A Message from the Rector

Last year we launched the first edition of the Polytechnic of Namibia Annual Research Report and this marked an important step in the advancement of the academic agenda of the institution. In previous years, our focus has been on excelling at teaching and learning but, with the transitioning of the institution to the Namibian University of Science and Technology, our new mandate requires an additional emphasis on research and service to the community. The reporting of our research outputs is thus an important initiative in the presenting our research profile.

Despite the financial constraints that the institution continues to experience, in 2013 we have, through the Institutional Research and Publications Committee, disbursed N$ 688,000 in seed money for research. In the current year, twenty-eight new and on-going research projects from the various Schools are being funded. We are aware that the resources the institution makes available for research are inadequate and hence we encourage academic staff to take advantage of the opportunities that Government provides via the Namibia-South Africa Bilateral Commission, as well as via the recent call for proposals from the National Commission on Research, Science and Technology (NCRST). These serve as alternative sources for funding research.

The Polytechnic has put in enormous effort and investment into setting up structures to create an enabling environment for our researchers. One such structure is the Project Services Centre, which is charged with providing support to academics in accessing external grants. During 2013 the Centre processed fifteen grant applications, of which seven were funded at a total of N$ 1,400,000. The institution subscribes to “Research Professional Africa”, which alerts us to international funding opportunities that are available to African institutions and thus academics are able to identify calls for proposals that are in their area of speciality. This, together with the support from the Project Services Centre, has significantly increased our potential for accessing grant funding.

I’m excited that the Annual Research Report is being published again. It means that we are embedding the Report in the research culture we are developing as an institution. It also gives us a platform by which we are able to make stakeholders aware of the practical problems our
research is trying to find solutions to, and the expertise in research that the institution possesses. From an internal perspective, the Annual Research Report serves to monitor the progress we are making in our research endeavours. Most importantly, as a public institution that depends largely on public funds for its academic enterprise, the Report serves as an accounting instrument for stakeholders, allowing us to describe how the institution has utilised public resources.

Finally, I would like to thank our partners and sponsors for their financial support to this important institutional endeavour. Perhaps one way of showing our gratitude is through the increased research outputs that have been generated this year. My sincere thanks to the Vice-Rector: Academic Affairs and Research for the leadership he provided, and the researchers, support staff and postgraduate students for the relentless effort they have put in to ensure that this institutional project is a success.
Introductory Remarks

This is the second Research Report of the Polytechnic of Namibia and probably the last Research Report under that name, since the Institution is swiftly transforming into the Namibia University of Science and Technology. The new University will provide a foundation to address the spectrum of concerns we face, today and in the future, with discoveries and their application. Our mission is to promote our competitiveness as a nation, by providing multiple opportunities for excellent education, applied research, innovation and services.

The new Polytechnic Strategic Plan 4 has set clear goals to promote excellence in Teaching, Research and Service. The Office of the Vice Rector Academic Affairs and Research and its Research and Postgraduate Studies Unit, will play a pivotal role in assisting our researchers, scholars and students to attain those goals.

Through these efforts, we will continue to explore new means and opportunities to deepen our connections to partners in industry, government and the wider community. Research projects conducted by institutional investigators and our partners span the entire spectrum from world-class basic investigation of fundamental questions in social, natural, engineering sciences and technology to the applied sciences that are yielding significant breakthroughs in areas that have been rarely researched.

We also engage in additional translational research efforts that promote collaborative solutions to problems in various industries in Namibia and the SADC region. In addition, the Institution is a member in the Southern Africa Technikon Network (SATN) and in the Southern African and Nordic

Interconnecting our research and national agendas for development ensures that:

- We take full advantage of translating research discoveries into practical applications
- We are mindful of our obligation to provide solutions that positively impact the lives of Namibian citizens through basic and applied research solutions
- We intentionally engage in opportunities to expand our local and state economies through entrepreneurship and creative innovation
Countries Universities Network (SANORD). These affiliations, like others, support our research efforts by providing a collaboration network and resources to support and conduct world-class scientific and technological research.

Recently, the Research and Postgraduate Studies Unit has been established under the office of the Vice Rector Academic Affairs and Research to oversee research compliance relating to our institutional goals and mandate, as well as to local, regional and national regulations. We have already successfully conducted research seminars and workshops at institutional and faculty levels, but this Unit will take our institution research endeavours to greater heights. Recognition in the form of awards given to our researchers of the year has now become part of our institutional culture. Hence, in 2013, we rewarded seven Researchers of the Year from all Faculties and academic centres and we expect the more researchers to take part in this contest in the course of 2014.

Our website offers information and contacts to help with your questions regarding our role at our institution and how we serve, assist and interact with our community. Please feel free to contact us, aniikondo@polytechnic.edu.na and kwieder@polytechnic.edu.na, or any of our exceptional staff members, to find out more about our Research and Postgraduate Studies Unit, our strategic plan, our research strategy, our Masters and PhD Guidelines, or our new research initiatives and opportunities.
School of Economics and Finance

The School of Economics and Finance is made up of the Departments of Economics, Marketing and Accounting.

The School has a long-standing history in research and publication. Promotion of research, and specifically applied research, is a prerequisite for transforming the Polytechnic of Namibia into the Namibia University of Science and Technology. In light of this objective, the School, together with the School of Management, organised a Research Day on 15 August 2013. Academic staff, students and a number of invited guests attended this gathering. Together with the School of Management, the School also hosts seminars on Friday afternoons from 2:30 to 4:30 pm.

Collaboration with other universities and schools at an individual researcher level is on-going. The collaborations resulted in publications of a number of articles in international journals and the presentation of joint papers at international conferences.

Funding

In 2013, the Marketing Section received funds from Telecom Namibia. The School is grateful for the funds received.

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Projects

Customers’ Satisfaction Survey at Telecom Namibia
contact: Victor Somouso at vsomouso@polytechnic.edu.na

Highlights

Cyril Ogbokor was awarded “School’s Researcher of the Year”.
Journal Publications


As the Polytechnic of Namibia transforms into the Namibia University of Science and Technology, it is vital that science, engineering and technology take centre-place. In this regard, the School of Engineering considers itself to be a high priority School and hence should take a leadership role in research capacity building. The School therefore has taken steps to introduce a number of master degree programmes in the next five years in the following fields: Energy Systems, Civil Engineering, Mechatronics, Mining Engineering and Environmental Engineering. Our First Doctoral programme is also expected to be introduced in 2014 in the Civil Engineering Department.

Research interest and activities by academic staff of the School of Engineering has been on the increase. Special research focus areas that are growing into clusters within the School are:

- Renewable Energy
- Manufacturing Systems
- Water Resource Management
- Mining Sustainability and Environmental Impact

In particular, the renewable energy cluster has taken a number of new initiatives and has thus acquired external research funds through proposal writing in partnership with our international collaborators. The School is championing the Research Cluster on Renewable Energy, which is part of the EDULINK group of projects funded by European Union-Caribbean, African and Pacific group of states. These projects are aimed at enhancing research and education in the field of energy systems and include:

- Southern African Sustainable Energy Initiative (SASEI)
- Programme on Energy Efficiency in Southern Africa (PEESA)
- Participatory Integrated Assessment of Energy Systems to promote Energy Access and Efficiency (PARTICPIA)
- Network of Excellence in Renewable Energy Technologies for Development (NEED)
Funding

Most funding for research activities has come from third party donors. The Institutional Research and Publication Committee also plays a role in supporting our research activities. A list of our major external donors, to whom we are very grateful, is given in the Table below and are pro rata 2013.

