



NIHERST ADMINISTRATIVE REPORT FY 2019



NIHERST ADMINISTRATIVE REPORT

2018/2019

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LIST OF ACRONYMS

COSTAATT	College of Science, Technology and Applied Arts of Trinidad and Tobago
NASA	National Aeronautics and Space Administration
NASA I ²	NASA International Internship Programme
NIHERST	National Institute of Higher Education (Research, Science and Technology)
NSC	National Science Centre
RICYT	The Network for Science and Technology Indicators – Ibero-American and Inter-American
STEM	Science, Technology, Engineering and Mathematics
STI	Science, Technology and Innovation
UNESCO	United Nations Educational, Scientific and Cultural Organisation

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1 INTRODUCTION

During the 2018/2019 fiscal year, the National Institute of Higher Education (Research, Science and Technology) [NIHERST] remained steadfast and focused on its mission to build Trinidad and Tobago's capacity in Science, Technology and Innovation (STI) and embarked on several new initiatives; key among which was the completion of its new Strategic Plan 2020-2022.

Under the direction of its Board of Governors, NIHERST channelled a significant part of its efforts towards completing the required groundwork through an organisation-wide strategic planning exercise to develop the Institute's new Strategic Plan for the period 2020-2022. This included assessing the Institute's current offerings and market position, analysing changing external environments and developing the Institute's overall strategy and new strategic initiatives in relation to national priorities, increased competition for limited government funds, global economic downturn and changing global scientific and technological trends. New avenues and mechanisms for expanding the Science, Technology, Engineering, and Mathematics (STEM) workforce and applying STI research, creativity and innovation to the country's product, service and process development continue to be critical to Trinidad and Tobago's economic growth, diversification efforts and improved global competitiveness.

Simultaneously, the current work programme under the Institute's existing Strategic Plan 2011-2015 continued with many of its signature programmes and projects being offered under three strategic initiatives namely Popularisation of Science, Technology and Innovation; Research and Intelligence Gathering; and Building Strategic Alliances. These initiatives were in keeping with the Institute's mandate to provide and promote STI services and to promote and develop indigenous capability in science and technology.

In addition, substantial work was undertaken to re-engineer the Institute's brand and strengthen and expand stakeholder engagement, participation, financial and non-financial contributions and support for existing, enhanced and future initiatives of the Institute.

2 VISION, MISSION AND STRATEGIC OBJECTIVES

2.1 Vision

The Institute aspires to:

- be a focal point for research and information dissemination on science and technology and higher education;
- provide advice to government on policy and planning in science and technology and higher education;
- consolidate and expand its science popularisation activities through the establishment of a National Science Centre (NSC) of Trinidad and Tobago; and
- be an active member of regional and international networks in relevant fields of endeavour in science and technology and higher education.

2.2 Mission

NIHERST's mission is: To provide intellectual leadership and to promote research, development and quality service in the areas of science, technology and higher education.

2.3 Philosophy

NIHERST was established to provide and promote science, technology and higher education, and to develop innovative, creative and entrepreneurial capabilities in science and technology, relevant to the development needs of the general population. Through its pioneering work, the Institute has developed core competencies in disseminating and imparting STEM education in a practical and interactive way, collecting data on STI indicators, conducting applied research to inform STI policies and promoting STI to contribute to the growth of an innovative knowledge-driven society.

2.4 Strategic Objectives

The work of NIHERST placed emphasis on three strategic objectives as follows:

- Fostering a culture of science, innovation and creativity:
 - To engage all citizens in the experiential learning of science; and
 - To provide hands-on experience for developing capabilities in technological innovation and entrepreneurship;
- Research and intelligence gathering in support of economic diversification:
 - To provide policy support and advocacy in developing a national STI policy; and
 - To undertake STI policy studies in support of economic diversification;
- Building collaborative global relationships:
 - To build international relationships with world-class STI institutions; and
 - To establish and maintain linkages with specialised regional and international research, science and technology institutions, and initiate and implement joint STI projects of relevance to the rapid creation of a sustainable knowledge-based economy.

3 ORGANISATIONAL STRUCTURE

3.1 Corporate Structure

3.1.1 Board of Governors

NIHERST is governed by a Board of Governors appointed by the President of the Republic of Trinidad and Tobago for a period of three years as mandated by NIHERST Act 20 of 1984 (now Chapter 39:58 of the Laws of Trinidad and Tobago).

During the reporting period, the Board, which was installed on July 27, 2017, comprised of members as follows:

- Prof. Emeritus Winston Mellowes - Chairman
- Mrs. Angela Hordatt - Member
- Mr. Barry Parasram - Member
- Mrs. Cavelle Joseph-St Omer - Member
- Mrs. Diane Jebodhsingh - Member
- Dr. Fasil Muddeen - Member
- Mr. Garvin Warwick - Member
- Ms. Gillian Pollidore - Member
- Mr. Kyle Jackman - Member
- Mr. Kurleigh Prescod - Member
- Dr. Rhonda Jaipaul-O'Garro - Member
- Dr. Ruel Ellis - Member
- Mr. Shakka Subero - Member
- Mrs. Marleen Lord-Lewis – Member (*ex-officio*) appointed President July 23, 2019
- Ms. Sylvia Lalla – Member (*ex-officio*) (Ag. President until July 22, 2019)

The Board of Governors established six committees to consider matters and make recommendations in the following areas:

- Audit;
- Communications;
- Finance and Investments;
- Human Resources;
- Operations; and
- Procurement.

3.1.2 The Management Team

The management team comprised Heads of Departments who managed and led departments in executing plans in fulfilling the Institute's mandate. The executive leadership and management team was comprised of staff members as detailed in **Table 1**.

Table 1: Composition of NIHERST's executive leadership and management team during the 2018/2019 Fiscal Year

Position	Name	Remarks
President	Mrs. Marleen Lord-Lewis	Effective July 23, 2019 and assumed duty on August 12, 2019.
Vice President, Science & Technology	Mr. Roopchand Raghunanan	Assumed duty on June 03, 2019.
Registrar	Ms. Julia Charles-Joseph	Performed as Secretary to the Board of Governors and Secretary to the Institute.
Senior Accountant	Ms. Sylvia Lalla	Ag President up to August 11, 2019, and Senior Accountant up to resignation on September 15, 2019.
Marketing and Communications Manager	Ms. Stacy-Ann Lowe	Assumed duty on October 15, 2018 and functioned as Head of Marketing and Communications.
Internal Auditor	Mr. Pedro Pierre	Assumed duty on March 19, 2018.
Senior Human Resource Officer	Mrs. Giselle Dinzey	Functioned as Head of Human Resources.
Senior Research Officer	Mrs. Nandi Ogiste	Functioned as lead of Monitoring and Evaluation.
Senior Project Officer	Ms. Lovaan Superville	Functioned as Head of International Projects and Innovation.
Senior Economist	Ms. Sharon Parmanan,	Assumed acting duty on May 01, 2016 and functioned as Head of Science and Technology Statistics.
Systems Analyst II	Mrs. Kathy-Ann Joseph-Creese	Functioned as Head of Information and Communication Technology.
Interim Science Education Coordinator	Ms. Adafih Thomas	Functioned as lead of Science Education.
Health and Safety Officer	Ms. Cindy Poonwassie	Effective April 09, 2018 and functioned as Head of Health, Safety and Environment.
Records Manager	Dr. Lillibeth Ackbarali	Functioned as Head of Records Management.
Senior Librarian	Ms. Karen Ross	Functioned as Head of Documentation Centre.

3.2 Organisational Structure

The following departments are responsible for implementing the core STI programmes, projects and initiatives of the Institute:

- **Policy, Research and Intelligence department** - undertakes international benchmarking and comparative analytical studies on STI and provides policy support to inform national STI policy formulation.

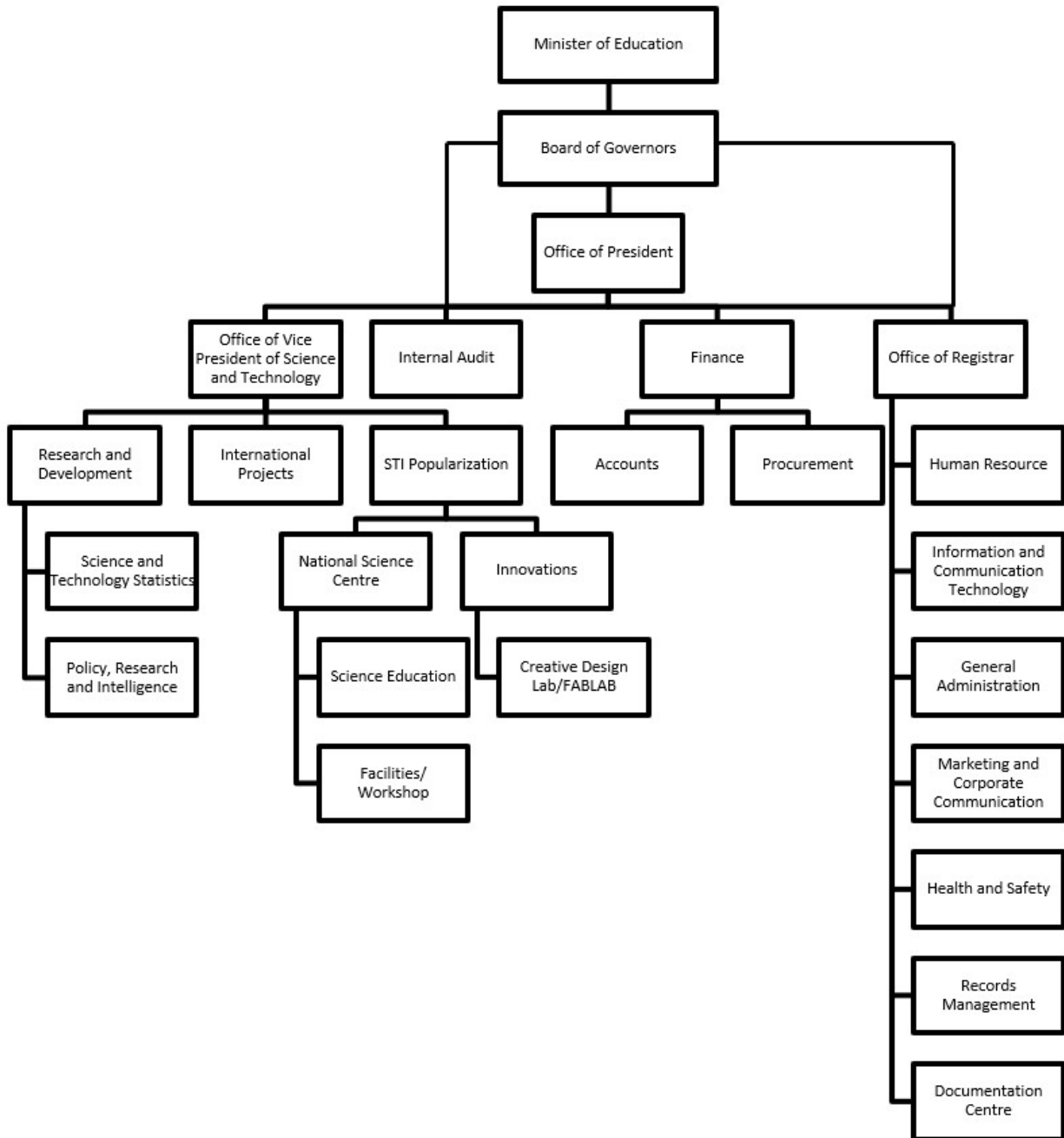
- **Science and Technology Statistics department** - conducts surveys on STI and analyses the collated data to inform science and technology policy formulation, planning and improvement.
- **Science Education department** - plans and executes programmes in support of formal and informal science education to improve citizens' understanding of and engagement in STI.
- **Innovation department** - plans and conducts initiatives to develop the creative, inventive and entrepreneurial abilities of students, teachers and existing and potential entrepreneurs.
- **International Projects department** - promotes and develops partnerships and working alliances with regional and international agencies, centres of excellence in STI in foreign countries, and national agencies.

