University of Science and Technology, Windhoek, Namibia

*Corresponding author: eomoregie@nust.na; +264 81 3732311

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ABSTRACT

This research investigated the diversity and distribution of macroinvertebrate assemblages of a subtropical high-pressure belt man-made lake, the Goreangab Dam, in Windhoek, Namibia in order to develop a respective index of biotic integrity as a baseline of determining and monitoring the health status of the dam. Macroinvertebrates samples were collected biweekly, over a period of two months (August and September 2019) from 8 stations along the bank of the dam. Collected macroinvertebrate samples were sorted live, counted and identified to the lowest taxonomic level possible. The Shannon Weiner index (H'), Simpson's index (D) and Pielou Evenness index (J') were used in analysing macroinvertebrates diversity. A total of nine different macroinvertebrate species belonging to different orders were recorded during the sampling period. *Chironomus plusmosus* (larvae), had the highest composition (19%) and *Arctocorisa arguta* with the lowest composition (6%). Anthropogenic activities have a huge impact on the distributions of the macroinvertebrate assemblages according to the tolerance of water pollution. The fact that the *Chironomus plusmosus* (larvae) are the highest in composition shows that the waterbody is unhealthy and at this stage only supports the life of species that are tolerant to water pollution.

1. Introduction

The Goreangab Dam is known to be a polluted water body arising from anthropogenic activities and habitat degradation as a result of economic development and urbanization (Kenney et al., 2009). However, little research has been conducted on the macroinvertebrate assemblages and their environmental relationships. Aquatic macroinvertebrate abundance increases with conductivity, altitude and water temperature (Reiss et al., 2015). This shows that habitat diverseness is the greatest predictor of macroinvertebrate assemblages, but species richness can be predicted based on climatic changes and topographical features.

Sustainable use of freshwater systems requires background of the spatial distribution of water body types, how their physico-chemistry varies across the landscape and the total contribution that it has on the biodiversity. Differences in the habitat complexity, physio-chemical parameters and the constantly varying influence of living

interactions will lead to distinct freshwater habitat types supporting different faunal assemblages (Benke, 1996).

Macroinvertebrates of freshwater systems have a particular (low) saline content that they have adapted to and when this content increases, it affects the macroinvertebrates and at the same time forces them to migrate or acclimatize to new conditions in order to survive (Schneider & Frost 1996). Despite their apparent vulnerability, there is little published information on the general ecology and biodiversity of small non-perennial freshwater system macroinvertebrates. This study has arisen largely from the need to inaugurate baseline data on the macroinvertebrate diversity in a sub-tropical high-pressure belt man-made dam, in order to make room for future biological monitoring of impacts that can arise due to hydraulic fracturing activities and climatic change. In order to sample the maximum diversity and abundance of freshwater macroinvertebrates, the study strictly focussed on the period where peak rainfall coincides with the warmest temperatures throughout the dam.

The structure of macroinvertebrate communities has been a popular subject of much research in freshwater ecosystems (Boven, 2009). Potential benefits of research on macroinvertebrates include the quick evaluation of biological resources for maintenance purposes with the use of indicator organisms, the measuring of physical and chemical parameters of the water, the detection of pollution through differences between predicted and actual macroinvertebrate assemblages (Hauer, 1992). Macroinvertebrates are an important component of freshwater systems and they play a very crucial role in conserving the structural and functional integrity of freshwater ecosystems (Flores & Zafaralla, 2012). They alter the geographical and physical conditions of the sediments that promote detritus, decomposition and the nutrient cycle, in order to allow energy transfer among trophic levels (Lim et al., 2018).

Macroinvertebrate communities are being affected by habitat complexity, because complex habitats provide a variety of ecological niches, which causes macroinvertebrates to be highly vulnerable to the loss of the habitat that they are adapted to (McGoff & Sandin, 2012). Consequently, habitat deterioration will severely decrease the diversity and composition of macroinvertebrate assemblages. Thus, identifying the possible factors regulating macro invertebrate structure, diversity, and distribution can aid the

development of more prescriptive maintenance and management strategies for freshwater ecosystems.

The research was assessed to analyse the macroinvertebrate biodiversity, composition and abundance and to determine the physicochemical parameters of a man-made dam in a sub-tropical high-pressure ecological belt, which plays a vital role in macroinvertebrate diversity.