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Projects

Water Demand Management
contact: Damas Mashauri at dmashauri@polytechnic.edu.na

Material Recovery Facility
contact: Damas Mashauri at dmashauri@polytechnic.edu.na

Future of Okavango
contact: Andrea Vushe at avushe@polytechnic.edu.na

Facility Management
contact: Victor Kamara at vkamara@polytechnic.edu.na

Residential Time of Use Energy Modelling and Tariff Evaluation
contact: Gideon Gope at ggope@polytechnic.edu.na

An Assessment of the Wind Resources of Namibia
contact: Bernard Siepker at bsiepker@polytechnic.edu.na
Design of a Machine to Extract Mangetti Nuts
contact: Andrew Zulu at azulu@polytechnic.edu.na

Design and Development of Bio-Char Stove
contact: Rajaram Swaminathan at rswaminathan@polytechnic.edu.na

A Feasibility Assessment of Energy Savings through Deployment of Suitable Daylighting Technologies
contact: Okorie Emmanuel at okorieme@polytechnic.edu.na

The Optimisation of Fluorspar Flotation
contact: Harmony Musiyarira at hmusiyarira@polytechnic.edu.na

Promoting Sustainable Development in Namibia by Using Solar Energy
contact: Smita Francis at sfrancis@polytechnic.edu.na

Modelling the Growth of Informal Settlements: A Case of Windhoek, Namibia
contact: Maria Marealle at mmarealle@polytechnic.edu.na

Evaluation of Suitability of Treated Effluent For Re-Use in Vegetable Irrigation: A Case of Study of Windhoek
contact: Liberty Moyo at lmoyo@polytechnic.edu.na

Investigation of Techniques to Improve the Behaviour and Strength of Civil Engineering Composite Materials, i.e. Termitarium, Calcrete, Polypropylene Fibres, etc.
contact: Victor Kamara at vkamara@polytechnic.edu.na

Research on Improving Road Safety in Major Roads in Namibia
contact: Candidus Tomeka at ctomeka@polytechnic.edu.na

Research on Polymer Stabilization of Unbound Materials in the Northern Regions of Namibia
contact: Lucas Wakudumo at lwakudumo@polytechnic.edu.na

Decision Support System for Water Supply in the Central Area of Namibia
contact: Liberty Moyo at lmoyo@polytechnic.edu.na

Development of Maritime Education in Namibia (MARIBIA)
contact: Samuel John at sjohn@polytechnic.edu.na
Water Demand Management (WDM) of Keetmanshoop Municipality, a collaboration with the Tampere University of Technology, Kangasala and Lempäälä municipalities of Finland. Contact: Liberty Moyo at lmoyo@polytechnic.edu.na

Water and Environmental Innovation and Design Laboratory in Namibia, a collaboration with the Lund University Sweden, and Sponsored by SIDA and main partner is Lund University. Contact: Demas Mashauri at dmashauri@polytechnic.edu.na

Journal Publications


**Conference Papers**


The School of Health and Applied Sciences was inaugurated in 2010 and is therefore the youngest School at the Institution. The School currently consists of three Departments, namely Mathematics and Statistics, Biomedical Sciences, and Environmental Health Sciences. The Emergency Medical Care Programme resides in the Department of Biomedical Sciences, and the latest addition to the School is the Natural Sciences Unit.

The School offers the following programmes: Bachelor of Sciences professional degree programmes in Biomedical and Environmental Health Sciences, Bachelor of Science in Applied Mathematics & Statistics, Bachelor of Science Honours in Applied Mathematics, Bachelor of Science Honours in Applied Statistics, a Bachelor’s degree in Pre-Hospital Emergency Medical Care and Bachelor of Science in Natural Sciences.

The School has an extensive staff establishment, including laboratory staff that support practical teaching. Since inception, the School has transformed from a relatively small, predominantly undergraduate teaching school into one that actively fosters excellence in its three fundamental pillars – teaching, research, and community service.

In the past year, the School has endeavoured to assess its research focus by developing a research strategy to align with Polytechnic’s Strategic Plan 4 (PSP-4). The school has identified four research niche areas, namely: maternal and neonatal health; indigenous medicinal plants; mycotic and zoonotic diseases; and environmental pollution and remediation. These niche areas were arrived at with a view to contribute directly to the National Development Plan 4 (NDP4) and to Namibia’s Vision 2030, through relevant research (applied research that addressed our national development priorities in our unique southern African context). To this end, the School aims to conduct quality research, the results of which and the attendant expertise, will be commercially and community-directed in response to national, regional and global needs. Many of the current projects listed below are in line with the identified niche areas.
2013 RESEARCH REPORT
Polytechnic of Namibia

Highlights

The highlight was the School Research Day held on 23 May 2013. In addition to the plenary lectures by two invited guest presenters, Prof L Chagonda (University of Zimbabwe) and Prof A M Viljoen (Tshwane University of Technology), academic members of staff and students made poster and oral presentations. The quality of posters was outstanding, as attested by Dr Niikondo, Vice-Rector for Academic Affairs and Research, who performed the official opening of the Research Day. For the first time, the School was also able to produce an Abstracts booklet.

Funding

In 2013, no new projects were funded by the IRPC. Carryover funds were used for the projects listed in the section below. The School is grateful for both internal and external financial support received. Without this support, the research done would not have been possible.

The table below shows the new funding support received in 2013.

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</table>
Projects

*Studies of water treatment protein extracted from seeds of Moringa tree*
contact: Habauka Kwaambwa at hkwaambwa@polytechnic.edu.na

*Prevalence of noise induced hearing loss in university students using personal music devices: A case study at the Polytechnic of Namibia*
contact: Dingilizwe Mazibuko at dmazibuko@polytechnic.edu.na

*Investigation into the effects of occupational exposure to charcoal dust*
contact: Ndinomholo Hamatui at nhamatui@polytechnic.edu.na

*In vivo hepatotoxic response of short term exposure to mycotoxins in pearl millet as substantiated by immunolocalization in rat liver*
contact: Christo Isaaks at cisaaks@polytechnic.edu.na

*Comparing the nutritional quality in two Moringa species grown in South Africa and Namibia*
contact: Jeya Kennedy at jkennedy@polytechnic.edu.na

*Discrete optimisation model for 2-dimensional energised waves*
contact: Sunday Reju at sreju@polytechnic.edu.na

*Colloid Science to improve water purification and contaminated soil remediation with natural products*, a collaboration with the University of Botswana and Uppsala University.
contact: Habauka Kwaambwa at hkwaambwa@polytechnic.edu.na

*Development of Lysin-Chitosan Functionalized Therapeutic Polymer against Group B Streptococci (GBS)*
contact: Sylvester Moyo at srmoyo@polytechnic.edu.na
Journal Publications


Conference Papers

During the last Polytechnic Strategic Plan, the School of Communication, Legal and Secretarial Studies became the School of Humanities, offering eight programmes in various disciplines in the field of Humanities. This was also the period during which departments in the School initiated an increased number of research-related activities.