The following departments provide specialised, financial and administrative services that support the core work of the Institute:

- **Human Resources** - manages the selection, recruitment and development of the Institute's human capital.
- **Accounts** - oversees and coordinates financial operations of the Institute.
- **Information and Communication Technology** - provides technical and network support services at the Institute.
- **General Administration** - provides operational support for internal programmes and outreach projects.
- **Documentation Centre** - provides access to information resources on STI and other relevant subject areas.
- **Records Management** - develops information governance policies, systems and practices to facilitate an effective records management programme.
- **Procurement** - acquires goods and services according to Institute's procurement procedures and guided by the Public Procurement and Disposal of Public Property Act, 2016 (Amended).
- **Health, Safety and the Environment** - identifies and evaluates potential risks, advises, recommends and implements strategies and policies for the creation and maintenance of safe working conditions and practices.
- **Internal Audit** - provides assurance to the Board and Management of the existence of sound governance processes and internal controls to mitigate risks.
- **Marketing and Corporate Communications** - develops and maintains corporate image and brand identity, reputation and communications management, business and sponsorship development, and stakeholder engagement.

The organisational structure of NIHERST during the 2018/2019 fiscal year is presented in **Figure 1**.

Figure 1: NIHERST Organisational Structure (2018/2019)



3.3 Business Locations

During the reporting period, NIHERST continued its operations from its Head Office (located at Level 13, Education Tower A, Ministry of Education, No. 5 St. Vincent Street, Port of Spain) and from the NSC (located at the corner of Old Piarco Road and Churchill Roosevelt Highway, D'Abadie).

3.4 Services/Products

The services and products provided to the national community by NIHERST during the 2018/2019 fiscal year are detailed in **Tables 2, 3 and 4**.

3.4.1 STI Popularisation

Table 2 shows the services and products provided by NIHERST in the area of STI Popularisation during the fiscal year.

Table 2: Services and Products Provided by NIHERST in the Area of STI Popularisation

Services/ Products	Description	Target Group
NSC Visitor Programme	Hands-on exhibits, workshops and activities, Astronomy Night, Planetarium Features and Night of Science events.	Schools, individuals, families, community and special groups, the public
Science Weeks	Thematic and/or community-based events showcasing STI.	Schools, individuals, families, community and special groups, the public
Fab Lab	Workshops and access to equipment for 3D design and 3D printing.	Students, teachers, designers, engineers, inventors, artisans, hobbyists, entrepreneurs and makers
Outreach Workshops for Secondary Students	Electricity and Electronics workshops provides hands-on experience in difficult areas of the physics Caribbean Secondary Education Certificate syllabus. Robotics workshops assist with the aspects of the Information Technology syllabus that focus on programming.	Secondary school students
Vacation Camps	A variety of STI themed camps ranging from one to three weeks held at various venues in Trinidad and Tobago.	Children – 5-12 years Teenagers – 13 – 16 years
Clubs	Science Club (NSC), Robotics Club (NSC) - Term-long learning sessions to teach science concepts.	Children – 7 – 12 years Teenagers – 13 – 16 years
Outreach workshops	Hands-on sessions to support specific and challenging syllabus areas in science.	Secondary school students
Outreach through events staged by external public and private agencies	NSC and the Innovations Department by invitation exhibit at events hosted by government agencies, Non-Governmental Organisations, schools and private bodies on	The public

Services/ Products	Description	Target Group
	specific STI themes relevant to those bodies, for celebrations, and the needs of society.	

3.4.2 Research and Intelligence Gathering

Table 3 shows the services and products provided by NIHERST in the area of Research and Intelligence Gathering during the fiscal year.

Table 3: Services and Products Provided by NIHERST in the Area of Research and Intelligence Gathering

Services/ Products	Description	Target Group
STI Statistical Surveys and Publications	Surveys on science, technology and innovation including indicators and analyses to inform policy formulation and planning.	Policy makers, the Network for Science and Technology Indicators – Ibero-American and Inter-American (RICYT), United Nations Educational, Scientific and Cultural Organisation (UNESCO) Institute for Statistics, stakeholders, researchers, education specialists, students
STI Research Studies	The Sectoral Innovation Mapping studies are micro-level studies targeting priority sectors in Trinidad and Tobago. Sectoral Innovation Mapping studies map the innovation system of the targeted sector – identifying internal and external actors of the sector, the linkages that exist among actors and the factors and gaps/challenges that drive and impede innovation. The studies also analyse and make recommendations to improve innovative capacity and enhance performance of targeted economic strategic sectors.	Government, industry, academia
Policy support and advice.	Provides comments, contributions, guidance and advice on policy-related documents or relevant policy documents focussed on improving the impact of STI on economic transformation.	Ministry of Education and other government Ministries, STI agencies, international organisations

3.4.3 Special Projects and Collaborative Relationships

Table 4 shows the services and products provided by NIHERST in the area of Special Projects and Collaborative Relationships during the fiscal year.

Table 4: Services and Products Provided by NIHERST in the Area of Special Projects and Collaborative Relationships

Special Project	Collaborating Agency	Strategic Intent/ Objective
National Aeronautics and Space Administration (NASA) International Internship (NASA I ²) Program tenable at NASA Ames Research Center, California, USA	NASA	To promote interaction and collaboration among United States of America and international students, with the view to enhancing students' knowledge of STEM, developing skills in novel areas of research, developing leadership abilities, fostering cross-cultural understanding, and enabling future multinational missions and collaborations in science. NASA I ² is open to tertiary students pursuing STEM in such areas as space exploration, scientific discovery and aeronautics research.
Seismology in Schools programme hands-on seismological activities	University of Leicester, Durham University, Imperial College London, the British Geological Survey, the Ministry of Education and the University of the West Indies Seismic Research Centre.	To foster a deeper understanding among secondary school students and inspire careers in the field of Geosciences by introducing practical seismology activities that demonstrate the application of theories and principles taught in physics, mathematics and geography.
National Youth Science Camp, West Virginia, United States of America	United States Embassy, Port of Spain	To inspire lifelong engagement and ethical leadership in careers in STEM and related professions through its proven educational model for mentoring, challenging and motivating Sixth Form students.
E-Scientia Exhibit	Institute of Electrical and Electronics Engineers	To enable pre-university students, teachers and the public to learn and/or improve their understanding of key principles of science and engineering and their applications.
FIRST® LEGO® League Animal Allied Competition – Robotic missions and student research project on human/animal interactions	FIRST® LEGO® League	To engage children 9 to 16 years (ages vary by country of participation) in research, problem solving, and engineering by utilising theme-based challenges.
Teach ME	Ministry of Education, Curriculum Planning	To increase the confidence and competence of teachers in the transfer of knowledge and technical skills of STEM subjects to students at

Special Project	Collaborating Agency	Strategic Intent/ Objective
	and Development Division.	the primary and secondary levels by providing needed in-service teacher training; To improve students' capacity to think critically, problem solve and deepen understanding of STEM concepts and their applications in the real world; and To promote STEM and its careers to youth.
Resilient TnT — Rainwater Harvesting Systems	ALIARSE Foundation, Costa Rica	To increase public education and awareness of the use of rainwater harvesting systems in water-scarce rural communities.
Microscience TT	UNESCO	To improve the delivery of science education to primary school and secondary school students through the use of microscience and making opportunities for practical experimentation more accessible to students and teachers.
Deep Sea Wonders of the Caribbean	The University of the West Indies, German Embassy, Shell Trinidad and Tobago, Atlantic LNG, Sagikor	To foster a deeper understanding and appreciation of the deep sea environment in the region, through the introduction and distribution of an educational video series and photo book detailing this previously unexplored natural feature.

3.5 Delegated Levels of Authority

The NIHERST Signing Authority Policy, approved in 2017, treats with delegation levels of authority. An excerpt of Section 8 of the policy is as follows:

“Signatory Authority Policy Summary

- i. Any signatory in a higher category can replace one in a lower category
- ii. Any person acting in a position may – with the approval of the Board of Governors – be granted signing authority as the substantive holder of the position
- iii. Members of the Board of Governors who are approved to sign are limited to the following:
 - The Chairman;
 - The Deputy Chairman
 - The Chairman of the Finance and Investments Committee”

Tables 5 and 6, respectively, show the Delegation Levels for Cheques and Contracts under Section 8 of the policy.

Table 5: Delegation Levels for Cheques

CATEGORY	APPROVAL AMOUNT	AUTHORISED SIGNATORY
A	Over TT\$100,000	Approved member of the Board of Governors and any one of the following: <ul style="list-style-type: none"> • President; • Vice President, Science & Technology; or • Registrar.
B	Over TT\$50,000 - TT\$100,000	Any two of the following: <ul style="list-style-type: none"> • President; • Vice President, Science & Technology; • Registrar; and/or • Senior Accountant.
C	TT\$10,000 - TT\$50,000	Any two of the following: <ul style="list-style-type: none"> • President; • Vice President, Science & Technology; • Registrar; • Senior Accountant; and/or • Information Analyst.
D	Up to TT\$10,000	Any two of the following: <ul style="list-style-type: none"> • President; • Vice President, Science & Technology; • Registrar; • Senior Accountant; • Information Analyst; and/or • Accountant.

Table 6: Delegation Levels for Contracts

CATEGORY	APPROVAL AMOUNT	AUTHORISED SIGNATORY
A	Over TT\$450,000	Any of the three approved members of the Board of Governors.
B	Over TT\$10,000 to under TT\$450,000	Any one of the following: <ul style="list-style-type: none"> • President; • Vice President, Science & Technology; or • Registrar.
C	TT\$10,000 and under	Head of Department for respective expenditure: <ul style="list-style-type: none"> • Senior Accountant – Head of Accounts; • Senior Policy Analyst – Head of Policy, Research and Intelligence; • Senior Economist – Head of Science and Technology Statistics; • Senior Project Officer – Head of International Projects;

CATEGORY	APPROVAL AMOUNT	AUTHORISED SIGNATORY
		<ul style="list-style-type: none"> • Senior Science Educator – Head of Science Education; • Systems Analyst II – Head of Information and Communication Technology; • Senior Human Resource Officer – Head of Human Resources; • Marketing and Communications Manager – Head of Marketing and Communications; • Senior Procurement Officer – Head of Procurement; • Records Manager – Head of Records Management; • Administrative Officer IV – Head of General Administration; or • Senior Librarian – Head of Documentation Centre.

Section 5 of the NIHERST Signing Authority policy addresses transactions requiring Board approval and states as follows:

“Notwithstanding any authorisations provided in this policy, only the Board of Governors (acting with the approval of the Minister) may authorise and approve the following:

- a commitment wherein the liability or expenditure in aggregate, is in excess of \$1,000,000 or the revenue is in excess of \$1,000,000;
- a commitment which exposes NIHERST to an uncertain and potentially significant liability;
- the sale, purchase, acquisition or disposal of assets;
- an agreement to lease land or buildings.”

3.6 Legislative and Regulatory Framework

NIHERST was established by Act of Parliament No. 20 of 1984 (Chapter 39:58 of the Laws of Trinidad and Tobago). The Act places the Institute under a Ministerial portfolio for policy direction, finances and the appointment of the President of the Institute *inter alia*.

The Act can be accessed at: [http://rgd.legalaffairs.gov.tt/law2/alphabetical list/lawspdfs/39.58.pdf](http://rgd.legalaffairs.gov.tt/law2/alphabetical%20list/lawspdfs/39.58.pdf) or www.niherst.gov.tt.

3.6.1 Finances

With respect to finances, NIHERST is governed by Sections 19 and 20 of the NIHERST Act. Other governing regulations include *The Financial Regulations of Trinidad and Tobago 1965*; *The Financial Instructions 1965*; *Exchequer and Audit Ordinance Act No 20 of 1959* (and Amendments); and Call Circular issued by the Ministry of Finance for the relevant year in which the Budget is due.

3.6.2 Human Resource Management

With respect to human resource management, NIHERST is governed by all relevant legislation of the Government of the Republic of Trinidad and Tobago and NIHERST related documents such as the NIHERST – Public Services Association of Trinidad and Tobago Collective Agreement (January 01, 2008, to December 31, 2010); the NIHERST – Public Services Association of Trinidad and Tobago Memorandum of Agreement (dated September 18, 2015) for cost items for the period January 01, 2011 to December 31, 2013; and the NIHERST Pension Fund Plan Trust Deed and Rules.

3.7 Reporting Functions

3.7.1 Internal Reporting

The President of the Institute reports to the Board of Governors on the matters of the Institute. **Table 7** shows the internal reports prepared and submitted by Management over the 2018/2019 fiscal year.

Table 7: NIHERST Internal Reports during the 2018/2019 Fiscal Year

Report	Frequency	Recipient(s)
President's Report	At each ordinary Board meeting	NIHERST Board of Governors
Financial Reports	Monthly	President/Finance and Investments Committee/ NIHERST Board of Governors
Status Report on Projects and Programmes	Monthly	Operations Committee of NIHERST Board of Governors
Departmental Reports	Monthly	President
Quarterly reports of Internal Audit	Quarterly	Audit Committee of NIHERST Board of Governors

3.7.2 External Reporting

During the 2018/2019 fiscal year, NIHERST reported on its finances and budget, both annually and monthly to the Ministries of Education and Finance, and quarterly to the Ministry of Planning and Development for funds under the Public Sector Investment Programme. Special reports were also submitted on request including the draft Strategic Plan 2020-2022.