2. Materials and Methods

2.1 Study area

The Goreangab Dam (22°31'0"S, 17°1'0"E / 22.51667°S, 17.01667°E) is in the north-western suburbs of Windhoek, the capital of Namibia. The dam was constructed in 1958 to alleviate the water supply problems to Windhoek (Brand, 1962), with an average capacity of 3.6 million cubic metres of water. The general climatic conditions around the dam is that of *Subtropical High-Pressure Zone* (SHPZ), characterized by semi-permanent *high atmospheric pressure*. Two main rivers, the Arebusch and the Gammans Rivers, contribute the bulk of the catchment water supply to the dam. A total of 8 stations along the bank of the dam were sampled biweekly during the study period from 13 August to 27 September 2019. The stations were randomly selected and approximately 200 metres apart (Figure 1). All the stations were geo-referenced using the Garmin® global positioning system.

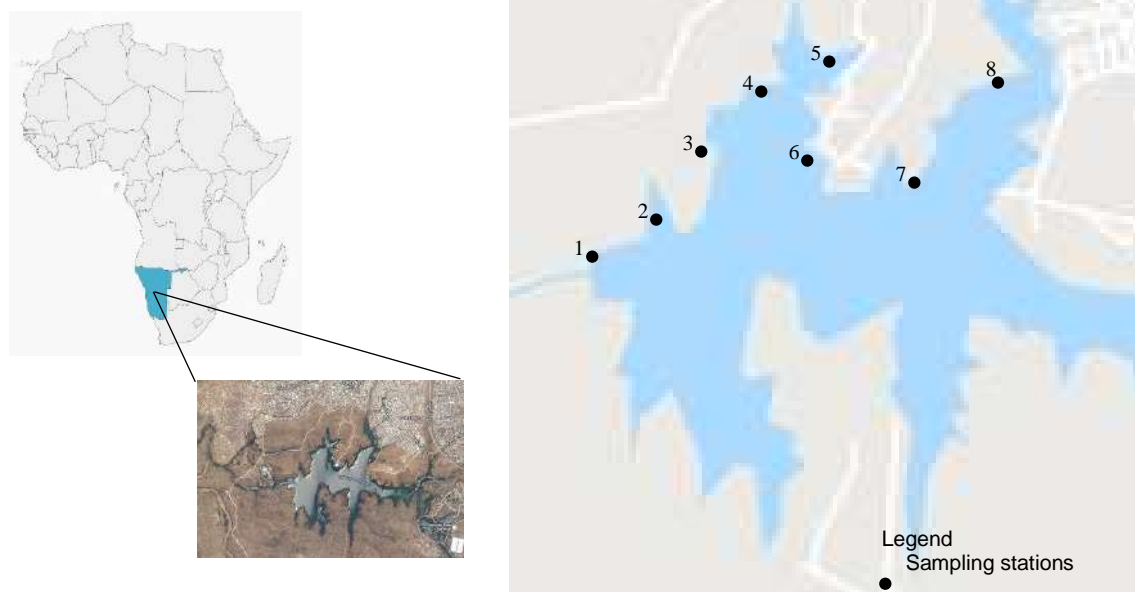


Figure 1. Map of the Goreangab Dam showing the sampling stations.

2.2 Sampling

2.2.1 Physicochemical parameters

Selected water physicochemical parameters were taken in-situ using appropriate meters. The parameters measured included temperature, pH, turbidity, conductivity and light intensity. During each visit at each sampling stations, these parameters were taken in triplicates and the mean (± SE) calculated for statistical analysis.

2.2.2 Macroinvertebrates

Sampling of macroinvertebrates was done is all eight stations using a portable laboratory grab (Ponar®) and a 500 µm mesh size hand-held scoop net on aluminium frame and a 135 cm aluminium handle. Scooping was done in the opposite direction of water flow. Collection of macroinvertebrates was done in identified biotopes (water column, bottom sediments and emergent vegetation) within each sampling station. In each sampling station, a total of three grabs (for bottom sediment biotope) and three scoops of macroinvertebrate samples were taken. Collected samples washed on site, sorted and then preserved in 70% ethanol before being transported to the laboratory for counting and identification. In the laboratory, the macroinvertebrates were sorted into different orders and identified to their species level with the aid of the macroinvertebrate field guide manual by Gerber and Gabriel (2002).

