





2023-2027

National Roadmap for Research and Innovation

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List of Abbreviations

A.P.E.I.M	Association de Parents d'Enfants Inadaptés de l'Ile Maurice
AFRC	Albion Fisheries and Research Centre
AI	Artificial Intelligence
AIS	Automatic Identification System
AML/ CFT	Anti-Money Laundering/Combating the Financing of Terrorism
AtoN	Aids to Navigation
BOM	Bank of Mauritius
CBBR	Centre for Biomedical and Biomaterials Research
CBO	Community Based Organizations
CDD	Customer Due Diligence
CSR	Corporate Social Responsibility
DTAA	Double Taxation Avoidance Agreement
EDB	Economic Development Board
EEZ	Exclusive Economic Zone
EU	European Union
FAREI	Food and Agricultural Research and Extension Institute
FATF	Financial Action Task Force
FSC	Financial Services Commission
GBV	Gender-Based Violence
GDP	Gross domestic product
GRF	Global Rainbow Foundation
GRID	Grassroots Innovation Database
ICT	Information and Communications Technology
IFC	International Finance Centre
IGC	Intergovernmental Council
IMF	International Monetary Fund
loT	Internet of things
IUU	Illegal, Unreported and Unregulated
KYC	Know Your Customer
MACOSS	Mauritius Council of Social Service
MAFH	Mauritius Africa FinTech Hub
MCA	Mauritius Chamber of Agriculture
MCIA	Mauritius Cane Industry Authority
MDA	Maritime Domain Awareness
MITCI	Ministry of Information Technology, Communication and Innovation
MOI	Mauritius Oceanography Institute
MOST	Management of Social Transformations
MOTCI	Ministry of Technology, Communication and Innovation
MRIC	Mauritius Research and Innovation Council
MSIRI	Mauritius Sugarcane Industry Research Institute, MCIA
NCG	National Coast Guard



Non-Governmental Organization
National Land Transport Authority
Organisation for Economic Cooperation and Development
Research and Development
Satellite Radar Imagery
Registrar of Companies
Robotic Process Automation
Regulatory Sandbox Licence
Sustainable Development Goal
Small Island Developing States
Social Innovation and Research Grant Scheme
Small and Medium Enterprise
Science, Technology, Engineering, the Arts and Mathematics
Social Technology Network
Strength, Weakness, Opportunity and Threat
United Nations
United Nations Development Programme
United Nations Environment Programme
United Nations Educational, Scientific and Cultural Organisations
United Nations High Commissioner for Refugees
United Nations Children's Fund
United Nations Technology Innovation Labs
University of Mauritius
Unsolicited Research and Innovation Grant Scheme
Virtual Asset and Initial Token Offering Services
Visible Infrared Imaging Radiometer Suite
Vessel Monitoring System



Foreword



I have the pleasure to present the National Roadmap for Research and Innovation (2022-2027), which outlines the Government's vision to transform the country into an innovative nation.

The Government, with the vision and leadership of the Prime minister, Honourable Pravind Kumar Jugnauth, has always been committed to fostering a vibrant environment where our enterprises, workers, the civil society and NGOs are all empowered to innovate.

Since the islands of the Republic of Mauritius are not endowed with natural resources, we cannot compete on natural resources. That is why we endeavour to continuously reinforce the enablers, including our transparent and progressive

regulation, and our digital connectivity to the world. These enablers will continue to allow businesses to anchor in Mauritius. At the same time, we will continue to deepen our international partnerships to reach new frontiers of innovation. «Les Assises de La Recherche et de l'Innovation» was a platform that drove a national dialogue and formulated a conducive framework for policy revamping while concurrently providing insights on emerging innovations.

The **National Roadmap for Research and Innovation** is the outcome of a long series of consultations, deliberations, analysis, and concertation. This report embodies the efforts of all involved parties towards bettering the innovation ecosystem of the country.

Put simply, the Roadmap marks the start of a conversation to identify: the strengths and challenges facing the selected priority sectors, the issues that need to be addressed, how we want to work with businesses, universities, the **third sector** and across Government to cement our aspirations to become an innovation-savvy country.

As a nation, we indeed need to strive and make Innovation a reality and part of our lives.