Table 8 shows the external reports which were prepared and submitted by NIHERST during the 2018/2019 fiscal year.

Table 8: External Reports Submitted by NIHERST during the 2018/2019 Fiscal Year

Report	Frequency	Receiving Agency
Annual Budget	Annually	Ministry of Finance and Ministry of Education
Annual Business Plan	Annually	Ministry of Education
Annual Business Plan - Quarterly Reports	Quarterly	Ministry of Education
Annual Financial Statements/Annual Report	Annually	Ministry of Finance and Ministry of Education
Annual Performance Appraisal Report	Annually	Ministry of Education
Administrative Report	Annually	Ministry of Education
Board Minutes	One week following confirmation	Ministry of Education
Monthly Cash Statement of Operations	Monthly	Ministry of Finance and Ministry of Education
Quarterly Returns Report	Quarterly	Ministry of Finance
Quarterly Status of Loan/Overdraft/Investments in Securities Portfolios and Litigation Proceedings	Quarterly	Ministry of Finance
Return of Award of Contracts	Monthly	Ministry of Finance
Internal Audit Reports	Quarterly	Ministry of Finance

4 DEVELOPMENT INITIATIVES

4.1 Overview of Development Initiatives

Initiated in July 2018, NIHERST sought to chart a new way forward with the development of a new strategic plan, which was facilitated by VSL Consultants Limited. During the period July 2018 to March 2019 the Institute embarked upon a strategic planning exercise which involved re-examining its current position, assessing its development initiatives and establishing new initiatives in alignment with the government's national development strategy and within the context of changing external environments.

A collaborative process was utilised involving the Board of Governors, the executive leadership and management team and staff of the Institute and consisted of a series of workshops, surveys and research.

This provided the contextual groundwork needed to develop the Institute's new Strategic Plan 2020-2022, which included the development of new strategic initiatives, strategic action plans and implementation strategies, a draft organisational structure and an accompanying budget for the 2020-2022 period. The new strategic plan for the period 2020-2022 was subsequently approved by the NIHERST Board on February 27, 2019. The Strategic Plan 2020-2022 was submitted to the Ministry of Education at the end of the fiscal year in 2019.

With the global economic downturn and increased competition for government funds, NIHERST's fee structures for programmes/services offered were also reviewed and upgraded with a view towards sustainability and revenue generation. The Institute commenced development of a Memorandum of Understanding with the University of Trinidad and Tobago and the Intellectual Property Office to secure partnerships. In addition, NIHERST continued its leadership role in national STI development in accordance with its mandate, and in support of the advancement of the mission and goals of the Ministry of Education.

4.2 Strategic Initiatives Continued Under the 2011-2015 Strategic Plan

NIHERST's last approved strategic plan spanned the period 2011-2015. During the reporting period, the work undertaken by NIHERST was aligned with the 2011-2015 Strategic Plan, focusing on the following three strategic focal areas:

- fostering a national culture of science, technology, innovation and entrepreneurship, including an extensive science popularisation programme and national awards schemes;
- undertaking strategic research and intelligence gathering in science, technology and innovation to inform policy development and guide public and private sector investment, towards greater economic diversification; and
- promoting national advancement in STI through establishing and strengthening collaborative relationships with institutions of excellence worldwide.

Aligned with the strategic focal areas, the three strategic initiatives were undertaken during the 2018/2019 period. Key details are presented hereunder.

4.2.1 Strategic Initiative 1: Popularisation of Science, Technology and Innovation

4.2.1.1 Close-Off of the Science City Project

In October 2018, the decision was taken by the Board of Governors to approve the recruitment of an external firm to assist in the closing of the Science City project. Through a tender issued for the “*Provision of Consultancy Services required to assist NIHERST in closing off the Science City Project*”, an international firm was identified and the recommendation for the award of contract was subsequently approved by the Board of Governors in March 2019, with negotiation of the stated price to be pursued. At the end of the reporting period, discussions were ongoing to finalise the contract agreement between NIHERST and the international firm.

4.2.1.2 Science Popularisation Programme

Science popularisation initiatives continued in NIHERST’s ongoing efforts to foster a culture of science, technology and innovation in both the national population and that of the wider Caribbean region. Science education programmes were tailored to both nurture and develop capacity in science among diverse age groups. Through the NSC, informal, curriculum-based learning opportunities were designed to reinforce and enhance knowledge, skills and attitude towards STEM. The programme comprised activities as detailed hereunder.

A. Activity 1: NSC Visitor Programme

i. NSC Tours, Student Activities and Workshops

The NSC Visitor Programme, NIHERST’s major science popularisation initiative, continued to provide hands-on and innovative STEM experiences to increase science literacy among youth and the general population. Learning opportunities were planned, executed and delivered with specific intent to present “real world” application of science concepts through hands-on and interactive exhibits and activities. Programmes also complemented the formal education system and enriched student learning outside of the traditional classroom setting.

During the period under review, twenty thousand, four hundred and thirty-four (20,434) visitors participated in the NSC standard tours and special events, such as, thematic Science Weeks and Astronomy Night. This represented a 25.7% increase in visitorship compared to the previous fiscal year. Five hundred and twenty-seven (527) standard tours attracted a total of fourteen thousand, eight hundred and ten (14,810) visitors, including one hundred and eighty-one (181) families, seventy-two preschools, one hundred and thirty-six (136) primary schools and twenty-nine secondary schools. The tours included science shows, live demonstrations, immersive storytelling, and thematic and lab activities. In addition, a total of five thousand, six hundred and twenty-four (5,624) visitors participated in the Institute’s special events, detailed further in this report.

Of the adult visitors sampled, which comprised of teachers and supervisors accompanying children and heads of families, 90.8% indicated satisfaction with the visit and the offerings of NSC and 93.1% indicated that they would recommend the tour to others. A further 86.1% either agreed or strongly agreed that the tour increased their awareness of the relevance of science to everyday life, and 76.9% indicated an increased confidence in understanding science.

Picture 1: STEM-O-WEEN participants at the National Science Centre, November 02, 2018



Picture 2: STEM-O-WEEN experiments at the National Science Centre, November 02, 2018



Picture 3: Students of the Pranava Educational Institute visit the National Science Centre, November 16, 2018



ii. Astronomy Night

Astronomy Night events, popular with families and night sky enthusiasts, were held during the period January to June 2019, and included planetarium shows, telescope viewings along with activities and demonstrations combining innovation and STEM. Increased awareness in astronomy and the physical universe and related fields along with the centre's regular exhibits were available for exploring and interaction. For the period under review four sessions were held attracting two thousand and seventy-three (2,073) visitors.

Visitors' feedback from both children and adults, was as follows:

- 76.1% of children surveyed indicated that they were more interested in science;
- 94.5% of adults were satisfied with their tours, with 89.0% indicating increased interest in science, and 90.4% desiring to learn more;
- 84.0% of visitors (both children and adults) agreed that the tour brought to their attention the relevance of science in everyday life, with 91.6% indicating they learned something new; and
- 99.2% indicated their desire to visit the NSC in the future.

Picture 4: Astronomy Night telescope viewing at the EV3ning Under the Stars, February 01, 2019



Picture 5: Astronomy Night, Demonstrators explain the science to guests, March 15, 2019



Picture 6: Astronomy Night- A young star-gazer views the celestial wonders, March 15, 2019



B. Activity 2: Science Weeks

In-house science weeks, similar to Community Science weeks, aimed to present informal science education and provided visitors with a better grasp of science concepts, processes and issues through simulation, experimentation, demonstrations, workshops and exhibits. Themed displays and age-appropriate activities were developed to highlight and celebrate the universality of science.

Carnival Science Week was held from February 18 - 23, 2019 and highlighted the impact of STI on Trinidad and Tobago's Carnival industry. This event featured themed displays and attracted one thousand, eight hundred and thirty-six (1,836) visitors including seventy-eight families, ten preschools, twelve primary schools and twenty-nine secondary schools. One hundred and six (106) tours were conducted.

United Nations World Environment Day and United Nations World Oceans Day were observed between June 03 - 08, 2019, which highlighted the importance of protecting the environment and preserving oceanic ecosystems, respectively. The event attracted a total of one thousand, seven hundred and fifteen (1,715) visitors including one hundred and seventeen (117) families, seven preschools, seventeen primary schools, eight secondary schools. A total of one hundred and forty-nine (149) tours were conducted.

Public and private sector stakeholders both supported and participated in NIHERST's STEM education and STI popularisation programmes.

Featured participants included the following entities:

- Carbon-Zero Initiative of Trinidad and Tobago;
- Caribbean Industrial Research Institute;
- Environmental Management Authority;
- Intellectual Property Office;
- Ministry of Energy and Energy Industries;
- Ministry of Health via the Eastern Regional Health Authority;
- Ministry of Labour and Small Enterprise Development;

- National Energy Skills Centre;
- National Training Agency;
- School of Business and Computing Studies;
- The Telecommunications Authority of Trinidad and Tobago;
- The University of the West Indies;
- The University of Trinidad and Tobago;
- United Nations Food and Agriculture Organisation; and
- Water and Sewerage Authority of Trinidad and Tobago.

Picture 7: A Science Showman entertains students with his Science performance on the first day of the Carnival Science Week, February 18, 2019



Picture 8: A Science Demonstrator explains scientific principles to students at the Carnival Science Week, February 19, 2019



Picture 9: Children enjoy Science activities at the Carnival Science Week, February 20, 2019



Picture 10: Students express the joy of discovery and learning about Science at the Carnival Science Week, February 21, 2019



Picture 11: Students learn about marine species at the Oceanic and Environmental Science Week at the NSC, June 03 – 08, 2019



C. Activity 3: Fab Lab

The Institute’s Fab Lab modelled after the Massachusetts Institute of Technology Center for Bits and Atoms Fab Lab programme, provided its user community with affordable access to digital fabrication equipment and resources for education, creativity, innovation, and professional development and stimuli for local entrepreneurship. Originally designed for communities as prototyping platforms for local entrepreneurship, Fab Labs are also being utilised by schools as platforms for project-based, hands-on STEM education. The Fab Lab, located at the NSC, offered in-house workshops to schools, families and the public as well as access to its prototyping equipment (3D printers, laser and vinyl cutters) to entrepreneurs, secondary and tertiary students and hobbyists. Camps, external workshops, roadshows, outreach and themed visitor rotations were delivered to promote and develop creative and innovative mind-sets among nationals.

During the 2018/2019 fiscal year, the Fab Lab attracted seven thousand, one hundred and sixty-four (7,164) visitors through a variety of workshops, clubs, camps, networking events and other outreach activities for various age groups. The labs trained persons in the use of prototyping and robotics technologies, design and hands-on projects using Computer-Aided Design, Computer-Aided Manufacturing, Electronics and Robotics to develop practical skills in these technologies. Fab Lab equipment including, the Epilog Fusion Laser Cutter, Makerbot 3D printer, robotics kits and 3D pens were used to generate thirty-one paying jobs by both businesses and individuals.

In 2019, the Fab Lab introduced “Meet the Entrepreneur Series,” a series of workshops hosted by entrepreneurs who utilised the facilities for their businesses. Three workshops were hosted by a business owner and two workshops were held by the Trinidad and Tobago Bridge Initiative. A total of sixteen participants attended. The views of participants who attended the NIHERST’s “Meet the Entrepreneur Series” 2019 workshops were as follows:

- 100% of the participants either agreed or strongly agreed that the sessions encouraged them to pursue the commercialisation of their creations or prototypes and that they would continue to use the Fab Lab’s facilities; and

- 86% of participants indicated that the sessions showed them different ways of creating revenue from their creations or prototypes and that they would now begin to create products for commercialisation.

The Fab Lab also piloted the NIHERST Intellectual Property Clinics, in collaboration with the Intellectual Property Office, to provide persons with information on securing intellectual property rights in relation to their ideas, products and innovations. The sessions sought to bridge the gaps in knowledge through presentations, question and answer sessions, and private consultations. Some of the issues discussed were patents, utility models, trademarks, industrial designs, integrated circuits, trade secrets; education, information and training in intellectual property; assistance in the commercialisation of intellectual property; and support with intellectual property issues in the business plan, among others.