Macroinvertebrate diversity in the dam was evaluated using the Shannon-Wiener diversity index (H') and Simpson index (D'), while species evenness was evaluate using the Pielou evenness index. The Shannon-Wiener diversity index was used to compute and analyse the evenness and abundance of the macroinvertebrate assemblages across the dam. A diversity index is a quantitative measure that shows how many different types (such as species) there are in the community, and simultaneously takes into account how evenly the basic entities (such as individuals) are distributed among those types (Stirling & Wilsey, 2001). The species richness per sampling station was evaluated using the Simpson index (D) as it gives more account to the dominant species within a community/ecosystem. The Shannon's index and Simpson index per station were computed using Equation 1 and 2 respectively (Krebs, 1994).

$$H = -\sum_{i=1}^s p_i \ln p_i \dots\dots\dots\text{Equation 1}$$

$$D = \sum_{i=1}^s (p_i)^2 \dots\dots\dots\text{Equation 2}$$

where:

pi = Proportion of the macroinvertebrates per sampling station made up of species i.

ln = Natural logarithm of pi

s = Number of species in sample

Species evenness refers to how close in numbers each species is in each environment. It is a diversity index that quantifies how equal the community is numerically. The Pielou evenness index was computed using Equation 3 (Krebs, 1994).

$$J' = \frac{H}{\ln(S)} \dots\dots\dots\text{Equation 3}$$

where:

H = the Shannon Weiner index

ln(S) = the natural logarithm of species richness (Krebs, 1994).

Statistical data analysis

Statistical analyses were performed using Excel© (2016), IBM SPSS© Statistics (version 24) and PAST (Version 3.21) software. All the data were found to be normally distributed. The data on physicochemical parameters were summarized into descriptive statistics and presented as mean and standard error (SE) and graphically represented. Spatial variations in the mean water physicochemical parameters between the different stations were tested using repeated measure analysis of variance (MANOVA) at 0.05 p level. Similarly, significant differences in macroinvertebrate diversity among the different stations were analysed using MANOVA at 0.05 p level. Tukey post hoc tests were used to establish direction of the detected differences in the statistical analysis. Results with p-values ≤ 0.05 were considered statistically significant.

3. Results

The spatial variations in the mean water physicochemical values are presented in Figure 2. The results obtained showed less spatial variations in the concentrations of hydrogen ions (pH), conductivity and temperature between the different stations (p > 0.05), this signifying that there were similarities in these parameters for the various stations. The mean pH values ranged between 7.32 and 7.75 and the mean conductivity values ranged from 1.60 ± 0.12 to 1.93 ± 0.05 mS/cm. Lowest temperature values were recorded at the beginning of August with a mean value of 21.48 ± 0.56°C and the highest values were recorded at the end of September with mean value of 23.01 ± 1.08°C. There was no significant differences (p > 0.05) in temperatures amongst the stations is directly related to prevailing climatic conditions and riparian vegetation. The mean light intensity (0.13 ± 0.02 lux) was highest at the beginning of September in stations 4 and 5 compared to the other stations (p < 0.05).