Innovation can only thrive in an environment where it is encouraged, where interaction and exchange of ideas are welcome and where brainstorming, and breakdown of information take place.

Research and Innovation will be critical to a swift economic and social recovery from the impacts, not only of COVID-19, but equally of the complex and economically volatile international context in which we are currently evolving. These are quintessential for a greener, healthier, resilient, and more inclusive Mauritius.

This initiative can be viewed as "le fil conducteur" of the ideas and hopes of actors across the board as well as an intertwining of the discussions and recommendations.

It also supersedes the National Innovation Framework (2018) which, in the current context, requires a thorough revamping.

We are confident that this Roadmap is the cornerstone toward igniting the innovation ecosystem and that it will remain a landmark in the Mauritian economic panorama.

Honourable Deepak Balgobin

Minister of Information Technology, Innovation and Communication



Message by Chairman



No nation can aspire to be in the league of high-income countries if it does not include research and innovation in its list of priorities. This is because innovation-led growth plays a pivotal role in establishing a solid position for any nation in this hypercompetitive world. Research and innovation is a tool par excellence to overcome the constraints of the small size of a country and its limited resources. The current Roadmap is a contribution of the MRIC in strengthening the foundations of Mauritius as a knowledge-based, innovation-driven economy.

I am proud that the Government of Mauritius, through the Honourable Darsanand Balgobin, Minister of Information Technology, Innovation and Communication has extended its

support to Mauritius Research and Innovation Council (MRIC) to conduct Les Assises de la Recherche et de l'Innovation (ARI), both in Mauritius and Rodrigues. This report, which emanates from the passionate and intense discussions held during the ARI, reflects the sincere contribution of the wide range of stakeholders who have the promotion of research and innovation close to their hearts.

It is with great satisfaction that we note that the ARI has led to projects, policies and activities that would allow our country to move up the economic value chain and build a strong base of resource persons, scientists, engineers and technologists who would help to drive economic and enterprise transformation.

I seize this opportunity to express my gratitude to all the participants who have contributed to the event's success and the preparation of this Roadmap. Their inputs before ARI have also played a pivotal role in churning out the priority areas. Undoubtedly, we would have also wished to work with a longer list, but the constraints have forced us to limit the number of sectors to six in Mauritius and four in Rodrigues. I would like to reassure all the stakeholders that MRIC will continue to contribute to the research and innovation initiatives in all sectors through its framework of schemes.

This Roadmap adopts a broader definition of innovation to appeal to a more significant number of actors involved in the socio-economic development of the Republic of Mauritius. Thus, innovation does not only refer to the application that breaks the knowledge frontier but also to the application of existing knowledge and the latest technologies to manufacture new products and to offer new services locally. I sincerely hope that by rejecting the narrow view of innovation that refers to sophisticated activities that can be conducted in a complex environment by experts only, all firms, including small, medium, and large ones, will be able to join us on this journey of transforming Mauritius into a research and innovation hub. In fact,



we would need all available pairs of hands to implement the current Roadmap. Moreover, the projects identified in this report also require inputs from all the captains of the industries. As this document is in the public domain, we encourage everyone to use it to prepare the research and innovation plans of their organisations. This will also help build the necessary synergy at sectoral and national levels.

MRIC, with the amended MRIC Act, will continue to play the role of a catalyst with renewed energy. However, despite all our efforts, this Roadmap can only be implemented with the commitment of the authorities, private sector, academics, researchers, and innovators. I want to thank them in advance. I would like to place on record the commitment of the Hon. D Balgobin, the Board-Directors of the MRIC, the Executive Director and all members of staff of MRIC, as well as all the sponsors who have endeavoured to make ARI a successful venture.

Dr Kaviraj Sharma Sukon, PhD, PFHEA Chairperson, Mauritius Research and Innovation Council



Acknowledgements



This roadmap was much awaited to delineate and implement priority research endeavours for Mauritius and Rodrigues in the context of current challenges. One significant difference we are making is to frame the mindset of local stakeholders to embrace open innovation as a key growth strategy whilst fostering teamwork, collaboration and sustaining synergies. We strongly believe that this ecosystem should be enhanced. The path towards this new roadmap exemplifies the new dynamism and impetus that have been endowed to the Council.