Two Intellectual Property Clinics were held in May and September 2019 in which a total of thirty-one attendees participated. The views of the attendees were as follows:

- 100% of the participants either agreed or strongly agreed that the sessions encouraged them to pursue the protection of their creations or prototypes;
- 72% of the participants either agreed or strongly agreed that the sessions showed different ways of earning revenue from their creations/prototypes; and
- 71% of the participants indicated that they would seek intellectual property protection.

For the 2018/2019 fiscal year, Fab Lab also offered public access to its prototyping equipment. One business and three individuals utilised the lab to create local products for commercialisation. Sixteen businesses utilised the lab to create a prototype, of which fourteen were registered businesses. Thirty-three innovative prototypes were developed by users of the lab and one hundred and forty-nine (149) persons were trained in the use of prototyping technologies and in “technopreneurship.”

Picture 12: A “Meet the Entrepreneur Series” workshop entitled “Sit with Sanianitos” is led by Ms Sanian Lewis, April 30, 2019



D. Activity 4: STEM Vacation Camps

Vacation camps provided opportunities to deliver constructive STEM content during breaks in the school year. Camps were developed and executed by the Science Education and Innovation departments and were offered for children between the ages of five to thirteen years. These camps engaged youth in hands-on activities to stimulate interest in learning about phenomena in the

natural and physical world. The Innovation department's camps catered to children aged five to seventeen years and exposed campers to fundamental concepts in several areas of science, technology, reading, engineering, art and mathematics intended to nurture the inventive process using innovative thinking and experimentation.

NIHERST continued to offer camps during the Easter and July/August vacation 2019 periods as follows:

- ***One-Day-Fun-Day STEM Camps:*** Twenty-seven one-day camps attracted a total of six hundred and sixty-two (662) youths for the nine-day period. Campers explored topics including environmental conservation, agriculture, chemistry, Newtonian physics, geology and coding.
- ***July/August 2019 Vacation period:*** NIHERST x Chuck E. Cheese's: NIHERST continued its partnership with Chuck E. Cheese's, conducting a series of one-week science-themed vacation camps catering to children aged five to seventeen years. Camps were conducted during the two-month vacation period at the Chaguanas and San Fernando branches of Chuck E. Cheese's. Nine one-week themed camps attracted a total of one hundred and eighty (180) children for Science Education's camp offered under the Chuck E. Cheese's collaboration. Campers explored topics including space exploration, gamification and fabrication. The campers' feedback in relation to some of the objectives of the aforementioned camps was as follows:
 - 80.2% either agreed or strongly agreed that the camps made them more interested in science and 54.9% indicated that the camps made them want to study more science at school; and
 - 73.6% either agreed or strongly agreed that they felt more confident about studying science and 89.0% wanted science in school to be as fun and interactive as delivered in camp.

The Innovation department conducted five themed one-week camps catering to a wide age group of children from five to seventeen years. Innovation camps attracted one hundred and fifty-six (156) participants. The camps were designed to develop campers' interest in STEM with a focus on innovation, invention and "technopreneurship." Campers were also taught skills in the use of new technology and software including 3D pens, computer programming, robotics and prototyping. External stakeholders from the Intellectual Property Office and the Trinidad and Tobago Solid Waste Management Company supported the Institute's efforts and conducted interactive sessions with campers on intellectual property rights, patents, copywriting, trademarks and recycling and the impact of pollution on the environment respectively. Feedback from campers was as follows:

- 87.1% of campers indicated increased interest/awareness in the use of science and technology to solve problems in the real world;
- 91.4% had increased interest in generating new ideas, creating new things and being able to earn money from it;
- 85% had increased interest in solving problems for their community; and
- 71% of campers rated their overall experience as "Excellent" and 23.6% "Really Good".

- Tech It Out:** NIHERST signed a Memorandum of Cooperation with the Institute of Electrical and Electronics Engineers Trinidad and Tobago Local Section in 2015 to execute joint projects. NIHERST partnered with the Institute of Electrical and Electronics Engineers and hosted two one-week vacation camps over the periods July 22 - 26 and August 5 – 9, 2019. A total of thirteen campers were taught skills in the use of Arduino technology and introduced to coding, creative thinking, problem solving, innovation, invention and prototyping.
- Robo-Tech:** NIHERST also partnered with St. Benedict's College and hosted a one-week Robotics vacation camp which catered to children in the ten to sixteen age group. The camp scheduled between the August 05–09, 2019 taught students design and programming using the LEGO® Mindstorms EV3 robotics system. Sixteen campers participated in these sessions.
- Pop-Up Fun Weeks:** In an effort to maintain the provision of STEM services to NIHERST's East-West corridor's clients, nine themed camps were offered by the Science Education department over a three-week period at the NSC. Three camps were held weekly for children from ages five to thirteen years old. One hundred and fifteen (115) children participated. Topics explored included space exploration, gamification and fabrication. The campers' feedback in relation to the camps' objectives was as follows:
 - 69.4% either agreed or strongly agreed that the camps made them more interested in science and 63.3% indicated that the camps made them want to study more science at school;
 - 63.3% either agreed or strongly agreed that they felt more confident about studying science and 73.5% wanted science in school to be as fun and interactive as delivered in camp;
 - 77.6% either agreed or strongly agreed that the camp brought to their attention the relevance of science in everyday life, with 87.8% indicating that they learned something new; and
 - At the end of camp, 49.0% of campers indicated interest in pursuing careers in science and technology while 26.5% were still unsure.

Table 9 provides details on STEM Vacation Camps held during the reporting period.

Table 9: STEM Vacation Camps conducted during the Fiscal Year

Camp Description	Target Group	Results	Client Feedback
Easter Vacation: Pop-Up Fun-Days camps. Campers explored the topics of environmental conservation, agriculture, chemistry, Newtonian physics, geology and coding.	5 – 13 years	Six hundred and sixty-two (662) campers attended twenty-seven one-day camps conducted over nine days.	80.2% either agreed or strongly agreed that the camps made them more interested in science. 54.9% indicated that the camps made them want to study more science at school.
July/August Vacation:	5 – 17 years	One hundred and eighty	

Camp Description	Target Group	Results	Client Feedback
NIHERST x Chuck E. Cheese camps included topics of space exploration, gamification and fabrication		(180) children attended nine one-week camps.	73.6% either agreed or strongly agreed that they felt more confident about studying science.
Innovation Camps: Camps focused on innovation, invention and “technopreneurship.” Campers were taught skills in the use of 3D pens, computer programming, robotics and prototyping.	5 – 17 years	One hundred and fifty-six (156) campers participated in five one-week camps each with a different theme.	91.4% had increased interest in generating new ideas, creating new things and being able to earn an income from it. 87.1% indicated an increased interest/awareness in the use of science and technology to solve problems in the real world. 71% rated their overall experience as excellent.
Tech It Out Camp: NIHERST partnered with the Institute of Electrical and Electronics Engineers to host the camp which taught skills in the use of Arduino technology and an introduction to coding, creative thinking, problem solving, innovation, invention and prototyping.	11 – 17 years	Thirteen campers attended the two one-week camps.	69.9% either agreed or strongly agreed that the camps made them more interested in science. 63% indicated that the camps made them want to study more science at school. 63.3% either agreed or strongly agreed that they felt more confident about studying science.
Robo-Tech Camp: NIHERST partnered with St. Benedict’s College to host the camp which taught students design and programming using LEGO® Mindstorms EV3 robotics system.	10 – 16 years	Sixteen campers participated in the four-day camp	73.5% wanted science in school to be as fun and interactive as delivered in the camp. 77.6% either agreed or strongly agreed that the camps brought to their attention the relevance of science in everyday life.
Pop-Up Fun Weeks: The NIHERST Science Education department offered the camps to clients residing in the East-West corridor. Camp topics	5 – 13 years	One hundred and fifteen (115) children participated in nine themed camps which	87.8% indicated they learned something new.

Camp Description	Target Group	Results	Client Feedback
included space exploration, gamification and fabrication.		were held over a three-week period.	

Picture 13: Campers are guided during a hands-on activity at the Pop-Up Fun-Days camp, April 18, 2019



E. Activity 5: iSTEM Club

The newly rebranded Science Club, iSTEM Club, helped to foster a positive attitude towards STEM by students. NIHERST's Science Education department administered one science and technology club for students ages five to thirteen years old. The club provided academic support to the students in problematic science topics encountered in the classroom. Content was designed for students to gain critical-thinking abilities and other transferrable skills in areas such as information technology, research, design, analytics, teamwork/collaboration and communication. The club met six Saturdays per term at the NSC, exploring the following scientific areas:

- Term 1 – Patent Pending:** Seventy-five members explored the world of innovation and invention while learning about design processes and the importance of failure and obstacles. Problem-based learning resulted in the creation of members' very own solutions and development of their ideas into tangible prototypes via the use of various technologies. The term culminated with an expo-style showcase of content for parents.
- Term 2 – Water-Food-Energy Nexus:** Sixty-three members explored the connections between water, food and energy and investigated applications and opportunities for sustaining and enhancing the nexus, within the context of the Caribbean. The term culminated with an expo-style showcase of content for parents. There was also the participation of external stakeholders in the mini project fair – Trinidad and Tobago Solid Waste Management Company, Water and Sewerage Authority of Trinidad and Tobago and National Agricultural Marketing and Development Corporation.

- **Term 3 – Forensics - Crime Science Investigation:** Fifty-six members were exposed to hands-on, interactive activities that explored various analysis techniques in Crime Scene Investigation such as fingerprint, footprint, fibre, hair, DNA, soil and documentation/writing. The term culminated with the staging of a mock trial and participation of stakeholders in the mini project fair – ARRIVE ALIVE, the Trinidad and Tobago Police Service Highway and Traffic Patrol Branch and the Trinidad and Tobago Police Service Criminal Investigation Division.

The members' and parents' feedback on the performance of the iSTEM Club was as follows:

- 87.5% of members enjoyed the activities throughout the academic year while 86.6% indicated that they learned new things;
- 83.0% of members indicated that they were more interested in science and 69.6% of members indicated that they wanted to continue studying science subjects in school;
- 64.3% of members indicated that the iSTEM Club helped them to understand science better in school;
- Parents agreed that their child/children demonstrated improvement in all learning and innovation skills as a result of participating in the iSTEM Club: oral and written communication (74.6%), teamwork and collaboration (86.1%), problem solving (85.2%), critical-thinking (84.4%), creativity and innovation (91.8%); and
- 100% of parents indicated satisfaction with the content delivered and would recommend the offering to other parents.

Picture 14: iSTEM Club members build and test their robots at the club's meeting



F. Activity 6: External Outreach

NIHERST's pioneering efforts to popularise science over the decades has attracted public and private organisations engaged in the promotion of STEM education. As such, NIHERST is regularly invited to participate in exhibitions hosted by government agencies, Non-Governmental Organisations, schools and private and religious bodies.

Participation in external outreach activities has complemented the NSC's visitor programme and provided access to clients unable to reach the NSC location. These outreach activities have served to enhance the Institute's STI engagement. During the period under review NIHERST participated in thirty-seven outreach events and attracted a total of eight thousand, seven hundred and forty-seven (8,747) participants.

Picture 15: NIHERST/NSC participates at the St. Joseph College's Career Fair, December 12, 2018



Picture 16: Staff of the NIHERST/NSC interact with participants at Radio 103.5 FM's Famalay Fun Day, April 17, 2019



Picture 17: NIHERST/NSC staff engage with students at Fatima College's Career Day and Expo, April 24, 2019



Picture 18: NIHERST/NSC demonstrates Science to students at the Waterloo Secondary School's Career Day, April 26, 2019



Picture 19: NIHERST/NSC showcases Science to students at the Grant Memorial Presbyterian School's Career Day, May 28, 2019



4.2.2 Strategic Initiative 2: Research and Intelligence Gathering

A key strategic goal of NIHERST is to strengthen its research and intelligence gathering capability to better support evidence-based decision-making through clear policy direction supported by data and strategic foresight. In the 2018/2019 fiscal year, NIHERST continued to make strides in this area through the following:

- the work of the Science and Technology Statistics department responsible for the collection, compilation and analysis of statistical data on STI for the benefit of policy analysts, researchers, educators, entrepreneurs and decision-makers as well as contributions to international and regional databases; and
- the work of its Policy, Research and Intelligence department responsible for the initiation of Sectoral Innovation Mapping studies and provision of policy support and advocacy.

4.2.2.1 Science, Technology and Innovation Statistics

The Science and Technology Statistics department's 2018/2019 work programme was designed to support the development of STEM education, provide science and technology indicators and give insights on the innovative activities in emerging sectors of the economy. The details of the activities completed by the department during the 2018/2019 fiscal year are provided hereunder.