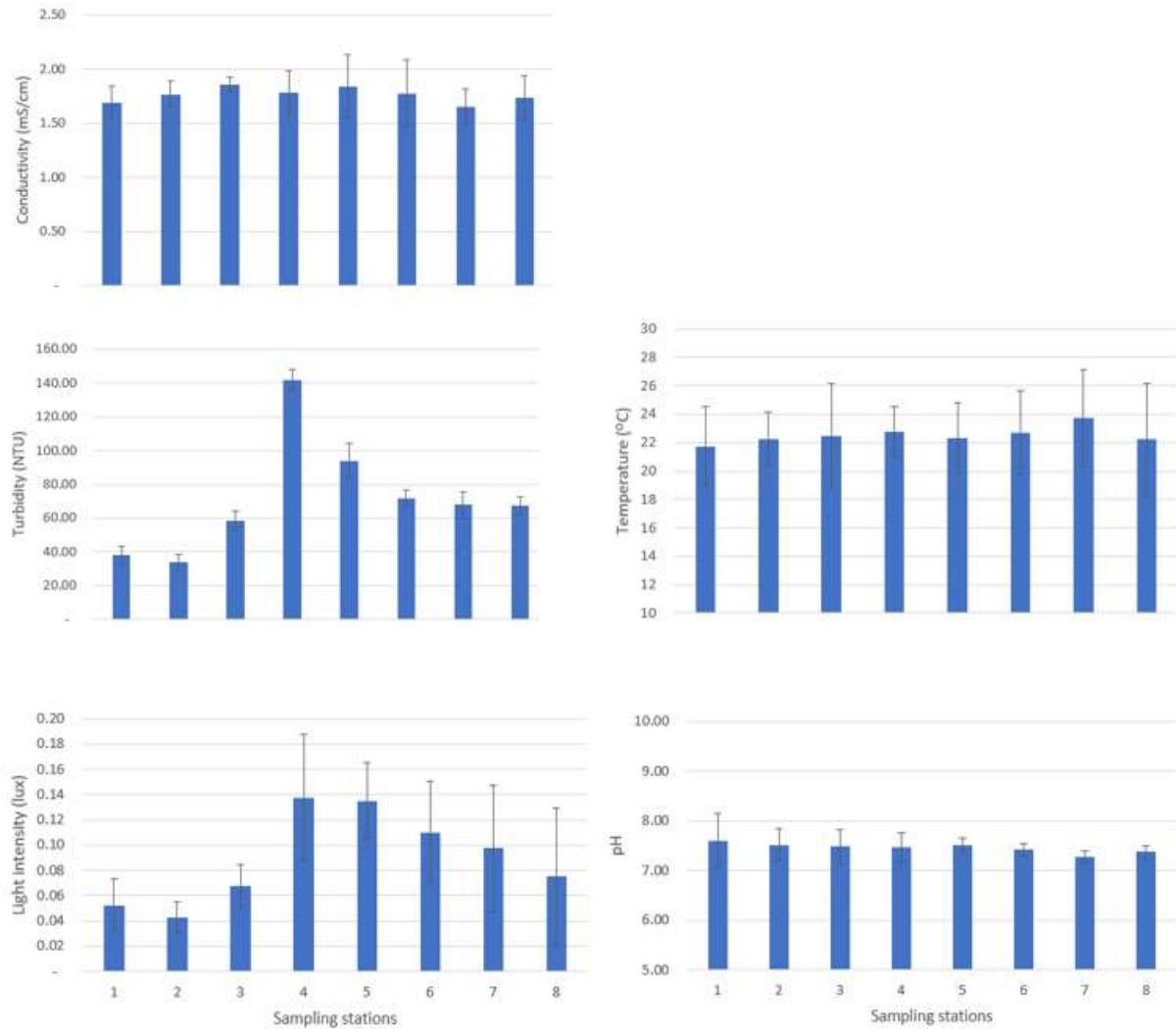


Figure 2: Spatial variations in mean water physicochemical parameters (mean ± SE) of the Goreangab Dam during the sampling period.

Macroinvertebrates belonging to 3 orders and 9 species were identified in the samples collected from the 8 sampling stations. Macroinvertebrates of the Diptera and Hemiptera, were the most dominant of all macroinvertebrate taxa, contributing 46 and 43% respectively, of the total macroinvertebrate abundance. On the species level, larvae of *Chironomus* was the most dominant (19%), which was closely followed by adults of *Gerris lacustris* (15%), with adults

of *Arctocoris arguta* being the least recorded species (Figure 3). The checklist of collected macroinvertebrate per sampling dates and stations is presented in Table 1. Larvae of *Culiseta longiareolata* was completely absent during the first sampling date (13 August 2020) in all stations, however, they were subsequently present in all stations during subsequent sampling. Larvae of *Chironomus plumosus* were present during every sampling in all stations.

