YOUNG RESEARCHERS' EXPERIENCE IN THE CARIBBEAN

AND THE IMPLICATIONS ON
SCIENCE AND TECHNOLOGY INNOVATION

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Small Island Developing States (SIDS) such as those of the Caribbean face unique challenges, but technological advances such as Automation and Artificial Intelligence (AI) give them a chance to not only survive but thrive. These technologies facilitate SIDS to compete with resource-intensive countries by improving the quality of service, facilitating daily business operational-level planning and long-term strategic planning to build robust and strong economic prosperity.

Global Technology Readiness

The 2021 UNESCO Science Report suggested that a country's future economic competitiveness will depend on how quickly it transitions to a digital society (Lewis, Schneegans & Straza, 2021).

The Economist Intelligence Unit assessed automation readiness based on three key aspects: Innovation environment, labour market policies and educational policy. This readiness index ranked South Korea, Germany and Singapore as the top 3 countries in the world. A UNCTAD 2021 report on technology readiness, which covered various indicators, also shows that countries in North America and Europe are more ready than the rest of the world. The overall technology readiness index for Latin America and the Caribbean reported by UNCTAD is below the global average of 0.5. In terms of individual countries, the highest ranked Caribbean country by UNCTAD is Barbados, followed by Trinidad and Tobago (Table 1).

Country Name	Total Score	Total ranking	Score w Group	ICT ranking	Skills ranking	R&D Ranking	Industry ranking	Finance ranking
Barbados	0.56	48	Upper-middle	36	46	79	56	37
Trinidad and Tobago	0.45	75	Upper-middle	41	71	121	92	90
Mauritius	0.45	77	Upper-middle	83	58	94	74	40
Bahamas	0.39	84	Lower-middle	37	73	143	126	74
Fiji	0.37	88	Lower-middle	91	64	115	104	29
Saint Lucia	0.34	93	Lower-middle	84	75	153	93	62
Jamaica	0.32	96	Lower-middle	67	93	120	118	101
Cabo Verde	0.29	101	Lower-middle	92	107	153	82	63
Maldives	0.25	114	Lower-middle	100	54	153	153	103
Saint Vincent and the Grenadines	0.22	120	Low	141	110	153	128	123
Comoros	0.1	142	Low	137	127	153	117	139
Timor-Leste	0.09	144	Low	155	102	146	127	151
Average Score	**0.31**							

Table 1: UNCTAD's technology readiness index ranking for SIDS.

The common metrics in both reports are research, innovation, and education, meaning that the educational prowess of the people drives the shift in the economic prosperity of a particular nation.

For example, China and India ranked higher in research and development due to their highly skilled workforce.

Education Prowess of the People in the Caribbean

Finances have historically been a major barrier to postgraduate study in the Caribbean. In addition to financial difficulties, Ph.D. level study presents difficulties to access resources and developmental activities in the region's proximity. This results in students taking longer to finish or even abandoning their research altogether. It further leads to students seeking green pastures at foreign institutions. While higher learning institutions provide some support, it is not sufficient to allow students to fully focus and complete the research. The available financial support through tuition waivers and stipends are not livable wages resulting in students seeking other jobs to supplement income. Academic support from research supervisors also presents a challenge as their time is often exhausted with heavy teaching loads and administrative work. Students, therefore, rely on outdated or rudimentary technologies which reduce productivity.

The path to a doctorate in the Caribbean is marred by barriers to full-time academic research; limited resources and a lack of human capital resulting from the preoccupied research students. Universities cannot do it alone, the available active researchers

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promote new research and innovation. Local private corporations, government agencies and other institutions must then invest in supporting research and innovation which aligns with their business goals. What is required to gain competitiveness is the research and innovation ethos. This will then create a supportive environment where a competitive agenda is operationalized.

Globally, as part of sustainable development goals, countries such as those in the Caribbean have pledged to dedicate at least 1% of the GDP to Gross Expenditure on Research and Development (GERD) to support research and innovation. SIDS budgets are small in absolute terms and according to UNESCO Institute for Statistics (UIS) , the GERD in 2020 for Latin America and the Caribbean is at 0.63, 1.05 for SIDS, while the world average is 1.93. Looking at individual countries there were no statistics for most of the Caribbean countries, indicating that the regional statistics reported are predominantly of the other countries. For those with reported data such as Trinidad and Tobago, the GERD is 0.06 in 2019, Cuba has the highest at 0.52 in 2020.

Researchers and institutions in the Caribbean rely predominantly on foreign donors and funding agen-

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cies. This leads to the research focus, solutions and development of new technologies being directed by foreign interests. A famous Economist, Dambisa Moyo in her book Dead Aid, expounded on the negative impacts of the African continent or by extension any society relying on foreign donors, "when our best academics are attracted to work on objectives defined by foreign funding agencies, we lose more and gain little."

Research for Local Solutions in the Caribbean

There is unarguably massive potential for the use of research to solve local issues like making tourism more sustainable by understanding climate change. Machine learning models can be applied to predict regional sea-level changes in the Caribbean region 1 to 3 years into the future, using ocean temperature data. This estimate will be combined with the effect of ice melting, ultimately to reach the overall long-term/medium-term impact on regional sea-level changes. Those estimates can be used to support strategic planning in Caribbean countries. Similarly, a predictive model for rainfall and tourism activity in the short term based on regional historical data is also an option.

AI techniques such as machine learning could inform the design of the economic policy for our countries for the next 5 or 10 years, we could model and track economic growth and precisely predict the sustainability of social interventions. The Digital revolution will continue to benefit frontiers and societies that have invested in building intellectual capacity to solve their problems/challenges using modern technology powered by AI. Without such investments, we will find ourselves as consumers of foreign technology, contributing to the development of their interests or using ancient technology to solve new problems. Importantly our policy will depend on parachute science, which is relying on knowledge produced by researchers from other countries.

For example, a study in marine litter-related research in the Caribbean reported that 65% of the publications were not authored by lead authors affiliated with countries from the Caribbean region. They further reported that of the senior authors in the case of multiple authorships, 85% of the authors did not come from the region (Stöfen-O'Brien et al, 2022).

By empowering and stimulating young minds to become the makers of modern and relevant technology we can fuel growth and sustainable prosperity in our society, given the global context. The Caribbean is blessed with unique, diverse and creative people and shares unique challenges alike. As we embark on the next industrial revolution it is imperative that our people, communities and industries produce innovation and technologies of the future, capable of adapting to our changing world.

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References

- Lewis, J., Schneegans, S., & Straza, T. (2021). UNESCO Science Report: The race against time for smarter development (Vol. 2021). UNESCO Publishing.
- UNCTAD, M. (2021). Technology and innovation report 2021. In United Nations Conference on Trade and Development. United Nations Geneva.
- Dewanarayana, F. B., & Wimalaratana, W. (2021). Industrial revolutions and shifting of global competitiveness. Revolution, 3(7), 19-30.
- Stöfen-O'Brien, A., Ambrose, K. K., Alleyne, K. S., Lovell, T. A., & Graham, R. E. (2022). Parachute science through a regional lens: Marine litter research in the Caribbean Small Island Developing States and the challenge of extra-regional research. Marine Pollution Bulletin, 174, 113291

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