A. Survey of Science and Technology Indicators, 2018

The Survey of Science and Technology Indicators completed in the third quarter of 2018/2019 was designed to measure Trinidad and Tobago's investment in science and technology utilising financial and human resources data. Science and technology activities measured in this study include research and development, and scientific and technological services. The survey is guided by the RICYT and the UNESCO Institute for Statistics and is intended to utilise science and technology indicators to improve evidence-based decision-making by policymakers in Trinidad and Tobago. The data is also submitted to RICYT and the UNESCO Institute for Statistics annually and used to populate the regional and global databases of science and technology indicators.

Key indicators captured in this survey have served to monitor Trinidad and Tobago National Development Strategy 2016-2030 (Vision 2030): Theme 4 Building Competitive Businesses, Sustainable Development Goal Target 9.5 and the calculation of global indices. The survey captured data for the year 2017.

The main indicators collected include:

- Research and Development Expenditure:
 - Research and development expenditure (% of GDP): 0.09%; and
 - Expenditure on research and development was below the world average of 2.14% for the same period.
- Research and Development Personnel:
 - Number of Researchers (full-time equivalent), Total: 716.33;
 - Number of Researchers (full-time equivalent), Males: 325.08;
 - Number of Researchers (full-time equivalent), Females: 391.25;
 - Number of Researchers (Headcount), Total: 1506;
 - Number of Researchers (Headcount), Males: 664; and
 - Number of Researchers (Headcount), Females: 842.

- Patents:
 - Number of patents application, Total: 146; and
 - Number of patents application, Nationals: 0.

The data shows that Trinidad and Tobago is lagging behind in investments in research and development.

B. Survey of Mathematics in Primary Schools, 2017

The report on the results of the study was completed in the first quarter of 2018/2019. This survey was designed to provide empirical data on the teaching of Mathematics in primary schools and collected data from principals and teaching staff. The Survey of Mathematics in Primary Schools, 2017 was a two-part enquiry of principals and teachers from two hundred and sixty-four (264) government, government-assisted and private primary schools in Trinidad and Tobago. The survey provided essential data on the profile of primary school teachers, their training needs, their attitudes towards teaching, and difficulties encountered in teaching Mathematics as well as the adequacy and availability of teaching resources and the use of teaching and evaluation methods. Additionally, the survey included a profile of primary school principals and their views on primary Mathematics education.

The following is a summary of the survey's main findings:

- Principals:
 - Almost all (98%) of the principals indicated that there were Mathematics resources available to the teachers in their schools;
 - The data revealed that teachers in the lower class levels used Mathematics resources more frequently than their counterparts in the higher class levels;
 - Principals identified problem solving/critical thinking as the most important priority area (95%), followed by conceptual thinking (83%) and teaching methods (77%);
 - Principals identified teaching methods (45%), critical thinking/problem solving (30%) and concept teaching with the use of resources (26%) as the top three areas for teacher development; and
 - The main suggestion provided by principals on methods that could be used to improve students' performance in Mathematics at the primary level was the teaching of concepts using manipulatives (28%), followed by increasing teacher development (27%) and making Mathematics more hands-on and fun (18%).
- Teachers:
 - Over half (56%) of the sample of teachers had a Bachelor of Education degree, while 26% possessed a teacher's diploma in education, and 8% had a Master of Education degree and above. Compared to a similar study undertaken in 2007, the data showed an increase in teachers' qualification in education;
 - The majority (84%) of teachers surveyed reported an Ordinary Level/Caribbean Secondary Education Certificate pass as their highest qualification in Mathematics, while 7% obtained an Advanced Level/Caribbean Advanced Proficiency Examination pass; 3% and 2% possessed a diploma and bachelor's degree respectively;

- Generally, teachers had a very positive attitude towards teaching, with the majority of teachers indicating that they identified either “all the time” or “most times” with the following statements: “I love teaching” (92%), “I find my work full of meaning and purpose” (91%), “My work inspires me” (84%) and “I am going to continue teaching for as long as I can” (75%);
- A significant percentage (83%) of the sample of teachers agreed that there were suitable Mathematics resources available in their schools;
- The most common resource that teachers used to develop their scheme of work was the curriculum (97%), followed by textbooks (74%) and the Internet (63%);
- Most of the teachers who participated in the survey used concrete resources (97%), worksheets (97%) and textbooks (94%) in their Mathematics class, while 51% used Information and Communication Technology;
- 37% of the teachers indicated that students’ indiscipline limited how they taught Mathematics “a lot” and approximately one-third of the teachers assigned a similar rating to students’ absenteeism (32%), and parents not interested in their children’s learning and progress (32%);
- 30% of the teachers identified Number as the most difficult topic for students to conceptualise, followed closely by Measurement (29%) and Geometry (28%);
- Compared to the study undertaken in 2007, the data show an increase in the level of difficulty for students in all topics, except Number which decreased from 58% in 2007 to 30% in 2017; and
- A significant majority of teachers (91%) agreed that primary level Mathematics prepared students for Mathematics at the secondary school level.

C. National Survey of Information and Communication Technology in Secondary Schools, 2019-2020

As part of its national development strategy, the Government of Trinidad and Tobago has identified as a medium-term goal “a seamless, reformed, high-quality education and training system” (Goal 5) and a short-term goal of “a modern, relevant and accessible education and training system.” Data on Information and Communication Technology integration to support these efforts is needed to assist in the development of relevant policies and programmes.

Planning for the National Survey of Information and Communication Technology in Secondary Schools, 2020 began during the 2018/2019 fiscal year. The survey is designed to measure the use of Information and Communication Technology in secondary schools by examining key factors such as infrastructural needs and the usage, attitudes and impacts of Information and Communication Technology in schools. The survey’s target group includes principals, teachers, students and librarians in half of the secondary schools in Trinidad and Tobago. The results of this study is intended to inform policymakers, decision-makers, educators and stakeholders in education.

4.2.2.2 Science, Technology and Innovation Mapping and Priority Setting Programme

The Policy, Research and Intelligence department conducts research, formulates policy and provides evidence-based advocacy for the role of STI in supporting government’s plans to diversify the economy, improve the competitiveness of businesses and help nurture an innovative culture of people in Trinidad and Tobago.

In the 2018/2019 fiscal year, Trinidad and Tobago's Energy Services Sectoral Innovation Mapping Study was completed, officially launched and seventy-five hardcopies were published and disseminated. The Sectoral Innovation Mapping is a research tool which maps the pathway of innovation in specific industries, identifying key actors, the innovations created, the drivers and impediments to innovation, the gaps in the enabling environment such as capacity issues, and the interactions and intensity of linkages between actors. The Energy Services Sectoral Innovation Mapping Booklet featured five major deliverables: the Sectoral Innovation Mapping Report; the Innovation Mapping Diagram; a Stakeholder Feedback Report; a List of Key Performance Indicators and an Action Plan. An internal Lessons Learned document was also prepared for in-house usage.

The Policy, Research and Intelligence department also provided comments on the following:

- **Contributions made on Chapter IV Science, Technology, Innovation and Research of the Post-Cotonou Partnership Agreement** - In February in August 2019, the Trinidad and Tobago Embassy in Brussels requested comments on the negotiating text between the European Union and the African, Caribbean and Pacific countries. The current treaty which considers the overarching framework for relations between the European Union and African, Caribbean and Pacific countries expires in February 2020. NIHERST's submission treated with several themes captured under Articles 1-4 namely the objectives, science and technology, innovation and research and, Information and Communication Technologies and the Digital Economy;
- **Comments on the Initial Report on the Implementation of the United Nations Convention on the Rights of Persons with Disabilities** - A request was made by the Ministry of Education, to offer comments on the initial report. Several deficiencies and areas for improvements were highlighted giving consideration to working definitions for Persons with Disabilities, quality of data used, layout of the convention, the need for collaboration, and the need for assessment of the impact and outcomes generated from past programmes deployed. Adopting as required the principle of inclusivity for persons with disabilities, observance was given that at the national level, the inclusion of Persons with Disabilities in the national mainstream education system is not fully considered; and
- **Comments and interest expressed for the European Union's Concept Note on the "Erasmus+" Capacity Building in Higher Education project** - This project sought to establish a platform for regional and bi-regional collaboration and capacity building between the Caribbean and European Union higher education systems. A response was crafted offering broad support for the project, seeking clarification on the project's scope and objectives as well as, offering evidence-based suggestions to improve the structure and implementation of logistics of identified activities.

4.2.3 Strategic Initiative 3: Building Strategic Alliances

Central to NIHERST's mission to promote and advance STI in Trinidad and Tobago, is the building and strengthening of collaborative alliances with national, regional and international agencies. Such partnerships, in particular global centres of excellence, tap into resources and expertise that further serve to advance the Institute's mission, help build national capacity and accelerate progress in national priority areas. Some collaborations and exchanges enable NIHERST in turn to share its expertise with other national and regional agencies to support capacity building.

Details on collaborative projects undertaken in the 2018/2019 fiscal year are provided below.

4.2.3.1 NASA International Internship Programme

The National Aeronautics and Space Administration (NASA) continued its internship education exchange programme (NASA I²) with NIHERST and provided national students, at the undergraduate and graduate levels, with the opportunity to conduct research work under mentorship of a member of NASA's science and engineering workforce. Interns worked alongside international peers at the NASA Ames Research Center in California. This project has influenced participants to pursue further research work at local institutions related to research areas pursued at NASA.

For the 2018/2019 fiscal year, six candidates from Trinidad and Tobago, the largest contingent to date, participated in the NASA I² Summer 2019 session from June 03 - August 09, 2019. Interns spent the ten-week summer internship at NASA Ames Research Center where they received training to perform research under the guidance of NASA's science and engineering researchers. This collaboration has sought to increase national capabilities in conducting advanced research in both areas of national importance and novel areas in STEM.

Picture 20: NASA I² Interns with NIHERST and United States Embassy officials, June 06, 2019



4.2.3.2 Teach ME

The Institute's efforts to build capacity and improve innovation in teaching science education were promoted through the Teach ME projects. NIHERST capitalised on this alliance and continued to utilise Science Education as an enabler to prepare young persons in STI. Twenty-two training sessions were conducted for teachers/students to introduce 3D printing, coding and robotics technologies to participating primary and secondary schools. The project included eleven primary schools and four secondary schools located in North, East and South Trinidad. Two professional development workshops on creative teaching of primary mathematics were conducted in April and August 2019. Sixty-seven percent of the teachers scored at least 80% on the test from the professional development workshops.

Sixteen teacher/student sessions were also conducted to support student participation in the Innovation Competition themed "Technopreneurship." A STEM Enrichment Camp for primary

school students was also hosted during the period August 12-16, 2019, in which forty-seven students participated. Eight completed prototypes were subsequently submitted for the Innovation Competition.

4.2.3.3 Seismology in Schools

NIHERST continued its collaborations with local educational institutions and agencies including the University of the West Indies and the Ministry of Education. The Ministry of Education promoted the programme and encouraged students to develop Student Based Assessments for the Caribbean Secondary Education Certificate examinations based on related topics in the Seismology in Schools programme. For the 2018/2019 fiscal year, NIHERST held its third annual workshop, which engaged six school teams in mission-oriented tasks using real seismic data. Over one hundred and sixty-nine (169) students from eight schools joined the already three hundred and eighty (380) students trained through the Institute's Seismology in Schools workshops. An additional six new teachers also participated in this years' workshop.

This year, 23% of the students participating in the workshop chose Physics/Geography at the Caribbean Examinations Council Caribbean Advanced Proficiency Examination level. This represented an increase in enrolment when compared with 3% and 12% in 2017 and 2018 respectively.

4.2.3.4 National Youth Science Camp

The National Youth Science Camp partnership fostered through collaboration between NIHERST and the United States Embassy, continued. Two Sixth Form science students were awarded scholarships to attend the camp in West Virginia during the period June to August 2019. Delegates at the National Youth Science Camp were challenged to explore new areas of the biological and physical sciences as well as art and music with resident staff members and presented seminars covering areas of research interest.

4.2.3.5 Resilient TnT

NIHERST's alliance with the Global Water Partnership - Caribbean and Water Resources Agency continued with its project using environmental solutions to develop more sustainable communities. Its newer thrust to increase public education and awareness of the use of rainwater harvesting systems in water-scarce rural communities garnered much interest.

In May 2019, fourteen persons from Plum Mitán, the majority of whom were farmers, were trained in the production and installation of rainwater harvesting systems. The training also provided trainees with skills to earn income. A stakeholder dialogue which was later held with trained persons, received positive feedback and views on the project. In particular, those trained expressed their gratitude for the training and information received as it provided an additional source of water for the production of their crops.