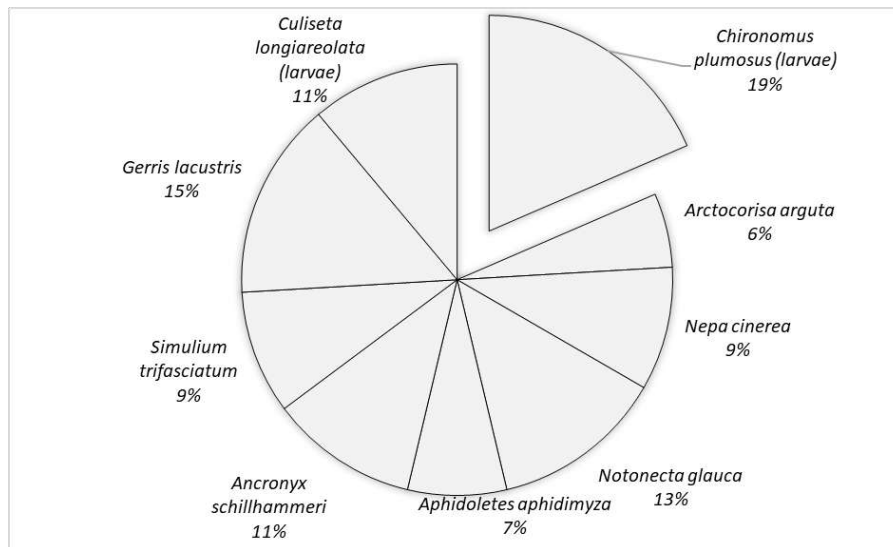


Figure 3. Distribution of macroinvertebrate species in 8 stations along the bank of Goreangab Dam (August – September 2019).

Table 1. Checklist and distribution of macroinvertebrates on survey areas in the Goreangab Dam. (August – September, 2019)

No	13-Aug-19								27-Aug-19								17-Sep-19								27-Sep-19							
	S1	S2	S3	S4	S5	S6	S7	S8	S1	S2	S3	S4	S5	S6	S7	S8	S1	S2	S3	S4	S5	S6	S7	S8	S1	S2	S3	S4	S5	S6	S7	S8
1	Macroinvertebrates																															
1	<i>Chironomus plumosus</i> (larvae)																															
2	<i>Arctocorisa arguta</i>																															
3	<i>Nepa cinerea</i>																															
4	<i>Notonecta glauca</i>																															
5	<i>Aphidoletes aphidimyza</i>																															
6	<i>Ancronyx schillhammeri</i>																															
7	<i>Simulium trifasciatum</i>																															
8	<i>Gerris lacustris</i>																															
9	<i>Culiseta longiareolata</i> (larvae)																															

Shading indicates presence

Significant temporal and spatial variations in macroinvertebrate diversity were observed for all other collected macroinvertebrates in all the stations ($p < 0.05$). The total number of all macroinvertebrate species collected is presented in Figure 4 and the values of Simpson index (D'), Pielou evenness (J') and the Shannon Weiner index (H') of macroinvertebrates analysed is presented in Table 2. The Shannon Weiner index (H') shows that there was a high diversity of

macroinvertebrates at stations 3, 5, 6, 7 and 8 ($p < 0.05$). The lowest diversity was recorded at stations 1, 2 and 4. The Simpson's index shows that there is infinite diversity amongst all the stations. Station 5 had the highest diversity and station 1 the lowest (Figure 5). Closer examination of analysed data indicated that the higher the richness index, the lower the number of individuals within a station (Figure 6).

Table 2. Summary of mean Simpson index (D'), Pielou evenness (J') and the Shannon Weiner index (H') of macroinvertebrates analysed on surveyed stations in the Goreangab Dam (August – September, 2019)

Stations	D'	J'	H'
1	11.23	1.68	1.77
2	13.02	1.59	1.77
3	15.00	1.57	1.85
4	13.43	1.61	1.82
5	14.97	1.58	1.86
6	14.35	1.60	1.86
7	14.45	1.59	1.85
8	13.69	1.65	1.88

4. Discussion

Results obtained from this investigation has revealed less spatial variations in the concentrations of hydrogen ions (pH), conductivity and temperature between the different stations ($p > 0.05$), this signifying that there were similarities in these parameters for the various stations. Mean pH values indicates weakly basic conditions during the months of sampling, this is in confirmation that most freshwater aquatic system pH ranges between 7 and 8 if such water bodies are relatively not pollution (Lepori et al., 2003 and Alavaisha et al., 2019). Values of conductivity values signifies low salt concentrations in the dam during the months of sampling, while nonspatial temperature values indicate uniformity in the riparian vegetation cover. similar observations were reported by Eady et al. (2013) and Yan et al. (2016), when they investigated

the relationship between water temperature predictability and aquatic macroinvertebrate assemblages in two South African streams. Light intensity plays a major role when it comes to macroinvertebrate assemblages, because a larger concentration of algae leads to the provision of nutrients for macroinvertebrates (Hawkins et al., 1982), therefore higher light intensity levels and corresponding gradual temperature increase would significantly lead to increased macroinvertebrate biomass. The turbidity has no intrinsic physical, chemical or biological significance (Alavaisha et al., 2019). Nonetheless, the macroinvertebrate assemblages mostly preferred the clear water compared to more turbid water. This is because turbid water limits the ability of algae to photosynthesize and this directly affects the macroinvertebrates diversity.

