



International
Labour
Organization

ASSESSMENT OF 21ST CENTURY SKILLS ACROSS EMERGING SECTORS



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Maritime | Aviation | Tourism | Software Design & Applications | Agro-Processing

National Institute of Higher Education, Research, Science and Technology (NIHERST)

Building Evidence-Based Quality Apprenticeship Systems

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WHO WE ARE

The National Institute of Higher Education, Research, Science and Technology (NIHERST) was established as a statutory body by Republic of Trinidad and Tobago Act No. 20 of 1984, now Chapter 39:58.

Mandate: To promote the development of science, technology and higher education in Trinidad and Tobago, and enhance the innovative, creative and entrepreneurial capabilities of the general population.

Key Objectives:

- *Solution-Oriented Research:* To deliver research results of today to meet the STI challenges of tomorrow
- *Solution-Oriented Innovation:* To strengthen the National Innovation and Technopreneurship System through our workshops, Fablab, programmes and events
- *Science Advancement:* To enhance the scientific literacy of the population of Trinidad and Tobago
- *Skills Development:* To facilitate growth of the capacity, capability and opportunity of the STEM labour force in T&T

NIHERST plays a key role in assessing workforce competencies and generating labour market intelligence to support apprenticeship and training systems across sectors.

WHY DATA MATTERS FOR APPRENTICESHIP AND TRAINING PROGRAMMES

Apprenticeship and training systems must be designed around evidence of real labour market demand.



The Assessment of 21st Century Skills Across Emerging Sectors reports provide evidence on skills needs across critical sectors

OVERVIEW OF THE STUDY

- **Conducted by:** National Institute of Higher Education, Research, Science and Technology (NIHERST) in collaboration with the International Labour Organization (ILO).
- **Focus:** The research examined current and future workforce demand, with a focus on STEM and 21st century skills across five emerging sectors in Trinidad and Tobago:



- **Objective of the Assessment:** To generate labour market intelligence to inform evidence-based policy development and strategic decision-making in the areas of labour force development, education, training and skills development, and career pathways.

WHY THIS STUDY WAS NECESSARY

Responding to Rapid Technological Advancements



Digitalisation, automation, AI and advanced technologies are transforming industry operations.

Addressing Changing Workforce Demands



Employers seek a combination of technical expertise and 21st century skills.

Closing the Skills Gap



Increasing mismatches between workforce capabilities and industry needs.

Supporting Economic Diversification and Competitiveness



Strengthens emerging sectors amid technology-driven transformation in Trinidad & Tobago.

METHODOLOGICAL FRAMEWORK

Method & Framework	Questionnaire Design — Core Skills & TVET	Sample & Data Collection
The survey employed a mixed-methods approach. A questionnaire was designed to collect both quantitative and qualitative data. Guided by the ETF/CEDEFOP/ILO Guide to Developing and Running an Establishment Skills Survey. Reference: European Training Foundation/European Centre for the Development of Vocational Training/ILO. Developing and Running an Establishment Skills Survey: Guide to Anticipating and Matching Skills and Jobs, Volume 5. 2017.	Developed using the ILO Global Framework on Core Skills for Life and Work in the 21st Century. Included 19 core skills grouped under four broad categories: 1. Social and emotional skills 2. Cognitive and metacognitive skills 3. Basic digital skills 4. Basic skills for green jobs Incorporated the Integrated STEM TVET Curriculum Guide to assess TVET-related STEM skills. References: Global Framework on Core Skills for Life and Work in the 21st Century, ILO (2021) ILO Women in STEM for Workforce Readiness and Development Programme: STEM in TVET Curriculum Guide, ILO (2021)	A representative sample of establishments was drawn from each sector. Systematic random sampling stratified by sub-sector and size. Interviews conducted by trained field staff (October–November 2023). Pilot study was undertaken to ensure clarity and accuracy of responses.

DATA COLLECTED AND ITS APPLICATION TO WORKFORCE DEVELOPMENT

Data Collected	Application to Workforce Development
1. Characteristics of Employers	Provides industry context, helping tailor apprenticeship and training programmes to sector-specific needs, and informs policymakers and educators about the types of employers driving demand.
2. Characteristics of the Workforce	Highlights workforce composition, skills gaps, and in-demand competencies to guide targeted training, curriculum design, and workforce planning.
3. Industry Demand & Skills Requirements	Identifies current and future STEM and 21st century skill needs, ensuring programmes equip learners with the skills required for employment and emerging roles.
4. Employer Engagement & Industry Signals	Captures real-world employer feedback, recruitment trends, and emerging roles to align training and apprenticeships with industry expectations.
5. Technological Advancements & Workforce Implications	Assesses the impact of digitalisation, automation, and AI to prepare learners for technology-driven industries and jobs of the future.
6. Recommendations: Policy, Programme & Career Development	Guides design of apprenticeship and training programmes, career pathways, and incentives to encourage participation in high-demand STEM and emerging sector roles.