Public education outreach sessions were held in two primary schools in the Plum Mitán and Biche areas in July 2019. The sessions also provided an opportunity to bring awareness about the rainwater harvesting system being installed at the Plum Mitán Community Centre and its benefits to the community. Over two hundred (200) students improved their knowledge and understanding

of the importance of water conservation and the benefits and opportunities derived from rainwater harvesting.

Construction of a rainwater harvesting system at the Plum Mitan Community Centre with a capacity of six thousand (6,000) gallons, was completed in July 2019. The rainwater harvesting system has been connected to the bathrooms and the kitchen tap in the Community Centre. A roadside tap was also installed for community use.

4.2.3.6 The International Centre for Genetic Engineering and Biotechnology

NIHERST continued in its strategic alliance thrust with the International Centre for Genetic Engineering and Biotechnology developing linkages between national researchers and research organisations. The Institute made administrative arrangements to promote access to meetings, courses, fellowship programmes, grants, and grant funding. Coordinating efforts such as these enabled the Institute to play a significant role in bridging the research and development gaps between nationals and international agencies.

In May 2019, Dr. Varma Rambaran from the University of Trinidad and Tobago was awarded a research grant of €39,000 for his application “*The Synthesis and Testing of Novel Drugs for the Treatment of Diabetes Mellitus.*”

4.2.3.7 FIRST® LEGO® League Trinidad and Tobago

NIHERST’s partnership with FIRST® LEGO® League continued to be supported by the Ministry of Education and its Social Investment partner, Shell Trinidad and Tobago Limited. During the 2018/2019 fiscal year, the annual Championship hosted in March 2019 at the NSC, attracted eighteen teams representing a total of one hundred and thirty-eight (138) students. The Institute’s efforts to establish, develop and nurture core values including cooperation, learning and community involvement among participating teams strengthened NIHERST’s alliance and served to build this collaboration.

The feedback of coaches, participants and parents on this activity was recorded as follows:

- The majority of coaches (at least 77%) reported seeing improvement in the knowledge, skills and attitudes of team members. This included an increased understanding of how science and technology could be used to solve real-world problems and an understanding of basic science principles (100%); an understanding of potential careers in science and technology (85%); and increased life and workplace skills (92% and 100% respectively).
- Participants indicated an increased interest in school subjects and careers in science and technology. Most team members either agreed or strongly agreed that they would like to learn more about computers and robotics (97%); learn more about science and technology (96%); and learn more about how science and technology can be used to solve problems in the real world (95%). They also reported that they were more interested in having a job that used science and technology (89%); were better at Mathematics and Science than before (85%); and would like to become a scientist or an engineer (68%). Participants also reported that they were more interested in going to college/university (91%) and also planned on pursuing other inventions/ideas (91%) as well as further pursuing their team’s invention (87%).

- Many parents saw positive changes with their child as a result of the participation in *FIRST*® LEGO® League. At least 65% of parents reported an observed increased interest of their child in science and technology and in school, and 61%-83% reported positive results on their child's skills, knowledge and attitudes.

Picture 21: A team competes at the *FIRST*® LEGO® League TT National Championship, NSC, March 23, 2019



Picture 22: *FIRST*® LEGO® League TT 2019 Closing Ceremony, NSC, March 23, 2019



4.3 Monitoring and Evaluation

NIHERST recognises the need for full accountability and transparency in the use of public funds and for providing value for money to its stakeholders by ensuring the Institute's interventions have significant impact on Trinidad and Tobago's citizenry and contribute to the country's development and diversification efforts.

In order to improve on the Institute's performance under the then strategic plan, during the 2018/2019 fiscal year the Institute through work under the NIHERST Results-based Monitoring and Evaluation initiative continued to:

- guide and assist staff in incorporating monitoring and evaluation in the Institute's programmes, projects and developmental policies to more aptly measure, monitor, report and improve on performance;
- guide, develop and assist in preparing the Institute's performance and achievement reports for the Ministry of Education, Ministry of Planning and Development and other external agencies, for greater efficiency, quality and relevance;
- promote and support decision-making on the basis of sound knowledge and results gained from monitoring and evaluating the Institute's interventions; and
- build staff's capacity in monitoring and evaluation through knowledge-sharing sessions, working meetings and the sharing of learning resources.

Several free courses were identified and selected for participation by staff. As a result of an increased staff interest, there was an expanded use of quantitative and qualitative feedback mechanisms and metrics to measure short-term results, which was demonstrated in the level and extent of performance reporting.

During the July/August 2019 period, through the award of a partial scholarship to the team lead of the Monitoring and Evaluation function, the Institute benefitted from participation in the renowned International Program for Development Evaluation Training held in Switzerland. From the knowledge and exposure gained, a wide range of evaluation approaches, data collection methods and other monitoring and evaluation tools were applied to enhance the performance framework of the Institute; and contribute to the efficiency, effectiveness and impact of the Institute's interventions.

Additionally, during the 2018/2019 fiscal year, several components for the institutionalisation of monitoring and evaluation were prepared and incorporated in the Institute's Strategic Plan 2020-2022. This included the development of an independent Monitoring and Evaluation department structure.

Towards this end, in September 2019, a Monitoring and Evaluation Officer was recruited for specific monitoring and oversight of the NIHERST-Shell Trinidad and Tobago Limited initiative.

5 FINANCIAL OPERATIONS

5.1 Budget Formulation

In response to a memorandum from the Permanent Secretary, Ministry of Education and the accompanying Ministry of Finance Call Circular No. 03 dated March 27, 2019, NIHERST commenced preparation of budget estimates for the 2019/2020 fiscal year. The Draft Estimates of Income and Recurrent Expenditure for the 2019/2020 fiscal year, together with projections for the next two fiscal years, were approved by the NIHERST Board of Governors. These estimates were then forwarded to the Ministry of Education for assessment and submission to the Budget Division, Ministry of Finance.

5.2 Financial Performance

5.2.1 Revenue

In addition to government subvention, in the 2018/2019 fiscal year, NIHERST derived income from registration fees from activities such as clubs and camps, admission fees from visitors to the NSC and its various other events including sales of items from the novelty shop located at the NSC. The income derived is referred to as *Other Income*.

For the 2018/2019 fiscal year, NIHERST received TT\$13.9 Mn. in government subvention. Other income earned during the fiscal year amounted to TT\$0.70 Mn. relating to earnings from bank interest, registration and admission/entrance fees. This amounted to total income of TT\$14.6 Mn, as shown in **Table 10**.

Table 10: Revenue of NIHERST during the 2018/2019 Fiscal Year

Revenue Category	Budgeted Revenue (TT\$) (A)	Actual Revenue (TT\$) (B)
Government Subvention	27,720,000	13,940,683
Bank Interest	10,000	4,635
National Science Centre Fees	0	697,644
Miscellaneous Other Income	1,000,000	0
Total Income	28,730,000	14,642,962

5.2.2 Expenditure

NIHERST incurred operating expenditure of TT\$19.0 Mn. as shown in **Table 11**, with a resulting deficit of TT\$5.1 Mn., which was funded from Other Income earned during the period and unspent balances, in keeping with Section 18 of the NIHERST Act and as advised by the Ministry of Education.

Table 11: NIHERST Expenditure for the 2018/2019 Fiscal Year

Expenditure Category	Budgeted Expenditure (Subvention plus Other Income) (TT\$) (A)	Actual Releases (Subvention only) (TT\$) (B)	Actual Expenditure (TT\$) (C)	Surplus /Deficit (TT\$) (B-C)
Personnel Expenditure	7,802,400	6,219,101	6,538,891	(319,790)
Goods and Services	19,073,200	6,404,052	11,006,614	(4,662,562)
Current Transfers and Subsidies	1,850,000	1,317,530	1,420,055	(102,525)
TOTAL	28,725,600	13,940,683	18,965,560	(5,084,877)

5.3 Public Sector Investment Programme

Table 12 shows the expenditure under the Public Sector Investment Programme for the 2018/2019 fiscal year. Releases amounted to TT\$146,020 with expenditure of TT\$271,684 during the fiscal year, resulting in a deficit of TT\$125,664, which was funded by NIHERST internal funds.

The Teach ME Project was the sole project of the Institute for which funds were released under the Public Sector Investment Programme during the 2018/2019 fiscal year. Funds were utilised as planned.

Table 12: NIHERST Public Sector Investment Programme Allocation and Expenditure for the 2018/2019 Fiscal Year

Sub-Head/Description	Allocation (TT\$) (A)	Releases (TT\$) (B)	Actual Expenditure (TT\$) (C)	Variance (TT\$) (B-C)
030 – Teach ME	300,000	146,020	271,684	(125,664)
031 – STI Mapping and Priority Setting	260,000	0	0	0
TOTAL	560,000	146,020	271,684	(125,664)

5.4 Audit

During the 2018/2019 fiscal year, the Draft Financial Statements for the years 2014 to 2016 were completed and dispatched to the Auditor General's office.

5.5 Debt Policy

Section 16 (1) the NIHERST Act states “The Institute may for the purpose of discharging its functions borrow such sums of money not exceeding in the aggregate one hundred thousand dollars.”

Section 16 (2) states “Loans in excess of the amount specified in subsection (1) may be effected with the approval of the Minister.”

5.6 Investment Policy

NIHERST has an Investment Policy which was formulated and approved in December 2017. According to Section 15 of the NIHERST Act, the Institute may invest from time to time in such securities as the Board, with the approval of the Minister of Education considers fit.

6 HUMAN RESOURCE DEVELOPMENT PLAN

6.1 Organisational Establishment

NIHERST currently has a permanent establishment of fifty-four positions, which represents more than a 50% reduction from its original permanent establishment of one hundred and eighteen (118) positions. The existing permanent establishment is shown in **Appendix 1**. Some of the challenges faced in human resource development planning include the obsolescence of posts, lack of relevant job positions, inadequate number of posts, uncompetitive compensation packages and an absence of avenues for career progression and advancement opportunities. These factors are known to impact negatively on employee engagement, performance and recruitment. As a solution to filling the gaps, the Institute continued to hire required personnel on contract. Efforts were also made to develop and implement a new structure and compensation plan that would move the Institute forward.

One of the deliverables that resulted from the strategic planning exercise during the 2018/2019 fiscal year, was the draft organisational structure. This proposed structure, shown in **Appendix 2**, emphasises more relevant positions to meet NIHERST's expanding role in science, technology and innovation.

6.2 Category of Employees

Operations at NIHERST have been carried out by four categories of staff, viz permanent, contract, short-term and part-time staff. At the end of the reporting period, NIHERST employed eighty-four persons on a full-time basis, which comprised thirty-seven permanent employees, thirty-nine on contract, and eight short-term employees. The Institute also employed sixteen part-time staff as science explainers who were asked to report to work as required to assist with the explaining of science exhibits and concepts to visitors of the NSC.

During the period under review, the Institute continued to utilise government's On-the-Job-Training programme, with twenty-three trainees gaining work experience at NIHERST's offices.

6.3 Career Path Systems

NIHERST adopts traditional career path systems/options that bases promotion on qualifications, seniority and experience. Permanent and contract staff represent the major constituent group and comprise different job categories namely manipulative, clerical, technical and professional. In relation to permanent positions clerical, technical and professional categories are stratified allowing some upward mobility once positions are available and requirements have been met. Within the manipulative category, staff operate without stratification in the positions but may move into other categories, with the requisite experience, attitude and qualification.

The organisational structure and positions on the permanent establishment have not been updated for a number of decades and gaps have been filled through contract employment.

6.4 Performance Assessment/Management Strategies

The Institute utilised the Performance Management Appraisal System established by the Public Service to assess full-time employees. The Human Resource department continued to develop and

improve job descriptions to measure employee performance. The department also provided training to new managers and supervisors on the Performance Management System and its importance to achieving the Institute's goals and objectives.

6.5 Promotion Selection Procedures

The selection procedure for promotion in the NIHERST- Public Services Association of Trinidad and Tobago Collective Agreement (Article 4: Employment and Promotion) covered permanent employees. A similar procedure was adopted for contract employees. Selection methods included the following:

- interviews;
- work sampling (job-specific ability test); and
- past performance appraisal records.

Interviewing panels comprised:

- an officer from the Human Resource department;
- persons with an appropriate mix of competence and rank (usually officers at least two levels higher in rank than the position under consideration by the panel); and
- external persons with relevant expertise if such did not reside internally.