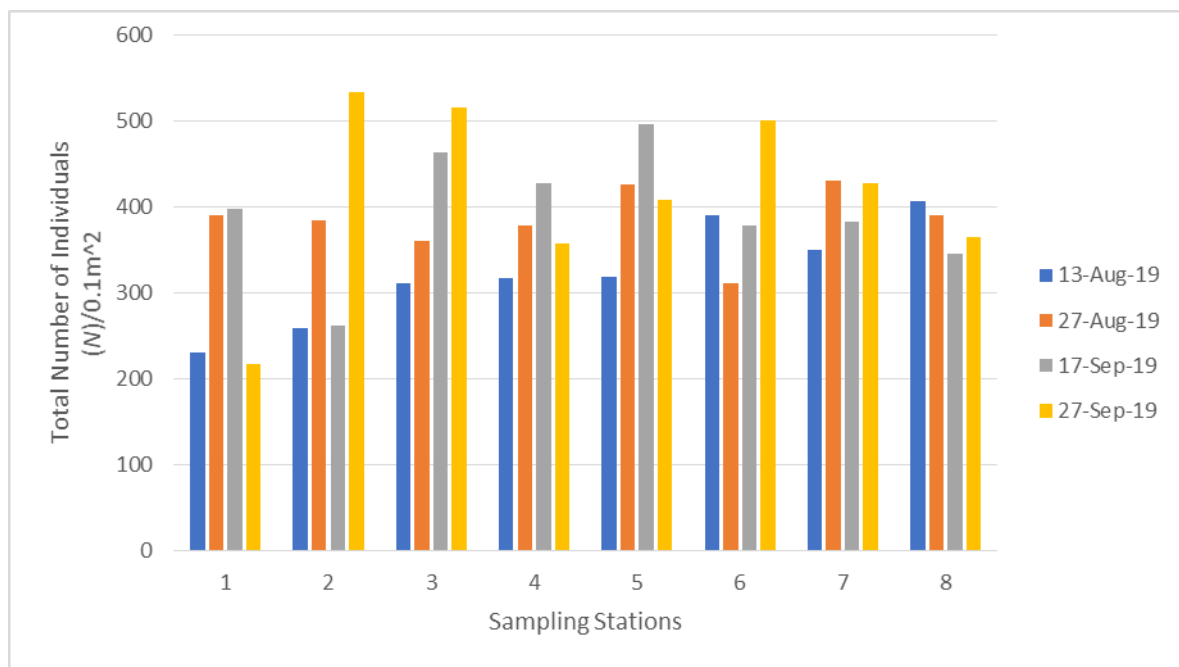


Figure 4. Total number of individual (N) organisms found in the Goreangab Dam (August – September 2019)

Macroinvertebrates are a useful indicator of an aquatic system health. Macroinvertebrate samplings are relatively quick, inexpensive, and can indicate the presence (or absence) of pollutants in a water body. They have predictable community composition under natural conditions and provide a snapshot of long-term conditions. Some macroinvertebrates are especially useful for targeted sampling due to their high sensitivity to environmental changes and pollutants. For quantification, models compare the taxa observed at the site to the taxa expected in the absence of human-caused stress.

Macroinvertebrate groups and metrics responded predominantly to specific or different environmental stressors acting at the same site. Natural water gets polluted when the contaminant material disturbs the natural equilibrium of living organisms near or in the water when it makes the water unsafe for human consumption or recreational purposes (Harley & Helmuth, 2003). It is evident that human activities are the most driving factors of water pollution in addition to the natural factors. Anthropogenic activities originate from different sources such as industries and farming practices that affect the water quality.