It is the outcome of a relentless in-house efforts and dedication coupled to wide external consultations. The process started in September 2021 when the

MRIC had been provided the directive to come up with a reasonable termed Roadmap for Research and Innovation. Technical Committees were set up for identified thematics with experts in those sectors with the view to embedding industry analyses, discussion outcomes and recommendations within the ambit of the roadmap.

We are thankful to Honourable Darsanand Balgobin, Minister of Information Technology, Innovation and Communication for sharing his vision of shaping this Roadmap for Research and Innovation and for his valuable guidance and support throughout this project.

We would also like to highlight the valuable inputs and contributions of all the stakeholders who were involved in preparing this Roadmap:

- Technical Committee members for their views, expert advice and feedback.
- More than 100 key stakeholders and innovation champions involved in Les Assises de la Recherche et de l'Innovation, both in Mauritius and Rodrigues. This included the Public Sector, Private Sector, Academic Organisations and NGOs, both on a national and international level.
- More than 500 participants who contributed by providing their insights during the conference.

We also extend our appreciation to our sponsors, namely: Australian Aid, High Commission of India, MARENA, Mauritius Telecom, Oxenham, Quality Beverages Ltd, Région Réunion and Rogers Capital.

Moreover, we are thankful for the collaboration of the Rodrigues Regional Assembly (RRA) for its support in the organisation of "Les Assises de la Recherche et de l'Innovation 2022" in Rodrigues.

We are grateful to the MRIC Council Members and Staff for their important role throughout this process.

Along with this new Roadmap is the renewed Strategic Plan of the Council which has been geared toward developing, supporting, and leveraging on Innovation with a redesigned



approach. This will enable us to stay ahead of the curve for Mauritius to be regarded as a Nation of Innovators.

Professor Theesan Bahorun, PhD, G.O.S.K

Executive Director, Mauritius Research and Innovation Council



"Vision without execution is hallucination" - Thomas Edison

INDRODUCTION

1.0 Introduction

On the 11th March of 2020, the World Health Organisation declared a global pandemic. Coined as COVID-19, this pandemic brought about tremendous and unprecedented changes in the day-to-day running of the world and the results are still being felt across the globe.

In the aftermath of COVID-19 pandemic, many countries, including the Republic of Mauritius, are confronted with a slow economic recovery. In January 2022, the International Monetary Fund downgraded global growth for 2022 by 0.5% to 4.4%, mainly on the account of significant downward growth revisions for the United States of America, China, Brazil and Mexico.

As Mauritius copes with these tumultuous times, experts believe that innovation is key to navigating the 'new normal'.

As per the Government Programme 2020-2024, the Government of the Republic of Mauritius has a clear vision for the future of the country. One of the vision ambitions to build "an economy in the league of high-income countries, driven by technology and innovation and bringing higher levels of growth, equality and shared prosperity".

"Les Assises de la Recherche et de l'Innovation 2022 (ARI 2022)" proposed to be a platform that initiates a national dialogue while concurrently providing insights on emerging and frontier innovations.

The COVID-19 pandemic has already highlighted the vulnerability of the country to external shocks with severe impact. The Ukraine crisis has further exacerbated the situation. Since the beginning of the crisis, prices in the country have soared, driving year-on-year inflation rate to a 11% in April 2022.

There is, hence, a need to create resilience and preparedness to respond to these kinds of circumstances.

Research, development and innovation may hold the key to unlocking the deadlock and relaxing this stranglehold.

The objectives of Les Assises de la Recherche et de l'Innovation were more specifically outlined as follows:

- Development of a national roadmap
- Provision of insight into emerging technologies and sectors
- Identification and introduction of strategies to drive leadership in emerging technologies and sectors
- Elimination of barriers to innovation
- Coordination of disparate policies toward research, technology commercialization, investments, education, tax, trade, IP, government procurement, and regulatory policies in an integrated fashion that drives economic growth
- Chart incentives for fostering innovation

ARI 2022 consists of three phases:

- Phase I Les Assises de la Recherche et de l'Innovation 2022 in Mauritius
- Phase 2 Les Assises de la Recherche et de l'Innovation 2022 (RodInov) in Rodrigues
- Phase 3 Validation Event



Working groups were set up at the very onset for the different thematic areas identified with key stakeholders, to chart the salient issues/features of the sector and initiate discussions with regards to drafting a Roadmap for Research and Innovation.