The School has always endeavoured to increase its research output both in terms of research projects undertaken by faculty and also in terms of publications. To facilitate this, the Dean of the School, Dr Sarala Krishnamurthy, was tasked by the Vice-Rector Academic Affairs and Research (VRAAR), Dr Andrew Niikondo, to conduct a Supervisor Training workshop. Approximately 25 staff members attended this training. Further, she also provided mentorship to junior faculty in two writing retreats organised by the Office of the VRAAR. A booklet of abstracts was published from work done in these writing retreats, and out of the 14 abstracts published; staff from the School of Humanities submitted seven.

**Funding**

We are grateful for any kind of financial support we received. Without this support the research done would not have been possible.

<table>
<thead>
<tr>
<th>Donor</th>
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</table>

**Projects**

*Prison Reform and the Inmate Population of Namibia*

contact: Hennie Bruyns at hjbruyns@polytechnic.edu.na

*Rapid Analysis: Children in Namibia in Conflict with the Law*

contact: Stefan Schulz at sshulz@polytechnic.edu.na
The Multi-Media Dialogue against Gender-Based Violence
contact: Vida De Voss at vdevoss@polytechnic.edu.na

The Digital National Archive project
contact: Sarala Krishnamurthy at skrishnamurthy@polytechnic.edu.na

International Corpus of English Namibia (ICENAM)
contact: Sarala Krishnamurthy at skrishnamurthy@polytechnic.edu.na

Books


Journal Publications


Makamani, R. (2013). Preserving oral traditions: Some reflections on student’s performances during cultural festivals held at the Polytechnic of Namibia (Namibia University of Science and Technology) from 2009-2012, NAWA 7(1), 1-12.
School of Information Technology

The School of IT intends to address the national need for capacity building in the development of secure, reliable and robust software tools, interfaces, networks and systems within the framework of contemporary national and international research projects. These lead to value-added national economic activities, and thus contribute to the achievement of national development goals and Vision 2030.

The School has four departments: Basic Computer Studies; Business Computing; Computer Systems and Networks; and Software Engineering. It offers a variety of postgraduate programmes, all of which include applied research. Staff have increasingly contributed to research activities through research clusters. A continuous staff development programme will allow staff members to upgrade their qualification to Masters and PhD levels. The School’s recruitment strategy has helped to increase the number of PhD holders from 5 to 11 by the end of 2013. The SIT expects this number to increase to 16 by mid 2014. This will further extend the School’s research activities.

Funding

To achieve the research objectives and targets, the School collaborates with a wide range of partners and stakeholders in Namibia and abroad. We would therefore like to extend our sincere gratitude to all our partners, funding agencies, NGOs and communities for making our research activities possible.

<table>
<thead>
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Research Clusters

Clustering research efforts improves the efficiency of the School’s research. The School has set up five research clusters:

- **Community-Centred Localisation**
  The research cluster, led by Heike Winschiers-Theophilus, has been running since 2008, with the current focus on the development of a community based indigenous knowledge management system. The development of this system is motivated by the interruption of generational local knowledge transfer, due to an increasing temporal rural-urban migration.

- **Mobile Content and Applications for Entrepreneurship Development**
  This cluster is led by Hyppolyte Muyingi. The cluster intends to establish an applied and action research platform for mobile applications and mobile web services framework for Namibia in three niche areas: Entrepreneurship Development, Education Enhancement, and General Services. Existing and emerging m-business world research and application results will be considered and adapted, as well as innovative approach to address local community and business needs and constraints.

- **Forensic Computing and Security Research Group**
  This research group, which was initially led by Jill Slay, is now led by Fungai Bhunu-Shava. The cluster focuses on making the Internet more secure and a safe place for civil society and government. This increases productivity, as less time is being spent on detecting and recovering from cyber-attacks.

- **Health Informatics Research Cluster**
  This cluster is led by Tiko Iiyamu. It focuses on the development, implementation, and integration of Health Information Systems. This includes readiness assessment, evaluation, and architecture of Health Information Systems on traditional Client/Server platforms, as well as technologies used for mobile and cloud computing.
• *Mobile Sensor Data Processing*

Klaus Wieder is leading this research cluster, which aims at the reliable collection, curation and application of data generated by remote and mobile sensor devices. This multidisciplinary research does not only include vehicle and train tracking but also classical wildlife and livestock tracking. Next to the data collection and transport, the development of useful software applications is the main concern of this research cluster.

**Multidisciplinary Research**

Multidisciplinary research at our Institution involved the School of Natural Resource and Tourism working with the *Community-centred Localisation* cluster and the *Mobile Sensor Data Processing* cluster. Research activities included a number of visits to our international partner institutions including, Flensburg University of Applied Science, Germany; Iowa State University, USA; University of Malaysia, Sarawak; University of Technique and Art, Berlin, Germany; Rhodes University, South Africa; University of South Australia, just to name a few.

**Highlights**

Tiko Iyamu was the recipient of the 2013 Institutional Researcher of the Year Award.

**Projects**

*Indigenous Knowledge Management System*, a collaboration with the University of Aalborg, Denmark, Meraka Institute, South Africa, University of Cape Town, South Africa and University of Malaysia Sarawak, Malaysia, cluster: Community-centred Localisation.
contact: Heike Winschiers-Theophilus at hwinschiers@polytechnic.edu.na

*Computer Technology Disruption in the Class Room – Cross Cultural Studies: Namibia, Uganda, USA Case Studies*, a collaboration with the University of Creighton, USA, and Makerere University, Uganda, cluster: Mobile Content and Applications for Entrepreneurship Development.
contact: Hippolyte Muyingi at hmuyingi@polytechnic.edu.na
Persuasive Computing for Cultural Institution and Creative Industry, a collaboration with the University of Applied Science, Berlin, Germany.
contact: Hippolyte Muyingi at hmuyingi@polytechnic.edu.na

Culturally Persuasive Digital Games for Mathematics Learning, a collaboration with the Rhodes University, South Africa.
contact: Hippolyte Muyingi at hmuyingi@polytechnic.edu.na

Crowd Source Systems for Social Behaviour Exploration: City Crimes and Violence, a collaboration with the University of Cape Town, South Africa.
contact: Hippolyte Muyingi at hmuyingi@polytechnic.edu.na

Resilient Cyber Systems, in cluster: Forensic Computing and Security Research, a collaboration with the University of South Australia IA research group, Idaho State University, USA, and the International Information Systems Security Certification Consortium.
contact: Fungai Bhunu-Shava at fbshava@polytechnic.edu.na