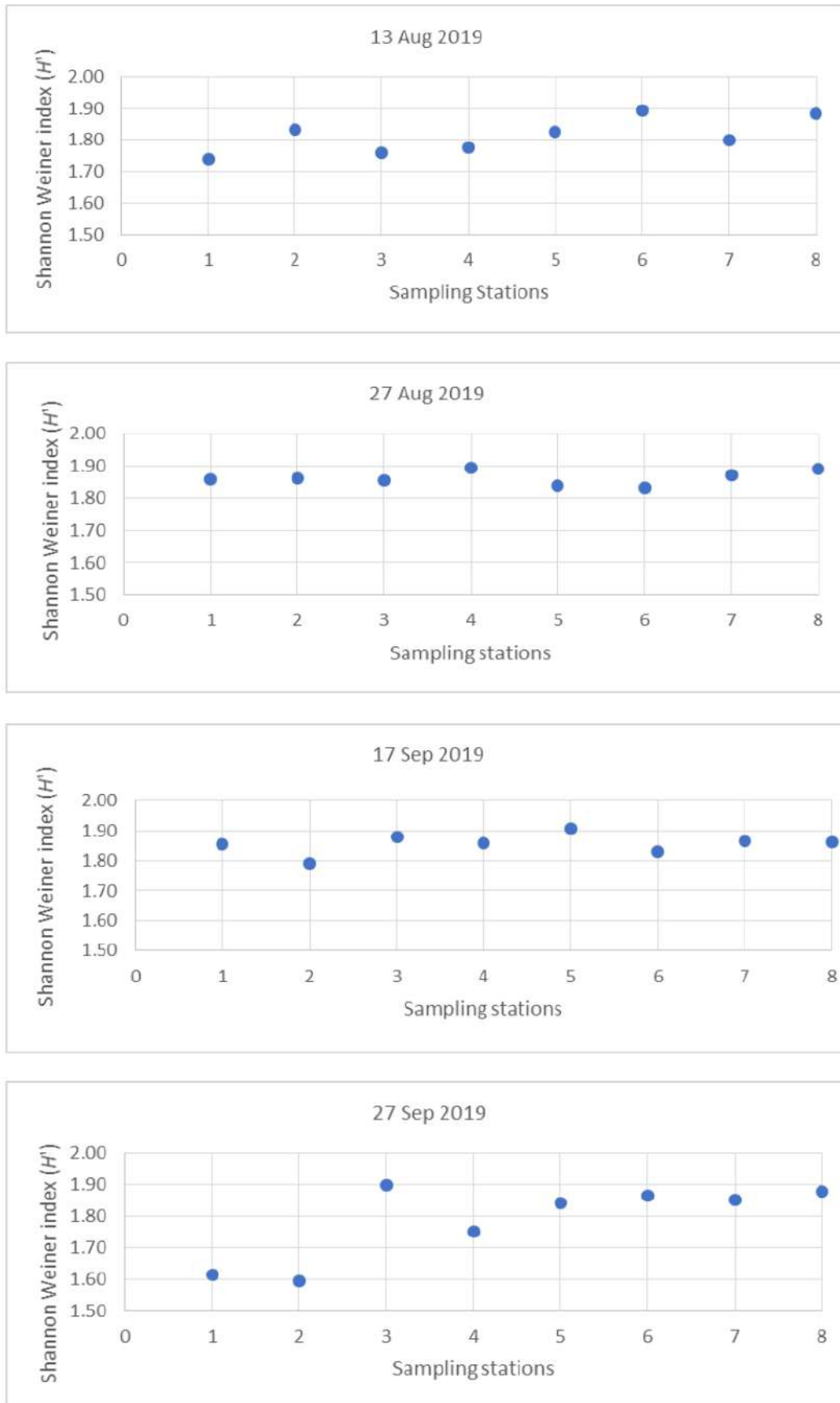


Figure 5. Spatial variations in Shannon Weiner index (H') of macroinvertebrates in the Goreangab Dam. (August – September 2019).