Phase I was held from the 27th to 29th of April 2022 at Le Meridien Ile Maurice Hotel.

A total of six thematic areas have been prioritised with respect to ministries which do not have a roadmap or strategic plan and/or where roadmaps will lapse in the coming two years. Those thematic areas were:

- I. Blue and Green Innovation
- 2. Health and Wellness Innovation
- 3. Financial Innovation
- 4. Social and Grassroots Innovation
- 5. Travel, Tourism and Entertainment Innovation
- 6. IT, Emerging and Enabling Innovation

The expert observers present during Les Assises de la Recherche et de l'Innovation gave their suggestions and made recommendations on the Roadmap for Research and Innovation. Due to its specificities, a special Assises - RodInov (ARI 2022- RodInov) was organised. Phase 2 of ARI 2022 was held in Rodrigues on the 27th and 28th of July 2022 in Cotton Bay Hotel. Four thematic areas had been identified with regards to Rodrigues' specificities:

- I. Blue Innovation
- 2. Green Innovation
- 3. Social and Grassroots Innovation
- 4. Health, Wellness and Tourism Innovation

Similar to Mauritius, working groups in Rodrigues had been set up to chart the salient issues/features of the sector and initiate discussions with regards to drafting the roadmap. This report summarises the proceedings and deliberations of the Phase I and Phase 2 of ARI 2022. It includes discussions of working groups and elaborates the current state of each sector, its respective gaps and challenges and visions adopted to deal with those challenges. It also includes short-term, medium-term and long-term strategies along with proposed projects to be implemented.



"Creativity is thinking up new things. Innovation is doing new things."



METHODOLOGY

2.0 Methodology

Consultations and background research were the backbone for development of the National Roadmap on Research and Innovation. The process guaranteed effectiveness, coherence as well as a broad buy-in of all major stakeholders while maintaining appropriate check and balances. The key actions undertaken are depicted in Figure 1.





Before the structuring of Les Assises de la Recherche et de l'Innovation 2022, various desk studies and consultancies were undertaken. A steering committee was set up with different stakeholders to oversee and ensure the smooth organisation of ARI 2022 as follows:

- Dr K. S. Sukon (Chairperson), Mauritius Research and Innovation Council
- Prof T. Bahorun, Mauritius Research and Innovation Council
- Dr (Mrs) V. Goorah, National Productivity and Competitiveness Council
- Mr R. Bheekhoo, Ministry of Information Technology, Communication, and Innovation
- Mr K. Ramkaloan, Business Mauritius
- Mrs S. Rama, Ministry of Finance, Economic Planning and Development
- Mrs P. Sohun, Prime Minister's Office



- Prof M. Santally/Mr Y. Tangman, University of Mauritius
- Mrs A. Audit, Economic Development Board

Members met on three occasions and were apprised of all updates regarding ARI 2022 and discussed the way forward. In parallel, a desk study was carried out with a view of understanding, analysing and synthesising best practices from past international summits pertaining to research and innovation.

The international events considered *inter-alia* are as follows:

- Global Innovation Summit (18th 20th May 2021, Graz Austria)
- Global Summit on Public Health and Preventive Medicine (23rd 25th August 2021, Paris France)
- International Conference on Human Interaction and Emerging technologies (27th 29th August 2021, Paris)
- Assises de l'Environnement (16th 17th December 2019, Mauritius)
- Third Global Conference on Health and Climate (21st 22nd March 2018, Mauritius)
- The Ocean Conference (5th 9th June 2017, United Nations, New York)
- Third International Conference on Financing for Development (13th 16th July 2015, Addis Ababa, Ethiopia)
- National Innovation Summit (9th 11th February 2000, Melbourne, Australia)

2.1 Thematic Area Selection

Since developing roadmaps for research and innovation for all economic sectors of the country was not feasible due to economic and logistical reasons, the approach adopted by the Council was to have a prioritised listing based on sectoral needs.

A total of six thematic areas have been prioritized for this event, based on the following criteria:

- Ministries which do not have a roadmap or strategic plan
- Ministries which have a roadmap lapsing in the coming 2 years
- Ministries which have a roadmap but need to be modified based on the evolution of events



The table below represents the different Ministries, indicating their existing roadmaps and strategic plans. Ministries which already have a roadmap have been marked with a tick (\checkmark) and Ministries which do not have a roadmap have been marked with a cross (*).