6.6 Staff Development and Training

The Institute's training and development programme strives to enhance individual, departmental and organisational effectiveness by facilitating access to training and fostering professional development of its human resource.

The programme includes:

- in-house customised training courses;
- sponsorship to pursue training courses externally;
- fellowships or long-term professional degree programmes;
- seminars and conferences; and
- knowledge-sharing sessions.

During the 2018/2019 fiscal year, nineteen staff members, which represented approximately 22% of staff, benefitted from free programmes delivered at the Government of Trinidad and Tobago's Public Service Academy, since financial constraints stymied training plans.

Notably, one of NIHERST's employees was able to acquire a partial scholarship to pursue two components of the International Developmental Evaluation workshop hosted by the International Program for Development Evaluation Training, the recommended international programme for Monitoring and Evaluation practitioners. NIHERST participated in the workshop with a view to developing the requisite evaluation skills of its Monitoring and Evaluation team. The workshop was held in Switzerland from July 29 to August 02, 2019.

Details of the training courses attended are contained in **Appendix 4**.

6.7 Employee Support Services

6.7.1 Group Pension, Health and Insurance Plans

NIHERST's Pension Plan for its permanent employees was established on January 01, 1988. The Plan also provides benefits to the staff of the former NIHERST colleges that were transferred to the College of Science, Technology and Applied Arts of Trinidad and Tobago (COSTAATT) with effect from November 06, 2000, under the COSTAATT Act.

As at September 30, 2019, there were forty-nine active members, twenty-five pensioners and six deferred pensioners participating in the Pension Fund Plan. Of the forty-nine active members, thirty-five were from NIHERST and fourteen from COSTAATT.

NIHERST and COSTAATT contributed to the Fund at the rate of 17.7% of basic salary and the members contributed at the rate of 6% of basic salary. These contributions were a major contributor to the Plan's assets which valued at TT\$61.2 Mn. as at October 31, 2019. The Plan continued to perform well, notwithstanding economic conditions. The triennial actuarial valuation of the fund as required by the Trust Deed for the period November 01, 2015, to October 31, 2018 was conducted and the final report submitted to the Central Bank of Trinidad and Tobago on or before July 31, 2019, as required.

NIHERST provides a Group Health and Life Insurance Plan for all full-time permanent and contract employees. As at September 30, 2019, there were fifty-nine active staff members of the plan, and six retiree members. The Life Insurance and Accidental Death and Dismemberment benefit attached to this plan was TT\$200,000 and NIHERST contributed 50% of the premium for this benefit. Major medical coverage was TT\$500,000 and NIHERST contributed 60% of the premium in respect of the health insurance benefit.

6.7.2 Employee Assistance Programme

PEAPSL Consultancy Limited continued to supply services for the Employee Assistance Programme, which were available to all NIHERST employees. During the period of this report, the scope of services was as follows:

- Orientation;
- Management Training;
- Organisational Support
- Assessment, Counselling, Referral and Consultations – six sessions per issue per annum for employees and dependents;
- Prevention Services to address issues such as Team Building, Conflict Resolution, Stress Management, Goal Setting;
- Access to the 24-hour hotline;
- Provision of three quarterly and one annual reports and Employee Assistance Programme brochures and promotional items; and
- Prevention services including two one-hour educational outreach and two half-day workshops.

The staff continued to make use of the services of the Employee Assistance Programme through the counselling sessions, outreaches and workshops, all of which ensures strict confidentiality and

promotes the wellbeing of staff. According to the International Employee Assistance Professionals Association, the benchmark for health utilisation of the Employee Assistance Programme counselling services is 3% of staff. NIHERST's utilisation rate for the period is 3.3% which is considered a healthy rate.

Two management training sessions were conducted on the topic "Supervisor as a Coach" on June 06 and 13, 2019.

7 INFORMATION GOVERNANCE

7.1 Records and Information Management

The Records Management department continued to adopt a strategic approach to managing NIHERST's information and content. This approach involved developing the Institute's capability in knowledge and information management to support Trinidad and Tobago's knowledge-based economy and the Institute's alignment to Ministry of Education's Goal 1-6: To effectively govern and administer the education system. Additionally, NIHERST continued its efforts to operate within an information governance framework, to comply with external regulations and to guide users' behaviour with respect to corporate content. Specific aspects of the records management programme within the information governance framework progressed at a slow pace. Activities of the records management programme follow.

7.1.1 Records Management

During the 2018/2019 fiscal year, the Records and Information Management programme focused on fine tuning Microsoft Office 365 document libraries of departments located at the NSC. Five departments located at the NSC worked to streamline and fine-tune its document libraries' structure as well as departmental shared folders on the server. Records inventory profiles of each of those departments were used to improve inefficiencies in the records management lifecycle process in the cloud and on the server, adhering to internationally acceptable standards and guidelines for consistency and standardisation.

The Records Management department also continued to work with four of seventeen departments that utilise specialised databases and software files to ensure that where non-integration of systems was not possible at the time, that information was intelligently, and securely managed for access. In such scenarios, the Records Management department continued to work to ensure that some type of structured approach was developed to extract the value of the information stored in such formats in order to enhance the business intelligence of the Institute. A further three departments continued as slow adopters of Microsoft Office 365, as a result of various departmental challenges.

No additional software tools or services were procured to facilitate either content management or development. Financial constraints and protracted approval processes hindered such initiatives. Detailed plans to implement on a phased basis, a fully functional NIHERST intranet on Microsoft Office 365, and a strategy to develop additional user services, selected workflow processes, and business intelligence modules in Microsoft Office 365, did not progress as planned due to financial and human resource constraints. The purchase and implementation of the Microsoft Power BI module to compute and display information on programmes and projects for improved statistical reporting, using dashboards to visually represent the status of projects, and to manage the Institute's information for improved decision-making competed with other projects for scarce financial resources, other strategic plan priorities and a proposed pending institutional structure.

7.1.2 Compliance - Policies, Procedures, Guidelines

NIHERST continued to adhere to the development of good information governance through policies, systems and practices in the context of the changing technology landscape, and legislative demands placed on the Institute regarding its records. Progress slowed on further development of various Records and Information Management policies and procedures, as significant time was

spent in re-conceptualising the work of the Records and Information Management department in relation to the Library Media Centre in providing inputs to a Knowledge Management strategic initiative in the development of the NIHERST Strategic Plan 2020-2022 and in participating on the Strategic Plan 2020-2022 revised organisational structure working group. However, information governance practices were monitored against agreed unambiguous baselines and maintained.

7.1.3 Storage, Archiving and Preservation

Consolidation of archival storage space and archival files continued with a view to increasing storage cost savings as well as efficiencies in access to consolidated files. In the 2018/2019 fiscal year, the department was successful in downsizing from two to one off-site storage location in March 2019 with a single archival storage contract for the period March-September 2019.

7.1.4 Risk Management

For the most part, risk management activities focused on minimising the risk of inappropriate and unauthorised information usage of departmental and project site records and documents. The Information and Communication Technology department continued to implement appropriate controls to protect the Institute's information according to its sensitivity, importance and risk profile. During this period, no breaches were identified. Checks were made as is customary to ensure that Heads of Departments knew the level of access being granted to the department's document libraries and to whom they would have approved access.

The archiving of files to an official off-site records' centre storage facility, reduced the impact of a risk on the ability of the Institute to satisfy its obligations to its employees, customers, partners, auditors and regulators. Minimal progress was made in feedback from the two key departments whose draft records retention and disposition schedules, which are based on regulatory and contractual requirements regarding records/information availability, quality, integrity, privacy and retention and disposition, are foundational to the development of an institutional-wide retention and disposition schedule for e-records (paper and electronic). Without proper processes, policies and systems in place for digital preservation, digital records are at constant risk of not being findable, readable or useable when required.

7.1.5 Successes/Challenges to Implementation

The Records Management department staffed by a Records Manager, continued to register qualitative and quantitative improvements in the Institute's commitment to the principle of "good information governance" in the areas of improved accountability, transparency, compliance, communication and collaboration in document management, and other record-keeping principles. Improvement in the management of the Institute's information assets, records, information and knowledge management systems were evident. Records Stewards supported by the Records Management department continued to work with their departmental staff to re-organise outstanding departmental shares in keeping with industry standards.

The major reliance on the Information and Communication Technology department, as well as staffing constraints, impeded the in-depth development and rollout of the Microsoft Office 365 services.

8 PROCUREMENT

The Institute continued to adhere to proper procurement principles in acquiring goods and services in accordance with *Public Procurement and Disposal of Public Property Act, 2016 (Amended)*. The Procurement function managed by the Procurement department has established and developed guidelines and internal policies and procedures. NIHERST utilised three forms of tendering namely the Open Tendering, Selective Tendering and Sole Tendering.

Selective tendering was utilised most often during the 2018/2019 fiscal year, except in the case of large contracts where either open or selective tendering processes was chosen. In accordance with NIHERST's approved Procurement procedures and the Signing Authority policy, approval of all contracts for goods and services valued in excess of TT\$450,000, must be obtained from the NIHERST Board of Governors.

Sole tendering would only be utilised in the following cases:

- where the item is made by a sole manufacturer or is available from a sole distributor;
- when replacement parts and accessories of equipment and machinery of a particular make or model are available from only one source;
- for standardisation purposes; and
- where no one else can provide the services or work to the standard and/or timeline required by NIHERST.

8.1 Award of Contracts

During the 2018/2019 fiscal year, ten contracts were awarded, all of which were under the value of TT\$450,000 and therefore did not require Board of Governors' approval. These contracts were as follows:

- TT\$100,000 < TT\$450,000:
 - S.K. Management for Accounting Service – for auditing of the Institute's financial reports.
- TT\$10,000 < TT\$100,000:
 - VSL Consultants Limited – for facilitating the strategic planning process of the Institute and the development of the Institute's new strategic plan;
 - Tramest Limited – In-house pest control at the NSC;
 - PEAPSL Consultancy Limited - for services under the Employee Assistance Programme;
 - Ms. Dianne Wells – Consultant, Rainwater Harvesting project;
 - Icons Limited – Security Services for NIHERST's ITC server;
 - Wanter Enterprises Limited – Printing Services, design and layout services of NIHERST Strategic Planning Booklet;
 - Signpost – Billboard Signs for the NSC; and
 - Massy Motors – Repairs and maintenance of Vehicles.
- TT\$10,000 or less:
 - Ms. Hazra Baksh – Facilitator for Professional Development Workshops for Primary Mathematics Teacher.

8.2 Improvement and Implementation of the Procurement Processes Review

In the Institute's effort to become compliant with the new laws and regulations that govern the procurement process, the Procurement Review team established in 2017 was reconvened in September 2019 to implement the recommendations of the Report prepared in March 2018 titled "Making the Connection: Improvement of the NIHERST Procurement Processes and Procedures with Recommendations and Operational Procedures for Mapped Processes".

9 PUBLIC, COMMUNITY AND STAKEHOLDER RELATIONS

9.1 Client and Public Access to Services/Service Delivery Systems

9.1.1 Service Delivery Model

NIHERST's service delivery model employed two strategies for public access to its products and services.

It utilised its locations as a pull strategy where clients and customers accessed products and services. The Institute also conducted outreach tours and participated in external exhibitions to reach key audiences that otherwise may not access the Institute's location given its geographical position.

Although these channels worked, enhanced digital approaches were utilised to capture the burgeoning class of NIHERST customers with preference for consuming products and services digitally. By calibrating digital messaging and promotions over the reporting period, the Institute recognised a substantial increase in social media engagement and performance as follows:

- Facebook following: New followers averaged one hundred and ninety (190) persons every month except for dips under one hundred in the months of November and December 2018. The month with the highest new followers was March 2019 with three hundred and thirty-nine (339) new followers on NIHERST's Facebook page.
- Facebook organic reach: Organic Reach doubled in the fiscal year increasing from thirteen thousand, four hundred and eighty-two (13,482) to twenty-six thousand, nine hundred and seventy-six (26,976) by the end of the period. This is attributed in part to the implementation of a social media schedule which saw an increase in weekly posts, more engaging content, posting of special observances in the STEM community and the beta testing of trivia, fun facts and other content to improve engagement.
- Instagram following: Increased Instagram following was noted.

The development and ongoing refinement of NIHERST's social media strategy complemented limited advertising spend on social media advertising and resulted in greater reach and response rates for advertised programmes and events. Moving forward, NIHERST will expand its digital presence by providing publications and reports digitally including possible sale of its publications and streaming events online.