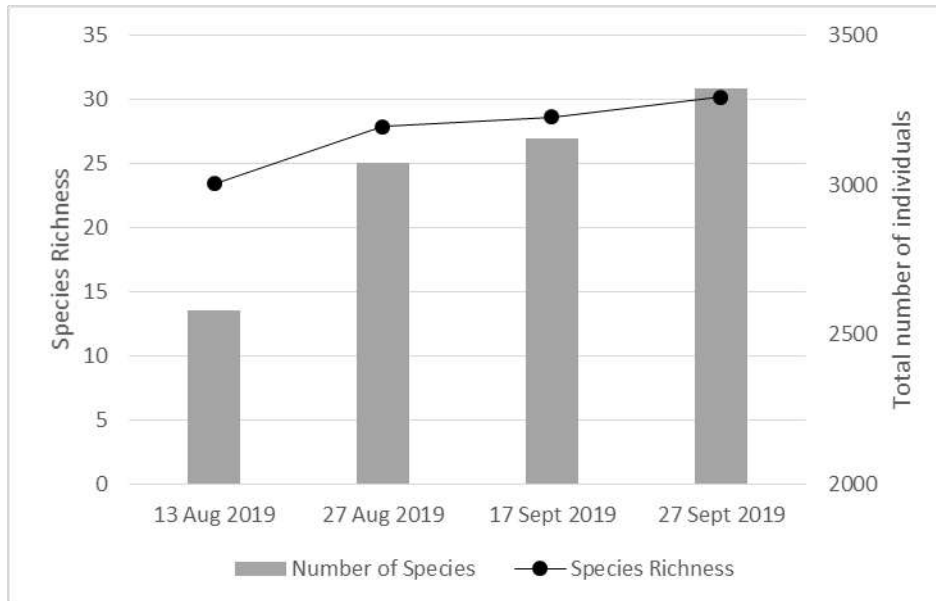


Figure 6. Relationship between temporal variations in number of individual species and species richness of macroinvertebrates in the Goreangab Dam

Macroinvertebrates are referred to as water quality indicators, because they are affected by the physical, biological and chemical conditions of the waterbody (Teixeira, 2010). They can be tolerant, sensitive and somewhat tolerant to pollution. These organisms can therefore tolerate changes in water quality and high loads of pollution. Of which under polluted conditions, the community structure may simplify in favour of tolerant species, but the abundance of a certain species may increase but the diversity and species richness decreases drastically (Martins et al., 2014).

Functional evenness may be seen as the degree to which the biomass of a community is distributed in niche space in order to allow effective utilization of the entire range of resources available to it (i.e. within the niche space that it encompasses). This investigation recorded that the species in all the stations were evenly distributed, although the highest evenness was recorded in station 1 with 1.68. Assuming resource availability is even throughout the niche space, the lower functional evenness will then indicate that some of the niche space, while occupied by macroinvertebrates is under-utilized, station 3 had the lowest evenness with 1.57. This will tend to decrease the productivity and reliability of the ecosystem, which will then increase an opportunity for invaders (Paul, 2008).

High functional divergence indicates a high degree of niche differentiation, and thus low resource competition. It is therefore safe to say that communities with high functional divergence may have an increased ecosystem function as a result of more efficient resource use. Studies have long been

intrigued by the fact that small – scale species richness can vary subsequently among communities (Griffith et al., 2005 and Jun et al., 2016). This can be related to species richness including geographic factors such as scale of observation, available species pool and dispersal patterns and biotic factors such as competition and predation, as well as the abiotic environmental factors such as site resource availability, disturbance and physical conditions (Teixeira, 2010). An increase in the individual number of species, decreases the richness of the community.

A widely held hypothesis is that greater diversity increases ecosystem stability, because more species rich communities have a broader range of adaptations and can thus respond better to stress, or disturbance experienced within the waterbody. There is a high diversity, composition and abundance of tolerant macroinvertebrates species in the Goreangab Dam, hence the Dam can be classified as unhealthy.

Species richness can provide important information about the ecosystem and its water quality. In systems where the processes affecting species richness are well understood, allows this richness to be used as an indicator of community properties such as resource availability or the disturbance level of the water. The diversity of macroinvertebrates can be used to assess water pollution (Flores & Zafaralla, 2012 and Orwa et al., 2015). Efforts to understand patterns of species distribution and diversity have provided useful means through which species distribution and diversity in the Goreangab Dam examines how fundamental ecological processes affect local communities and has therefore inspired a vast body of scientific research.

Understanding of the different factors that influence species richness is particularly important for applying the concept to biodiversity conservation. The richest sites do not necessarily contain the rarest habitats, the highest levels of endemism or the species most threatened extinction. Finally, it is important to remember that while species richness represents a relatively simple measure of diversity, the two are not the same. Species richness must always integrate a scale of measurement and it is a species count per unit area, while on the other hand diversity is a broader concept that attempts to account for the variety of life

in an ecosystem, not just of species but also of all taxonomic levels and the functions, interactions and abundance of organisms. According to the analysis made, both local and landscape determined features affect macroinvertebrate distributions.

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