Ministry	Roadmap	Strategic Plan	
Energy and Public Utilities	✓	Vehicle Integration Roadmap (5-year policy plan 2021-2026), Action Plan of the Energy Strategy (2011-2025)	
Local Government and Disaster Risk	✓	National Disaster Risk Management Action Plan 2020-2030	
Foreign affairs, Regional Integration and International trade	×		
Industrial Development, SMEs and Cooperatives	✓	Industrial Policy and Strategies Plan for Mauritius 2020-2025	
Finance Services and Good Governance	\checkmark	National Strategy for combatting Money Laundering 2019-2022	
Defense, Home Affairs and External Communication	×	National Drug Control Master Plan 2019- 2023	
Commerce and Consumer Protection	×		
Education	×	Digital Mauritius 2030 Strategic Plan	
		Forthcoming National Education Summit	
Housing and Land Use Planning	×		
Finance, Economic Planning and Development	✓	Public Sector Investment Programme 2021- 2022 to 2025-2026	
Environment, Solid Waste Management and Climate Change	✓	Les Assises de L'Environnement 2019	
Tourism	×	Strategic Plan 2018-2021	
Agro Industry and Food Security	×	Strategic Plan (2016-2020) for the food crop, livestock and forestry sectors	
Youth Empowerment, Sports and Recreation	✓	2018-2028	
Information Technology, Communication and Innovation	×	Digital Mauritius 2030	
Health and Wellness	✓	2020-2024	

FIGURE 2 - MINISTRIES AND ROADMAPS' AVAILABILITY



Gender Equality and Family Welfare	✓	Gender Based Violence (2020-2024)
Public Service, Administrative and Institutional Reforms	×	
Land Transport and Light rail	×	
Labor, Human Resource Development and Training	×	
Blue Economy, Marine Resources, Fisheries and Shipping	×	
Arts and Culture	✓	Creative Mauritius Vision 2025
National Infrastructure and Community Development	×	

Based on the above, the following six thematic areas were selected:

- I. Blue and Green Innovation
- 2. Health and Wellness Innovation
- 3. Financial Innovation
- 4. Social and Grassroots Innovation
- 5. Travel, Tourism and Entertainment Innovation
- 6. IT and Emerging Technology Innovation

2.2 Working groups constitution for each thematic sector

Six technical working groups were set up with different stakeholders to analyse the current state of the sectors, to understand their gaps and challenges, and to spell out their technological needs. The focus of the thematic working groups was on technology, research, and innovation in the sectors. Each working group was led by a Research Coordinator of the MRIC. The objective of these working groups was to produce a working document for each thematic area to be presented during ARI 2022.

Blue and Green Innovation

Chairperson:

Dr Poonam Veer Ramjeawon, Mauritius Research and Innovation Council

- I. Mr Mehul Bhatt, Rogers, Representative of Business Mauritius
- 2. Dr Mitrasen Bhikajee, Quality Assurance Authority
- 3. Dr Kishore Boodhoo, University of Mauritius
- 4. Mr Kishan Boyjoonauth, Mauritius Renewable Energy Agency
- 5. Dr Asha Dookun-Saumtally, Mauritius Sugarcane Industry Research Institute, MCIA
- 6. Ms Dhanisha Gopaul, Albion Fisheries Research Centre
- 7. Mr Poojanraj Khurun, Food and Agriculture Organisation



- 8. Dr Daniel Marie, Mauritius Oceanography Institute
- 9. Mr Deujen Mungur, Economic Development Board
- 10. Ms Mreedula Mungra, Mauritius Renewable Energy Agency
- II. Dr Yogesh Parmessur, Mauritius Sugarcane Industry Research Institute, MCIA
- 12. Mr Keshwarajsingh Ramnauth, Bank of Mauritius
- 13. Mrs Micheline Seeneevassen Pillay, Food and Agricultural Research and Extension Institute
- 14. Ms Melany Poorun-Sooprayen, United Nations Development Programme
- 15. Mr Keshav Sauba, Department for Continental Shelf, Maritime Zones Administration & Exploration
- 16. Mrs Jacqueline Sauzier, Mauritius Chamber of Agriculture
- 17. Mr Preeaduth Sookar, Agricultural Services, Ministry of Agro Industry and Food Security