A Framework for the Adoption of Enterprise Resource Planning (ERP) Systems In Developing Countries: A Case of Namibia, cluster: Health Information Systems.
contact: Tiko Iyamu at tiyamu@polytechnic.edu.na

contact: Tiko Iyamu at tiyamu@polytechnic.edu.na

contact: Klaus Wieder at kwieder@polytechnic.edu.na

Supporting the Optimisation of the Land-Based Transportation Infrastructure of Namibia - A Pilot Study, cluster: Mobile Sensor Data Processing.
contact: Klaus Wieder at kwieder@polytechnic.edu.na

contact: Fungai Bhunu-Shava at fbshava@polytechnic.edu.na
Books


Book Chapters


Journal Publications


**Conference Papers**


School of Management

The School of Management Sciences comprises of four departments, namely the Department of Management Studies, Department of Accounting, Economics and Finance, Department of Marketing and Logistics and Department of Hospitality and Tourism Management. This combination forms a strong multidisciplinary synergy that is remarkable for conducting and promoting research both at School and institutional level.

Promotion of research specifically applied research as a prerequisite for transforming the Polytechnic of Namibia (PoN) to Namibia University of Science and Technology (NUST). In the light of this objective, the School, together with the School of Economics and Finance, held the School's Research Day on 15 August 2013. Academic staff, students and a number of invited guests, attended the Research Day. The main purpose of the Research Day was to bring the research fraternity to showcase their research, develop a culture of research, avail an opportunity for researchers in the schools to demonstrate their research projects and ultimately engage academics and students to participate vigorously in research.

Furthermore, the School, together with the School of Economics and Finance, hosts a wide variety of seminars, covering topical issues. The seminars take place every Friday afternoon and are given by a mix of School and invited external scholars. Attendance is open to faculty and staff of the School and also extended to colleagues from other schools. The objectives are to enhance research culture, facilitate dissemination of knowledge, and encourage research collaboration.

Highlights

Grafton Whyte was awarded “School’s Researcher of the Year, 2013”.

Journal Publications

Conference Papers


The School is well known within the Polytechnic and beyond for engaging in high quality research. The School has participated in development projects through its three centres/institutes: Earth Observation and Satellite Application (EOSA), Integrated Land Management Institute (ILMI) and the Agri-Business and Technology Development Centre (ABTDC). These centres give faculty and students opportunities to apply their knowledge and skills to solve real life challenges and thus serve the nation at large. The School boasts of a very solid and vibrant teaching, learning and research environment supported by a modern IT infrastructure, equipment, labs and a modern library. The School hosts a number of international scholars each year and coordinates and manages a number of international projects.

The School’s research activities are aimed at enhancing the sustainability and resilience of ecosystems in which people can derive and improve their livelihoods as they live in harmony with the rich biodiversity. Our research activities are informed by the national development priorities, as crafted in National Development Plans, (NDPs), coupled with recognition of the impact of land use and climate variability and change that can in turn impact on the population and the environment. We do this through four broad research clusters that are of multi-disciplinary in nature. The four clusters and their main objectives are:

- **Eco-systems and Biodiversity (Eco-Bio)**
  This cluster focuses on the improvement of ecosystems functions and services by promoting conservation of biodiversity;

- **Land, Agriculture and Water (LAW)**
  This cluster focuses on sustainable utilisation of land, agriculture and water resources that improves productivity and conservation;

- **Wildlife and Tourism (WIT)**
  This cluster aims at promoting sustainable management of wildlife and their habitat for eco-tourism activities for wealth creation;
• **Development and Application of Spatial Technologies and Tools (DAST)**

This cluster focuses on the development and promotion of the use of Geographic Information Systems (GIS) and Remote Sensing (RS) tools for sustainable natural resources management.

Though research in the latter is independent of the other groups, our aim for this group is to support the top three clusters.

**Highlights**

The first Institutional Open Research Day was held on 21 November 2013 to showcase examples of institutional research to the public, including parents of students, potential employers of students, sponsors and the media. It was coordinated by the School of Natural Resource Management and Tourism, which invited all other Schools and Centres to select appropriate posters, exhibits and presentations. The selection criteria placed most emphasis on impact of the research in terms of public interest and contribution to national development through multidisciplinary cooperation between Schools and with stakeholders and students. The selected research was exposed through nine presentations, 15 hands-on exhibits and 30 posters.

Morgan Hauptfleisch was awarded “School’s Researcher of the Year, 2013”.

**Funding**

The School collaborates with a wide range of partners and stakeholders in Namibia and abroad to help achieve the School’s research objectives and targets. Therefore, we would like to extend our sincere gratitude to all our partners, funding agencies, NGOs and communities for joining hands in making our research activities possible. The amounts listed in the table below are pro rata 2013.
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Projects

**Growth models for selected woodland species in Namibia**, cluster: Eco-systems and Biodiversity.
contact: Vera DeCauwer at vdecauwer@polytechnic.edu.na

**Multiple resource use of Namibian range-lands with a focus on water use dynamics of bush encroachment**, cluster: Eco-systems and Biodiversity.
contact: Dave Joubert at djoubert@polytechnic.edu.na

**Land use impacts on vegetation distribution, plant species structure, and edaphic factors in the northern Kalahari rangelands**, cluster: Eco-systems and Biodiversity.
contact: Mutjinde Katjiua at mkatjiua@polytechnic.edu.na

**Timber provision of woodlands (for The Future Okavango)**, cluster: Eco-systems and Biodiversity.
contact: Vera DeCauwer at vdecauwer@polytechnic.edu.na

**Impacts of an episodic resource pulse on riparian vegetation in ephemeral river of the Namib Desert**, cluster: Eco-systems and Biodiversity.
contact: Barbara Curtis at bcurtis@polytechnic.edu.na
Classification and description of the vegetation of the farm Klein Boesman, cluster: Eco-systems and Biodiversity.
contact: Willie Adank at wadank@polytechnic.edu.na

The use of ecosystem parameters in predicting the risk of aircraft-wildlife collisions at Namibian airports, and designing proactive mitigation measures, a collaboration with the Namibian Airports Company, cluster: Eco-systems and Biodiversity.
contact: Morgan Hauptfleisch at mhauptfleisch@polytechnic.edu.na

Development of a national forest monitoring programme for Namibia, cluster: Eco-systems and Biodiversity.
contact: Patrick Graz at fgraz@polytechnic.edu.na

Forest regeneration, growth, threats and trends in different forest types, cluster: Eco-systems and Biodiversity.
contact: Patrick Graz at fgraz@polytechnic.edu.na

The impacts of fire on biodiversity and ecosystem processes in woodland savanna, cluster: Eco-systems and Biodiversity.
contact: Dave Joubert at djoubert@polytechnic.edu.na

Impact of bush encroachment on groundwater resources, cluster: Eco-systems and Biodiversity.
contact: Patrick Graz at fgraz@polytechnic.edu.na