9.2 Engagement and Stakeholder Relations

The Institute, as part of its strategic planning exercise towards the development of its new Strategic Plan 2020-2022, initiated the process of stakeholder identification and ranking during the reporting period. The output of this process was used to identify additional high value and potential NIHERST stakeholders and to solidify the developed ongoing stakeholder strategy and plan.

During the reporting period, NIHERST also devised an external newsletter to promote products and services to key stakeholders and to solicit feedback. The strategy increased top of mind awareness of NIHERST and its products and services to key influences in the government,

corporate and mass market segments. Targeted stakeholder consultation events are in the planning stages to reinforce the Institute's value proposition and offerings.

9.3 Leveraging Branding Relations

Several branding projects were initiated in the 2018/2019 fiscal year with a view to revitalising the NIHERST brand in the public domain and to effect demand creation for NIHERST services. Initiatives started in the period were:

- Website Refresh: the project sought to improve the user experience and make accessing relevant information quick and easy;
- NSC Signage: installation of attractive signage to increase visits at the NSC;
- Creative Branding Projects: negotiation of exhibition spaces at public spots such as the National Library and Information Systems Authority and the Ministry of Education Lobby to promote initiatives such as Fab Lab; and
- Cross Promotion on third parties' websites and social media platforms: leveraged other ministries and state agencies such as "ttconnect" to promote innovation projects and workshops.

9.4 Public Relations and Strategic Partnerships

Public Relations activities were geared towards building relationships with media for the reporting period to generate additional earned publicity for programmes and events to extend NIHERST's brand stories' shelf life. These strategies secured more mass media opportunities on television and radio for key initiatives such as NASA I² and *FIRST*® LEGO® League.

Under the Institute's third strategic focal area: Building Strategic Alliances and Partnerships, the Institute successfully secured a few lucrative sponsorships from private sector companies. This allowed NIHERST to reach more of its key audiences in rural and underserved communities as well as advance newer initiatives such as the Rainwater Harvesting System project that requires substantial investments.

The Institute remains committed to advancing its mandate and aggressively pursuing public-private partnerships to make this a reality.

10 INTERNAL AUDIT

The Internal Audit department was re-established on March 19, 2018, after more than two decades of being inoperative. Over the 2018/2019 fiscal year, the department functioned in spite of staffing constraints and lack of resources to develop both an Internal Audit Charter and an Internal Audit Plan. These were incorporated into the operations of the Institute. The department revised the Terms of Reference of the Audit Committee of the Board of Governors and embarked upon a comprehensive programme of audit activities for the key risk areas of the Institute. It was anticipated that the department would further fulfil its mandate to add significant value to the Institute in the areas of internal control, risk management and governance processes.

11 HEALTH, SAFETY AND THE ENVIRONMENT

The Health, Safety and Environment department in May 2019 embarked on developing the Institute's Health, Safety and Environment Management system to meet the requirements of the Occupational Safety and Health Act and the Environmental Management Act.

Components of the Health, Safety and Environment Management system that were developed by the Institute for the 2018/2019 period include:

- The Institute's Health, Safety and Environment Policy Statement which guides NIHERST in establishing and implementing programmes to reduce workplace hazards, protect lives and promote employee health.
- The following Health, Safety and Environment procedures that guide relevant processes of the Institute:
 - Control of Health, Safety and Environment Documents;
 - Employee's Right to Refuse Unsafe Work;
 - Conducting Risk Assessments; and
 - Incident, Accident and Near Miss Reporting and Investigation.
- An Emergency Response Plan, which identifies the measures to take in case of identified foreseen emergencies.
- Various risk assessments to guide and support the operations of the Institute.

The Health, Safety and Environment department has been challenged by both human resource and financial constraints which have delayed further system development and by extension limited the Institute's ability to maintain its basic duty of care.

12 CONCLUSION

The Institute added value by building on its established foundation and distinguished reputation to successfully deliver its work programme. The anticipated unfolding of NIHERST Strategic Plan 2020-2022 bodes well as it places the Institute on the trajectory to delivering new initiatives based on the current articulated needs for the national advancement of STI.

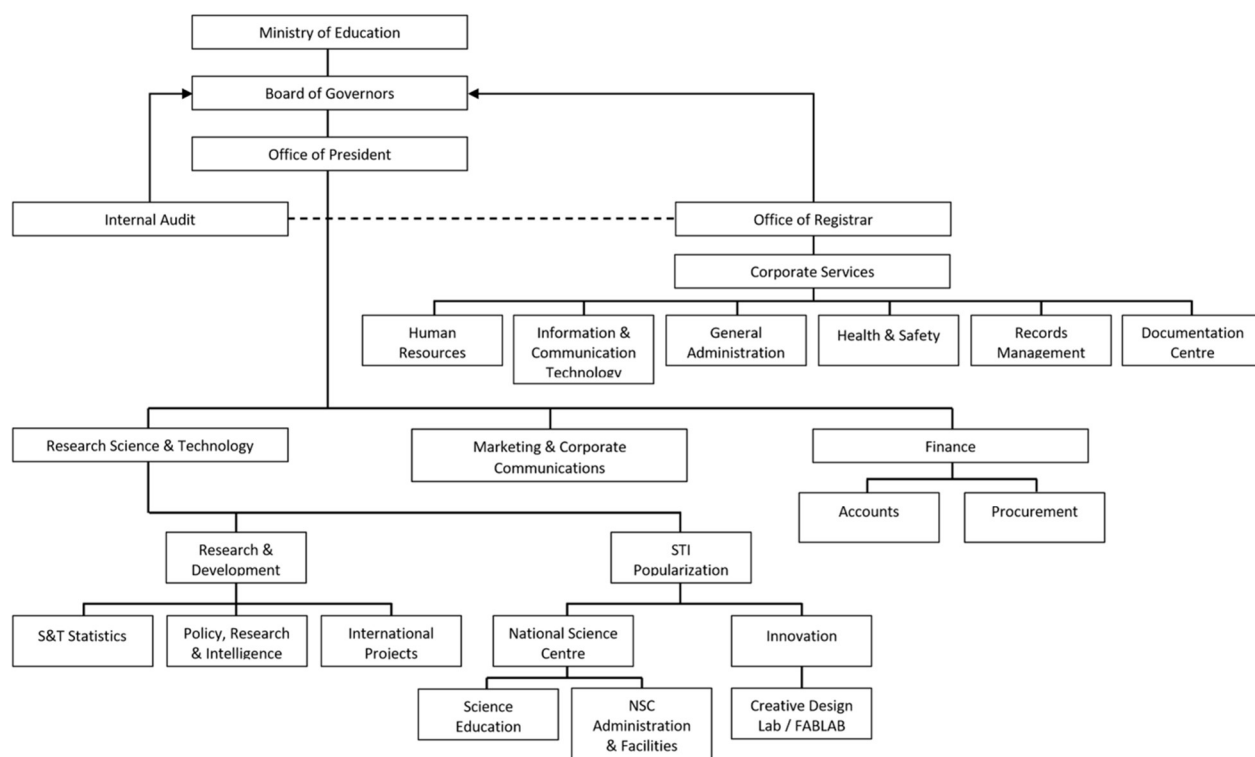
13 APPENDICES

13.1 Appendix 1 – Permanent Establishment

Board 01 - National Institute of Higher Education Research, Science and Technology
Details of Establishment, 2018

Establishment		Item No.	Description	Range No.	Explanation
2017	2018				
			Office of the President, Science & Technology		
1	1	(1)	President		
1	1	(2)	Vice President, Science & Technology		
1	1	(3)	Registrar		
1	1	(4)	Senior Specialist	68	
1	1	(5)	Assistant Registrar	63	
1	1	(6)	Senior Economist	60	
1	1	(7)	Systems Analyst II	59E	
1	1	(8)	Mechanical/Electrical Engineer I	59D	
1	1	(9)	Information Analyst	56G	
1	1	(10)	Systems Analyst I	55	
1	1	(11)	Economist II	53E	
1	1	(12)	Librarian II	53E	
1	1	(13)	Administrative Officer II	46D	
1	1	(14)	Teacher II	46D	
3	3	(15)	Research Officer I	46	
2	2	(16)	Economist I	46	
1	1	(17)	Programmer/Systems Analyst	39/45	
1	1	(18)	Programmer I	39	
1	1	(19)	Personnel and Industrial Relations Officer	35G	
1	1	(20)	Accountant II	35G	
1	1	(21)	Auditor	35F	
2	2	(22)	Administrative Assistant	35F	
2	2	(23)	Administrative Cadet	35D	
1	1	(24)	Workshop Superintendent	34	
1	1	(25)	Accountant I	31C	
3	3	(26)	Laboratory Technician	29	
1	1	(27)	Accounting Assistant	25E	
2	2	(28)	Clerk III	24E	
3	3	(29)	Research Assistant I	23	
2	2	(30)	Chauffeur/Messenger	17	
3	3	(31)	Direct Data Entry Operator	17	
1	1	(32)	Clerk Stenographer I	15	
3	3	(33)	Clerk I	14	
4	4	(34)	Clerk Typist I	13	
1	1	(35)	Messenger I	9	
1	1	(36)	Cleaner/Maid I	4	
54	54				

13.2 Appendix 2 - Draft Proposed Organisational Structure



13.3 Appendix 3 - Staff Training and Development

Department	Training Institution	Training Programme	Training Period	No. of persons trained
Office of the President; General Administration; Documentation Centre	Public Service Academy	HR for Non-HR Professionals	October 16-18, 2018	3
General Administration	Public Service Academy	Communication for Effective Customer Service	January 08-09, 2019	1
International Projects	Public Service Academy	Presentation Skills for Senior Managers	January 22-23, 2019	1
Science and Technology Statistics	Public Service Academy	Project Management Toolkit Series: Preparation of Logical Frameworks	January 29 - 30, 2019	1
International Projects	Public Service Academy	Conflict Resolution	February 05-07, 2019	1
Accounts	Public Service Academy	Introduction to Public Service Accounting	February 19-21, 2019	2
Human Resource	Public Service Academy	Coaching and Mentoring Skills for Managers	March 19 - 21, 2019	1
Human Resource Marketing and Communications	Public Service Academy	Ethical Issues in the Public Service	April 09-10, 2019	2
Office of the President; Information and Communication Technology	Public Service Academy	Financial Management for Non-Accounting Officers	April 09-11, 2019	2
Internal Audit	Public Service Academy	Audit Tools and Techniques for Internal Audit Managers	April 09-12, 2019	1
General Administration; Information and Communication Technology	Public Service Academy	Supervisory Management	May 08-10, 2019	2
Human Resource	Public Service Academy	Conducting Job Analysis and Writing Job Descriptions	May 15-17, 2019	1
Science and Technology Statistics	Public Service Academy	Ethical Issues in the Public Service	May 21 - 22, 2019	1

Department	Training Institution	Training Programme	Training Period	No. of persons trained
Finance - Procurement	Project Management Institute Southern Caribbean Chapter	Public Procurement and Disposal of Public Property Act, 2015 – Understanding the Requirements	May 22, 2019	2
Office of the President	Public Service Academy	Responding to Parliamentary Committee Queries	July 23, 2019	1
Office of the President	International Program for Development Evaluation Training)	International Developmental Evaluation Workshop Session III - Strengthening the use of evaluation evidence in policy and program implementation and service delivery: the role of evaluation systems Session IV- Evaluation Design and Approaches, mixed methods for evaluation	July 29 to August 02, 2019	1
Policy, Research and Intelligence Gathering	Public Service Academy	Project Management Toolkit Series: Project Appraisal and Analysis	September 11-13, 2019	1
Finance - Procurement	The Office of Procurement Regulation	Procurement, Retention and Disposal of Public Property	September 11-13, 2019	1

13.4 Appendix 4 – Key Partners

NIHERST'S key partners during the fiscal year were as follows:

- Atlantic LNG
- British Geological Survey
- Caribbean Academy of Sciences
- Caribbean Council for Science and Technology
- United States Embassy in Port of Spain
- European Union
- Fab Foundation
- *FIRST*® LEGO® League
- Institute of Electrical and Electronics Engineers – Global
- Institute of Electrical and Electronics Engineers – Trinidad and Tobago Section
- Intellectual Property Office
- LEGO® Education
- Massachusetts Institute of Technology
- Massy Foundation
- Ministry of Education - Curriculum Division and Information Communication Division
- NASA
- NASA Ames Research Center
- Nautilus
- Organisation of American States
- Scientific Research Council, Jamaica
- Shell Trinidad and Tobago Limited
- The National Gas Company of Trinidad and Tobago
- The University of the West Indies
- The University of the West Indies Seismic Research Centre
- The University of Trinidad and Tobago
- UNESCO



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2019