Core Team:

- I. Ms Hafsah Ramjane
- 2. Dr (Mrs) Nandini Savoo-Calotte

Supported by:

- I. Mr Koushul Narrain
- 2. Mr Pawan Hurnath
- 3. Ms Poonam Gobin

Financial Innovation

Chairperson:

Dr Nitin Gopaul, Mauritius Research and Innovation Council

- I. Mr Vinod Bussawah, Mauritius Finance
- 2. Mr Geetesh Gungah, Economic Development Board
- 3. Mr Rajnish Hawabhay, Ministry of Information and Communication Technology
- 4. Mr Jamsheed Khadaroo, Financial Services Commission
- 5. Mr Kailass Koonjal, Independent Commission Against Corruption
- 6. Mr Ashwin Jankee, Mauritius Bankers Association Ltd
- 7. Ms Tilotma Gobin Jhurry, Bank of Mauritius
- 8. Dr Bhavish Jugurnath, University of Mauritius
- 9. Mrs Varsha Mooneeram-Chadee, University of Mauritius
- 10. Mr Avinash Nemchand, Financial Services Commission
- II. Mr Roshan Oree, Mauritius Revenue Authority
- 12. Mrs Dovinassy Pillay-Naiken, Ministry of Financial Services and Good Governance
- 13. Mr Faraz Rojid, Economic Development Board



- I. Ms Hanaa Keenoo
- 2. Ms Karuna Lakheearam
- 3. Ms Karuna Bolaky

Travel, Tourism and Entertainment Innovation

Co-chairpersons:

Dr Roubeena Jeetah-Rampadaruth and Mr Kiran Tatoree, Mauritius Research and Innovation Council

Working Group Members:

- I. Ms Dayna Armoogum, Hospitality Plus Ltd
- 2. Mr Jocelyn Kwok, Association of Hoteliers and Restaurants in Mauritius
- 3. Mrs Smita Modak, The Lux Collective
- 4. Dr Perunjodi Naidoo/ Dr Prabha Ramseook-Munhurrun, University of Technology, Mauritius
- 5. Assoc. Prof. (Dr) Robin Nunkoo, University of Mauritius
- 6. Ms Zaheera Nurudin, Tourism Authority
- 7. Mr Rishi Purusram, Ministry of Tourism
- 8. Mr Robin Ramhit, Mauritius Tourism Promotion Authority
- 9. Mrs Shanobar Bibi Ansheed Sahebally-Jauhangeer, Ministry of Arts and Cultural Heritage
- 10. Mr Georges Soodeen, Polytechnics Mauritius Ltd

MRIC Working Group Team:

- I. Mr Pawan Hurnath
- 2. Ms Hashita Joyram
- 3. Ms Kashmira Banee

Health and Wellness Innovation

Chairperson:

Dr Madhvee Madhou, Mauritius Research and Innovation Council

- I. Dr Michel Abiteboul, Cap Research Ltd
- 2. Ms Kalyanee Auroomoogum, TI DIAMS
- 3. Mr. Sahajee Bappoo, Ministry of Youth Empowerment, Sports and Recreation
- 4. Dr Fabien Boullé, Axonova Pharma Ltd.
- 5. Associate Professor Dr. Ganessen Chinien, University of Mauritius
- 6. Dr Shameem Fawdar, Axonova Pharma Ltd.
- 7. Associate Professor Mrs Dayawatee Goburdhun, University of Mauritius
- 8. Dr Purnima Gunness, Nutritional and Food Scientist, Mauritian Diaspora



- 9. Dr Bavisha Jowaheer, TI DIAMS
- 10. Mrs Nirmala Jeetah, Bio Industry and Project Development, Economic Development Board
- 11. Mr Yannick Lincoln, National High-Performance Centre, Mauritius Multisports Infrastructure Ltd
- 12. Professor Archana Luximon, Clinical Research Regulatory Council
- 13. Ms Anshinee Devi Ramana, Ministry of Industrial Development, SMEs and Cooperatives
- 14. Dr Prithviraj Ramputty, Health Services, Ministry of Health and Wellness
- 15. Mr Narendredeo Reesaul, Polytechnics Mauritius Ltd
- 16. Mr Dinay Reetoo, Ethics Committee
- 17. Dr Régine Rouzier, Cap Research Ltd
- 18. Dr Ish Sharma, University of Mauritius
- 19. Dr (Mrs) Mungala Davi Soyjaudah, National AIDS Secretariat, Ministry of Health and Wellness