Agronomic benchmarks (for The Future Okavango), cluster: Land, Agriculture and Water. contact: Ibo Zimmerman at izimmerman@polytechnic.edu.na

Kavango farming systems (for the Future Okavango), cluster: Land, Agriculture and Water. contact: Ibo Zimmerman at izimmerman@polytechnic.edu.na

Socio-economic impacts of dichapetalum cymosum and prevention of livestock deaths, cluster: Land, Agriculture and Water.
contact: Mutjinde Katjiua at mkatjiua@polytechnic.edu.na

A pilot study on people’s perceptions and acceptance of rainwater harvest in North-Central Namibia, cluster: Land, Agriculture and Water.
contact: Teofilus Shiimi at tshiimi@polytechnic.edu.na
Landscape literacy, cluster: Land, Agriculture and Water.
contact: Ibo Zimmerman at izimmerman@polytechnic.ecu.na

contact: Petrina Haufiku at phaufiku@polytechnic.edu.na

A strategy towards inclusive education in the Department of Hospitality and Tourism at the Polytechnic of Namibia: Possibilities and barriers, cluster: Wildlife and Tourism.
contact: Mirjam Sheyapo at msheyapo@polytechnic.edu.na

Behavioural and spatial ecology of the puff-adder bitis arietans and the effects of translocation as a conflict management strategy, cluster: Wildlife and Tourism.
contact: David Browning at dbrowning@polytechnic.edu.na

Book Chapters


Journal Publications


Centre for Cooperative Education

The Polytechnic of Namibia (PoN), (transforming into Namibia University of Science and Technology) still regards the business communities as a very critical stakeholder and partner in education. Work Integrated Learning (WIL) is a vital component in the PoN curriculum framework, which affords students the opportunity to apply theoretical knowledge gained in a practical work environment. The Centre for Cooperative Education (CCE) was established at the Polytechnic with the main purpose of facilitating internship opportunities for students, which is conducted in “the work place”.

Other responsibilities of the Centre includes supporting the implementation of various modalities of cooperative education including service learning, project based learning, simulations and encourage multi-disciplinary student research for the purpose of WIL. We trust that the successful operation of our centre will contribute enormously to the development of the Namibian economy, and enhance student’s employability. This is achieved through WIL, which allows students to practise, in a real workplace situation, what they have learnt. 10% of the total undergraduate degree programmes is awarded through WIL.

Introduction to the Centre’s research

CCE is a Centre of Excellence mandated to build partnerships with industry, which enhance cooperation between the Polytechnic and Industry, Business, Commerce, NGO and Community. Both students and academic may be attached to industry for the purpose of internship and research respectively. The Centre is continuing to motivate staff members to get involved in activities, which contribute, to research and development at the Polytechnic of Namibia. Conducting research in the area of WIL is imperative for the purpose of benchmarking and adoption of best strategies. CCE still engages in Supervision of honours and masters students.
Research Clusters

The Centre still strives towards improvement of the effectiveness and efficiency of our research efforts. The Centre organises its research in two broad research clusters that are multi-disciplinary and trans-disciplinary in their nature.

The two clusters and their main objectives are:

- **Human Resource Development** (Pedagogy and e-portfolio development).
- **National Strategy/policy for Cooperative Education** (stakeholders include PoN, NTA, NQA, UNAM, IUM, NCCI, NCHE and the Ministry of Education).

Funding

We are grateful for any kind of financial support we received. Without this support the research done would not have been possible.

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<thead>
<tr>
<th>Donor</th>
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<td>IRPC Institutional Research and Publication Committee</td>
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<td>MoE Ministry of Education, Namibia</td>
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<td>DAAD German Academic Exchange Service</td>
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Multidisciplinary Research

- Collaboration with the University of Pretoria, University of Johannesburg, University of South Africa, Tshwane University of Technology and University of Witwatersrand – Cooperative Education policy, implementation and students support for WIL distance education, e-learning students.
- Student Research Development Teams (SRDT) in collaboration with Wismar University.

Highlights

A team of experts from the World Association for Cooperative Education (WACE) visited the Polytechnic of Namibia on invitation by Mr Carva Pop, the Director of the Centre for Cooperative Education in September 2013. The team consisted of Dr Paul Stonely: WACE CEO, Mr Marty Ford: WACE Director for Global Partnerships, Dr Richard Porter: Chair of Mathematics Department and former VP for Cooperative Education, North Eastern University, Dr James Stellar: Provost, Queens College, CUNY & WACE Board Member, and Mr Shakeel Ori: Director of Cooperative Education, Durban University of Technology and WACE Board Member. The team met with the members of the National Technical working group on internships, and gave input into the proposed National Policy on internship.

Projects

*Exploring the effectiveness of a Work Integrated Learning Programme in contributing towards the employability of graduates: The Graduate Intern’s perspective*, a collaboration with the North-West University, South Africa and Polytechnic’s Centre of Open and Lifelong Learning.  
contact: Carva Pop at cpop@polytechnic.edu.na
The cooperation between the Polytechnic of Namibia and the Flensburg University of Applied Sciences started back in 2003 with the signing of a partnership contract. In 2004/2005 this collaboration was raised to a DAAD-sponsored subject-related partnership project. The foundation of this partnership has always been a common understanding of how successful projects should be managed, and has led to ambitious and supportive university management on both sides of the Equator. This was an excellent basis, not only for initiating the development of the Centre, but also for managing the challenges inherent in evolving from a theoretical project to the reality of a working centre.

The collaborative day-to-day work on and for the Namibian-German Centre for Logistics (NGCL) since 2009, and the need to deepen and intensify cooperation in order to make the project a success, has created a high level of mutual trust and confidence. This partnership has by now reached a mature level, and close personal ties have been forged.

The NGCL was inaugurated in May 2009, with the focus of the completed first phase being the establishment of a training, research and technology transfer centre.

Research

Given the importance ascribed to logistics in Namibia's current National Development Plan (NDP4), our primary focus has been to continue our work (started in 2011) on understanding the state, capabilities and perceptions of the Namibia's logistics sector. This has involved collaboration with various academic institutions as well as local and international industrial stakeholders. This has led to some preliminary ideas on what may be needed to re-engineer the industry to suit 21st Century requirements.

One of the key stated aims of NDP4 is the establishment of a port-centric “logistics hub” based around the port of Walvis Bay to serve Namibia and the Southern African Development Community (SADC) region. With this in mind we have worked in collaboration with the Université des Antilles
et de la Guyane, Martinique to establish basic research into the potential benefits, requirements and risks associated with establishing such logistics based clusters in developing countries.

By combining the basic “curiosity driven” generic research with the more specific local work, it has been possible to make a preliminary investigation into the portents for success or failure of the proposed Walvis Bay hub. This has included the identification of some key issues and the proposal of an outline approach for addressing them. To ensure that such research is of practical use it has been disseminated to industry and government stakeholders via workshops, publications and presentations to industry and government.