KEY FINDINGS

RECRUITMENT CHALLENGES & EMPLOYERS' RECOMMENDATIONS

- Employers reported difficulties linked to:
 - Skills gaps
 - Lack of work experience
 - Work-readiness and attitudinal factors
- Hardest-to-fill roles: IT, Engineering, Natural Sciences, Food Science
- Highest difficulty by occupation: Professionals, Technicians/Associate Professionals, Managers
- Employer recommendations:
 - More industry-aligned training, internships and apprenticeships
 - Raise awareness of STEM careers
 - Restructure education to align with industry

KEY FINDINGS

CORE SKILLS & SKILLS MISMATCHES

Employers assessed current employees and recent job applicants across 19 core skills.

Core Skills – Employers' Expectations	Core Skills – Employees	Core Skills – Recent Applicants
Most valued skills: - Communication - Collaboration & Teamwork - Problem-solving & Decision-making - Analytical & Critical Thinking - Self-reflection & Learning to Learn Moderate importance: - Green skills (waste reduction, energy efficiency) Key Observation: - Employers expect higher skill levels than are currently present.	Existing employees: medium to high proficiency in most skills Strongest skills: - Communication - Collaboration & Teamwork - Planning & Organising - Analytical & Critical Thinking - Use of basic software/hardware Skills gaps: - Self-reflection & Learning to Learn - Conflict resolution & negotiation - Emotional intelligence	Recent Graduates are stronger in: - Basic digital skills - Collaboration & teamwork - Introductory green skills Skills gaps: - Emotional intelligence - Self-reflection & learning to learn - Analytical & critical thinking - Creative and innovative thinking - Problem-solving & decision-making Graduates' preparedness for the workplace: - Somewhat prepared: 50–70% - Well prepared: 10–36% - Poorly prepared: 10–21%

KEY FINDINGS

CURRENT & FUTURE DEMAND FOR STEM LABOUR

Current demand	Projected demand (next 5 years)
Main Jobs Demanded - Aviation: IT and Engineering Professionals - Agro-processing: Food Scientists, Web Designers, Mechanical Engineers, HSE Officers - Software: Database Developers, IT Technicians - Tourism: Web Designers & Environmental Scientists - Maritime: Marine Engineers, IT Technicians	Main Jobs Forecasted - Aviation: Web/Digital Designers, HSE Officers - Agro-processing: Food Scientists, Agricultural Technicians, Environmental Scientists - Software: Software Developers, Web Designers, Cybersecurity Specialists - Tourism: Environmental Scientists, Food Scientists, Software Developers - Maritime: Electrical Engineers, Marine Surveyors, Marine Engineers

KEY FINDINGS

TECHNOLOGICAL ADVANCEMENTS AND IMPLICATIONS

Main Technological Advancements	Implications for Skills Development	Key STEM Roles Across Sectors
AI, Machine Learning & Data Analytics	AI/ML expertise; predictive modelling; data-driven decision-making	AI/ML Engineers; Data Scientists; Data Analysts
Automation & Smart Systems	Robotics; mechatronics; systems control; IoT integration	Robotics Engineers; Automation Technicians; IoT Specialists
Cloud & Cyber Infrastructure	Cloud architecture; DevOps; cybersecurity; digital resilience	Cloud Engineers; DevOps Engineers; Cybersecurity Analysts
Advanced Engineering Systems	Engineering fundamentals; systems integration; digital diagnostics	Aerospace; Marine; Electrical Engineers
Digital Platforms & UX Technologies	UX/UI design; service digitisation; immersive tech development	UX/UI Designers; VR/AR Developers; Systems Developers
Sustainability & Green Technologies	Renewable systems; green engineering; regulatory compliance	Environmental; Renewable Energy; Sustainability Engineers

BUILDING EVIDENCE– BASED QUALITY APPRENTICESHIP SYSTEMS

Effective apprenticeship systems are built on a clear understanding of labour market demand, emerging skills trends and employer expectations.

When data is collected systematically, analysed rigorously, and applied strategically, apprenticeship systems can:

- Reduce skills mismatches by aligning training with real industry needs
- Strengthen productivity through a workforce equipped with relevant, future-ready skills
- Support economic diversification by preparing talent for emerging and priority sectors
- Prepare youth for the future of work by equipping them with future-ready, 21st-century skills that enable adaptability, innovation, and lifelong learning.



THANK YOU



NIHERST Science and Technology Statistics Department

Reports link: <https://www.niherst.gov.tt/research/AssessmentOf21stCenturySkillsAcrossEmergingSectors.html>

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