Whilst logistics is important in its own right, its true value comes when it is a tool to facilitate and generate trade that, in turn, can stimulate national and regional development. Therefore, it is important to understand not only the barriers to logistics development, but also predict what impact proposals such as the possible logistics cluster might have on future commerce, investment and development. Research into these topics is on-going.

Underpinning the above, research into more technical areas such as the possible development of a multi-agent based systems as a platform for transport collaboration in Namibia and her neighbouring countries has been carried out and continues.

**Funding**

We are grateful to our international sponsor, the German Academic Exchange Service (DAAD), who has contributed to the running of the Centre. Without this contribution the research would not have been possible.

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Highlights

The Centre organised and ran the 5th Annual Logistics and Transport Workshop, which took place in Walvis Bay, 24-27 September, 2013. In line with the Centre's research, the event was based around the theme of “Developing Namibian logistics hubs: Gateway to global supply chains and the backbone to regional development”. It drew over 100 delegates that included stakeholders and speakers from across the SADC region, the United Kingdom, and Germany. A number of students from the first cohort of Polytechnic logistics masters students also attended and profited from the opportunity to mingle with academics and industrialists.

To support this main event, the Centre ran the first of a planned series of breakfast workshops. This took place in Windhoek on 27 June, 2013 and focused on the topic of globalisation and sustainable supply chains. The key speakers were Dr Walter JV Vermeulen of Utrecht University (Holland) and Dr Peter Ras of Tshwane University of Technology (RSA), supported by Chris Savage (NGCL). This was a lively event that has led to a potential cross-disciplined project looking at supply chain sustainability and standards.

The work of the Centre, especially in the field of the possible Namibian logistics hub, has been recognised by industry and government, which has led to a number of invitations to address conferences and other gatherings. Possibly the most important of these being the special session of the Pan-African Parliament in Walvis Bay in June, where Chris Savage spoke on the theme: “Logistics cluster development in Namibia: A potential blessing?”

Projects

The state of logistics in Namibia: 2011, a collaboration with the University of Huddersfield, UK. contact: Chris Savage at csavage@polytechnic.edu.na

The response of key stakeholders to the proposed Walvis Bay port-centric hub development, a collaboration with the University of Huddersfield, UK. contact: Chris Savage at csavage@polytechnic.edu.na

Multi-agent based systems a better platform for transport collaboration in developing countries contact: Logan Fransman at lfransman@polytechnic.edu.na
The state of logistics in Botswana and its comparison with Namibia, a collaboration with the University of Botswana.
contact: Chris Savage at csavage@polytechnic.edu.na

Namibian transport information systems: Can they aid collaboration and reduce empty running?
contact: Logan Fransman at lfransman@polytechnic.edu.na

Will the proposed Walvis Bay hub, aid trade and development or frustrate it?, a collaboration with the University of Huddersfield, UK.
contact: Chris Savage at csavage@polytechnic.edu.na

Global supply chain management and logistics partnerships, a collaboration with the Université des Antilles et de la Guyane, Martinique.
contact: Chris Savage at csavage@polytechnic.edu.na

Journal Publications


Conference Papers


Renewable Energy and Energy Efficiency Institute

The Renewable Energy and Energy Efficiency Institute (REEEI) is mandated to facilitate and conduct research into renewable energy and energy efficiency; develop materials, reports, standards, and disseminate information on renewable energy and energy efficiency; and to facilitate cooperation between the MME and the Polytechnic, as a public institution primarily responsible for renewable energy and energy efficiency as well as cooperation with other stakeholders. The REEEI serves as an information dissemination platform and plays a leadership role in the transition from traditional energy sources and usage to a more sustainable-energy economy. REEEI is expected to develop and demonstrate projects that accelerate deployment of renewable energy in Namibia. Further goals are to advance market adoption of innovative energy solutions, and to support the formulation of regulations and policies that enable sustainable renewable energy generation, integration, security, and use.

The REEEI focuses on research in the following areas:

- Renewable Energy Resource Assessment;
- Solar water Heating in Namibia;
- Concentrated Solar Power;
- Energy policy and regulations;
- Minigrids; and
- Access to Energy in Namibia.

Research programmes are geared towards national development imperatives embedded in Vision 2030 and implemented through national development plans. The new vision of the Institute is to be a leading institute for energy research and development in Africa and beyond. This is to be achieved through the pursuit of its mission to contribute to Namibia’s industrialisation by linking energy research, technology, policy, and education to the needs of industry, and to national socio-economic development imperatives, initiatives and programmes.
Funding

The REEEI is eternally grateful for the sponsorship awarded for its programmes and projects. The major sponsors of REEEI research activities covering the year 2013 are listed below. The projects have terms up to 6 years. The figures listed are pro rata for 2013.

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Research Clusters

- **Renewable Energy / Energy Resource Assessment**
  The REEEI has produced Namibia’s direct normal solar irradiation maps from satellite data in a concentrated solar power pre-feasibility study. Ground measurements will now be done to ascertain resource availability at selected sites. A wind resource assessment project is currently underway, geared towards the production of regional observational wind atlas for Namibia.

- **Energy Efficiency**
  The Namibia Energy Efficiency Programme (NEEP) in Buildings was funded by the Global Environment Facility (GEF) supported by the United Nations Development Programme (UNDP), and managed by the REEEI.
A study on the Revision of National Building Codes to incorporate Energy Efficiency (EE) and Renewable Energy (RE) Principles was completed in 2013.

The REEEI also supervised the performance of energy audits and potential energy efficiency improvements study on 12 buildings in Namibia in 2013. Revelations were that in general building owners do not regard energy efficiency as important, and were shocked to notice the economic opportunities provided by utilising energy efficiently, sometimes at no additional financial cost.

The REEEI is the Secretariat of the Associated Working Group that has worked on the establishment of the Green Building Council of Namibia (GBCNA). The GBCNA was established to run the Green Building Rating System and is now registered as a Trust with the High Court of Namibia.

**Energy Policy and Regulation / Renewable Energy Procurement Process**

The REEEI holds the chair of the Project Management Unit of the Renewable Energy Procurement Process Project established by Ministry of Mines and Energy (MME). The PMU provides technical advice to the Project Steering Committee (PSC), which comprises of MME, Electricity Control Board (ECB), and NamPower. REEEI supported MME technically in the understanding and development of the Government Support Agreements (GSA), and attended a number of meetings with MME culminating in the draft of a technical report on the Implementation Agreement. REEEI assisted the ECB with the development of net-metering rules for rooftop based photovoltaic systems. The project is partially funded by the Renewable Energy and Energy Efficiency Partnership (REEEP) based in Austria through REEEI.

**Multidisciplinary Research**

**Solar Thermal Training and Demonstration Initiative (SOLTRAIN)**

In June 2013 REEEI received a solar thermal training and demonstration rig (a trailer equipped with different solar water and space heating applications) that was procured under the SOLTRAIN project. Proposals for partial funding of Solar Water Heaters to be installed at the Vocational Training Centres were submitted to the Environmental
Investment Fund of Namibia, and to the MME, and both were approved, as part of Soltrain project. This project funded by the Austrian Development Agency, and is coordinated by the Institute for Sustainable Energy Technologies AEE INTEC of Austria. Partner countries include Namibia, Zimbabwe, South Africa, Mozambique, and Lesotho.

- **Edulink Projects**
  REEEI is coordinating all the three Edulink II projects approved in October 2013, with support from the academic staff of the School of Engineering. The Southern African Sustainable Energy Initiative (SASEI), Programme on Energy Efficiency in Southern Africa (PEESA), and Participatory Integrated Assessment of Energy Systems to promote Energy Access and Efficiency (PARTICIPIA) projects have the overall objectives to foster capacity building and regional integration in the field of higher education through institutional networking, and to support the quality of higher education systems, to ensure efficiency and relevance to the needs of the labour market, consistent with ACP socio-economic development priorities. A total of 7 SADC Universities and nine EU Universities are participating in these EDULINK Projects. The Polytechnic of Namibia is the lead Applicant for the SASEI project.

**Highlights**

**REEEI Transformation to Namibia Energy Institute (NEI)**
After recognising the important role that the REEEI has played in Namibia’s energy sector, and after widespread consultations, and convinced of the need for and relevance of a national energy institute, the Cabinet of the Government of the Republic of Namibia approved the transformation of the REEEI to NEI (Cabinet approval, DECISION NO: 22nd/12.12.12/009) in December 2012. The NEI will encompass all energy sources, technologies and industries, and will have a new mandate that includes the establishment of four centres, viz.: the Centre for Renewable Energy and Energy Efficiency; the Centre for Oil and Gas; the Centre for Electricity Supply; and the Centre for Nuclear Sciences. It is expected that the services offered will be extended to the rest of the Southern African Development Community (SADC) region, thus increasing the institute’s relevance and role. Plans are at an advanced stage to launch the Namibia Energy Institute early 2014.
Projects

Investigating the effectiveness of introducing energy shops countrywide as a tool to improve access to sustainable energy technologies
contact: Helvi Ileka at hileka@polytechnic.edu.na

Low cost national wind resource assessment in Namibia
contact: Zivayi Chiguvare at zchiguvare@polytechnic.edu.na

Employment of the ZephIR LIDAR laser wind energy measurement equipment in validation of wind data measured on conventional telecommunications masts
contact: Zivayi Chiguvare at zchiguvare@polytechnic.edu.na

Full-feasibility study for the establishment of a pre-commercial concentrated 50 MW solar power plant in Namibia
contact: Zivayi Chiguvare at zchiguvar@polytechnic.edu.na

Improvement of regulations and building codes for energy saving in Namibian buildings
contact: Abraham Hangula at ahangula@polytechnic.edu.na

Provision of auditing and energy marketing services organisation as a catalyst for adoption of energy efficient technologies and practices in Namibia
contact: Abraham Hangula at ahangula@polytechnic.edu.na

Development of green rating tools for buildings in Namibia
contact: Abraham Hangula at ahangula@polytechnic.edu.na

Techno-socio-economic survey of energy efficiency in Namibia
contact: Abraham Hangula at ahangula@polytechnic.edu.na

Energy System Model for Namibia: Towards the development of a national energy policy
contact: Helvi Ileka at hileka@polytechnic.edu.na

Investigation of the regulatory framework for renewable energy procurement processes in Namibia
contact: Helvi Ileka at hileka@polytechnic.edu.na
Solar water heating as a tool for peak load reduction in Namibia
contact: Zivayi Chiguvare at zchiguvare@polytechnic.edu.na

Investigation of the load profile improvement mechanisms for the Tsumkwe hybrid PV diesel minigrid
contact: Abraham Hangula at ahangula@polytechnic.edu.na

Materials for Energy technologies and related manufacturing
contact: Zivayi Chiguvare at zchiguvare@polytechnic.edu.na
Finding reliable sources of funding has been a perennial problem for Namibian researchers. A long-term lack of interest in university research means that few countries have substantial national research grants open to scientists. The recent trend of African countries establishing national research funds could take the pressure off local scientists. But such funds will be successful only if they prove reliable and sustainable – something that active private sector involvement can help to ensure through university - industry linkages. Several African governments have announced plans to set up national research funds in the past couple of years, motivated by a desire to give their scientists the means to solve local problems, and to revitalise long-neglected universities.

Namibia is not excluded from this trend and embarked on this task in late 2013, after the formalisation of the National Commission on Research, Science and Technology (NCRST). The NCRST is in the process of finalising the research fund modalities and will start in early 2014 with national grant disbursement based on prioritised areas. The Project Services Centre (PSC) will play an active, facilitative role in this regard, to researchers who seek funding and have a focus on multi-disciplinarity.

Funding and Projects

In the absence of such grants, the majority of science in Namibia depends on international support from development agencies or international research funders. However in an attempt to bridge this gap a partnership of cooperation was signed between the South African National Research Foundation and the Ministry of Education in Namibia to facilitate scientific and technological cooperation through supporting researchers from traditional universities, universities of technology, science councils and public research institutes on an equally and mutually beneficial basis. In this regard, the Polytechnic responded to this bi-national call for research grants, with specific focus areas on:

- Bio-sciences (with focus on food, agriculture and health technologies)
- Indigenous Knowledge Systems (IKS)
- Information and Communications Technology (ICT)
• Environment (with focus on Climate Change)
• Space Science (with emphasis on astronomy and earth observation)
• Social Sciences (poverty alleviation, STI governance/policy, human environment)

A total of 15 proposals spanning across the focus areas except in the social sciences field, of which 7 grants were awarded to the tune of N$ 1,370,250 (for the Namibian part of the research for 2 years). These seven projects are spread across the various schools as indicated in Figure 1.

Figure 1: Namibia-South African collaboration grants awarded proportional to schools: School of Information Technology (SIT); School of Engineering (SOE); School of Natural Resources and Tourism (SNRT); and School of Health and Applied Sciences (SHAS)

In addition to the above mentioned projects, the PSC also facilitated writing of grant proposals under the ACP-EU Science and Technology Programme II which promotes innovation and the application of knowledge gained from science and technology (S & T) to ultimately develop appropriate technologies, which could be effectively deployed within the context of local needs and resources within the energy and agricultural sectors. In response to this call, 2 proposals were submitted and one was funded entitled “NEED: Network of Excellence in Renewable Energy Technologies for Development”. The partners include Ingolstadt University of Applied Sciences – Centre of Excellence for Renewable Energy research in Germany (main applicant); Botswana International University of Science and Technology; Gobabeb Research & Training Centre; Okavango Research Institute (ORI); University of Zambia. The total project value is EUR 995,435 (= N$ 14.6 Million), while Polytechnic will benefit EUR 180,500 (= N$ 2.6 Million) based on specific
roles and responsibilities. The School of Engineering and the Renewable Energy and Energy Efficiency Institute (REEEI) will implement this project over 3 years.

**Challenges and Opportunities**

In general Namibia faces a sharp reduction in external donor funding due to the country’s reclassification as an upper middle-income country. In particular, the sectors that are mostly affected by this include: Health (HIV/AIDS services) and environment. This decline prompted the Institution to seek alternative revenue streams to maintain research gains achieved over the past decade, and Namibia’s growing for-profit private sector is a potential source of such revenue. In this regard, it is becoming more evident that private sector donors are interested in research output commercialisation which leads to substantial investments in technical assistance, including the development of monitoring and evaluation systems that can accommodate both corporate and donor data needs and increased marketing capacity. Donors also frequently require co-funding or a sustainability strategy to be in place to ensure ownership and continuity beyond the donor funding.

The global changes that have occurred over the past ten years – particularly the financial crisis, but also the rising spectre of catastrophic climate change – have moved the goalposts for Africa, including Namibia. In this aspect, Namibia’s vulnerability to climate change makes this a new focus area for aid to flow into the country. S & T activities of the Polytechnic thus need to respond to these global undercurrents in order to stay relevant to development. Innovation ideas are now more sought after indicating the shift in donor thinking from funding “labs” (i.e. capital projects) to rewarding researchers to make the link between science and society by commercialising ideas and extending their reach to “real-time” challenges. In this instance the Polytechnic is strategically placed as the knowledge broker to address the capacity gap between academic community, policy makers and society.

While this report outlines market opportunities for Namibian donor-funded research, there are significant implications and change management processes needed in the institution to successfully operationalise these opportunities.

Special thanks to our funding parties and researchers for making these projects possible.
Focus on the Future

It is generally accepted that the three core functions of a university are teaching and learning, research, and community engagement, and that the varying emphasis on each of these strands will define the type of institution. The focus of the Polytechnic of Namibia has largely been on teaching and learning, but now, with the transformation to the Namibia University of Science and Technology (NUST), there is a shift in emphasis towards research and service. The production of an Annual Research Report is one of the many practises the institution has introduced in its updated Research Strategy to promote and build capacity for research within the institution.

The Annual Research Report provides us with an opportunity to take stock of what we have done during the year. In it, we reflect on what we have achieved and, most importantly, ask ourselves whether are we on the right path as we proceed to the future. The Research Strategy (2014 - 2018) stipulates a number of criteria for the type of research that researchers should pursue and these include that (i) the research should be applied; (ii) it is aligned to national development priorities; (iii) is unique in the context of Southern Africa; (iv) researchers collaborate with international partners; and they cooperate with local stakeholders. It would be useful to evaluate the individual research projects against these newly established criteria.

The second layer of parameters relates to building research capacity, as is indicated by the increase in the number of research projects emanating from the Schools and Centres, including the multi-disciplinary nature of the projects; the increase in the uptake of research by academic staff; the increase in the number of staff involved in upgrading of their qualifications; the increase in postgraduate students participating in research; and increased external funds in addition to the seed funding provided by the Institutional Research and Publication Committee (IPRC).
In a recent article, Philip Altbach\(^1\) addresses the question of how to measure research productivity, and he states that, “Publication in high status refereed journals has become a major criterion of academic success in the competitive global higher education.”

These are journals that are listed in global indices, such as the Science Citation Index (SCI), Web of Science, Scopus or other equivalents. As a result of publishing in highly rated journals, the national prestige of the institution is enhanced and it influences government allocation of the budget. Sourcing and attracting best students and professors is easier, but most importantly, it helps for placement in the global university rankings. These are all things the Polytechnic would like to achieve and more so, as it transforms into the NUST. Furthermore, the new funding framework rewards productivity in research, and so does the National Commission on Research, Science and Technology (NCRST), whose function is to promote and fund research activities in the country.

Philip Altbach\(^1\) further recognises that books still remain an important tool for knowledge and research dissemination. At the same time the Internet is increasingly becoming an important medium for publishing research. However, it is bedevilled by issues of quality and rigour in the reviewing process of the published papers.

With the above in mind, it is therefore important to examine the research output with respect to quantity and quality. While it is desirable that the Polytechnic increases its research outputs, particular attention and drive should progressively be towards research which is published in peer reviewed nationally and internationally accredited journals, books and book chapters, monographs and peer reviewed conference proceedings papers.

A comprehensive evaluation of the alignment of research with our Research Strategy, the progress in building research capacity, and the quality and quantity of the research outputs, needs to be carried out to determine whether we are moving in the right direction or whether we are making the desired progress. A quick analysis of the research outputs for the year under review, reveals that 49 peer reviewed journal articles, 5 books, 6 book chapters, 31 peer reviewed conference proceedings were published. As compared to 2012, this is not a significant improvement.

For an institution that aspires to achieve global rankings, it is important to build a solid foundation which makes it possible to achieve these goals. Hence the question we need to ask ourselves is, why is it problematic to jump-start research productivity?

Part of the answer lies in the observation that from 2012 to 2013 the staff with master’s and doctoral degrees increased only marginally from 150 to 160 and 56 to 63, respectively. In the same vein, student enrolments at Honours and Master’s levels remained rather low at 270 and 251, respectively, and the average throughput rate for both programmes remained at a low 23 % level. This suggests that recruitment of highly qualified academic staff, an aggressive staff development programme, and increasing enrolment and throughput of students in the Honours and Master’s programmes are but some of the issues that require urgent attention as we go into the future.

Finally, it is interesting that although the institutional Research Strategy has focused on building research culture within the Polytechnic, it did not consider the required strong connection between research and innovation. However, it is encouraging that the Polytechnic’s fourth Strategic Plan, PSP-4 (2014 - 2018), which will be implemented the following year, adds this missing link to the research objectives, which are to:

- Consolidate world-class research strength through our selected niche areas as set out in PSP-4;
- Demonstrate research of international standing in all our discipline areas as recognised by the NCRST and other international ranking metrics;
- Maintain a culture of research quality and performance that is well supported by infrastructure (physical and electronic) and resources (financial and human); and
- Maintain our core commitment as a university to innovation, bringing disciplines together, and undertaking socially relevant research, which provides demonstrable community benefit.

There is no doubt that the Polytechnic has developed a sound agenda for research, but enormous efforts will be required to meet the research objectives, as outlined in the institutional Strategic Plan PSP-4.
Conclusion

As is evident from reading this report, the Office of the Vice Rector Academic Affairs and Research is responsible for a number of PoN activities and functions, designed to support institutional research and scholarship. I would like to convey to the PoN community that it is a privilege to serve the schools, students, and staff. Our commitment is to always act in good faith and with good intent, in the service of the institution and the community at large.

We appreciate the progress made in the few years regarding research activities. However, there is a need to further increase high quality research outputs. For 2013 the School of Natural Resources and Tourism was entrusted to spearhead the overall organisation of research activities, assisting the Office of the Vice Rector Academic Affairs and Research. In 2014 the School of Humanities will play that role.

Finally, it was noted, with considerable concern, that funding for research has always been an issue, and more so in recent years. Researchers are to be especially commended for fulfilling the research goals of the institution, and managing to do so despite the small sum of research funding the Institutional Research and Publication Committee was able to allocate.
Addendum

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