- I. Mrs Divya Naginlal Modi-Nagowah
- 2. Mrs Vanessa S Patten-Ramen
- 3. Ms Nabiihah Khodabux
- 4. Dr Chandra Tatsha Bholah
- 5. Ms Diksha Boodhoo

Social and Grassroots Innovation

Chairperson:

Dr Aveeraj Peedoly, Mauritius Research and Innovation Council

- I. Mr A Appadoo, Ministry of Gender Equality and Family Welfare
- 2. Mr J Arsène, Fondation Medine Horizon
- 3. Associate Prof (Dr) C Bokhoree, University of Technology
- 4. Mr J Delorie, ENL Group
- 5. Ms A Dookhee, UNDP
- 6. Ms R Espitalier-Noel, FoodWise Mauritius
- 7. Dr H Neeliah, Human Resource and Development Council
- 8. Mrs P Noel, Lovebridge
- 9. Mrs M Poorun-Sooprayen, UNDP
- 10. Mr M Radegonde, ENL Foundation
- II. Mr R Ramlugon, Omnicane Limited
- 12. Mrs M D Ramsamy, Ministry of Social Integration, Social Security and National Solidarity
- 13. Mr S Ray, MACOSS



- 14. Mr N J F Ragodoo, University of Mauritius
- 15. Mr V Ragoobur, National Social Inclusion Foundation
- 16. Mr J Violette, Civil Service College

- I. Ms Chitra Ruhee
- 2. Dr (Ms) Nuhaa Soobhany
- 3. Mrs Reena Luchmee
- 4. Ms Prathna Rambharush



IT, Emerging and Enabling Innovation

Chairperson

Dr Vickram Bissonauth, Mauritius Research and Innovation Council

- I. Miss Maitha Babajee, Future Females Foundation
- 2. Prof Suryakiran Bhujun, Ministry of Education, Tertiary Education, Science and Technology
- 3. Mr Virendra Kumar Bissoonauth, Mauritius Telecom
- 4. Miss Ashwini Brijmohun, Future Females Invest
- 5. Mrs Zakiya Buhora, Federation of Innovative & Numeric Activities
- 6. Mrs Ashvina Fowdur-Parboteeah, Ministry of Education, Tertiary Education, Science and Technology
- 7. Mr Kaviraj Goodoory, Mauritius Institute of Education
- 8. Mr Mahendra Gungaram, State Informatics Ltd
- 9. Ms Sandhya Gunness, Centre for Innovative and Lifelong Learning University of Mauritius
- 10. Mr Akshaye Jeewoolall, Ministry of Industrial Development, SMEs and Cooperatives (SMEs Division)
- II. Mr Rajnish Hawabhay, Ministry of Information Technology, Communication and Innovation
- 12. Mr Marc Israel, Aetheis Ltd
- 13. Mr Awaad Kaidoo, Ceridian Mauritius
- 14. Mr Vikas Khanna, Emtel Ltd
- 15. Dr Kavi Kumar Khedo, University of Mauritius
- 16. Mr Clement Le Moigne, GWS Technologies
- 17. Mr Wilson Li, KIP Center for Leadership
- 18. Mr Michael Li Wai Man, Design Lounge Ltd
- 19. Mr Avinash Meetoo, UNDP Mauritius and Seychelles
- 20. Mrs Rosida Beebee Nohur, Ministry of Finance, Economic Planning & Development
- 21. Mr Roshan Ramoly, LinearArc Solutions Ltd
- 22. Mrs Pratima Sewpal, Economic Development Board
- 23. Mr Reza Soodin, National Computer Board



Core Team:

- I. Ms Yeshika Khuttur
- 2. Mr Runeal Ramma
- 3. Mr Ramaakaant Beekarry
- 4. Mr Ziyaad Soreefan

Supported by:

- I. Ms Radhaluxmee Jogessur
- 2. Ms Siddhee Bhojoo
- 3. Mr Koushul Narrain
- 4. Mr Yogeshwar Gajadur

Rodrigues Blue Innovation

Chairperson:

Mr Joseph Maurice Ravina, Mauritius Research and Innovation Council

- I. Mr Jean Rex Pierre Louis, South East Marine Protected Area (SEMPA)
- 2. Mr Sylvio Perrine, Marine Academy and Research Centre
- 3. Ms Espiegle Anielle, Shoals of Rodrigues
- 4. Mr Reshad Jhangeer-khan, Mauritian Wildlife Foundation
- 5. Mr Herman Clair, Commission for Environment & Others
- 6. Mr Thomas Genave, Commission for Agriculture & Others
- 7. Mr Kishan Boyjoonauth, MARENA
- 8. Mr Raj Mohabeer, Indian Ocean Commission (COI)
- 9. Dr Yashvin Neehaul, CAP Business
- 10. Dr Daniel Marie, Mauritius Oceanography Institute
- II. Dr M. Bhikajee, Consultant


Rodrigues Green Innovation

Chairperson:

Ms Marie Brenda Clair, Mauritius Research and Innovation Council

Working Group Members:

- I. Mr Jerome Felicite, Commission for Agriculture & Others
- 2. Mr Jameson Perrine, Lycee Agricole
- 3. Mr Sabrino Clair, Consultant
- 4. Mr Joseph Christopher Leopold, Walali Company
- 5. Mr Christopher Meunier, Advisor RRA
- 6. Mr Raj Mohabeer, Indian Ocean Commission (COI)
- 7. Mrs Marie Lourdes Raphael Robertson, Commission for Environment & Others
- 8. Mr Kishan Boyjoonauth, MARENA
- 9. Mrs Micheline Seenevassen Pillay, FAREI

Rodrigues Health and Wellness/Tourism Innovation

Chairperson:

Mr Bryan Young Tie Yang, Mauritius research & Innovation Council (MRIC)

Working Group Members:

- I. Dr Drack, Commission for Health & Others
- 2. Ms Issana Agathe, Office du Tourism
- 3. Mrs Marie Antoinette Clair, Red Cross
- 4. Mr Elvino Pierre Louis, Commission for Youth & Sport
- 5. Marie Christiane Louis, Family Planning Rodrigues
- 6. Mrs Rughoobur Bheekhee Artee, Hospital Director (QEH), Commission for Health & Others
- 7. Dr Henry Bernard Baptist, Mauritius Sport Council
- 8. Mr Lisette Jean Mc Dally, CRAC Anti-Drug of Rodrigues



Rodrigues Social and Grassroots Innovation:

Chairperson:

Ms Marie Elsie Justine Perrine, Mauritius Research and Innovation Council

Working Group Members:

- I. Dr Tolbize Annick, Roman Catholic Education Authority (RCEA)
- 2. Ms Agathe Marietta, Gender Links
- 3. Mrs Bapoo-Dundoo Pamela, United Nations Development Programme (UNDP)
- 4. Mr. Ravina Jean Michel, Rodrigues Scout Council
- 5. Mrs Legentil Yannick, Rodrigues Regional Assembly (RRA)
- 6. Mr Meetoo Avinash, United Nations Development Programme (UNDP)
- 7. Ms Meunier Laura, Rodrigues College
- 8. Mr Perrine Davy Williams, Rodrigues Regional Assembly (RRA)





"If at first the idea is not absurd, then there is no hope for it."

- Albert Einstein

3.0 Proceedings of Les Assises de la Recherche et de

l'Innovation 2022 (Mauritius)

Les Assises de la Recherche et de l'Innovation 2022 was held over three days from 27th to 29th April 2022 at Le Meridien IIe Maurice, Mauritius.

Throughout the three days, ten exhibitors (recipients of MRIC funding) showcased their research and innovation projects.







FIGURE 3 - PROCEEDINGS OF ARI2022

Day 1 - Inaugural Session

The welcome address was given by **Prof Theesan Bahorun**, the Executive Director of the MRIC, which was followed by a short address by **Dr Kaviraj Sharma Sukon**, the Chairperson of the MRIC. **Prof Soumitra Dutta**, Founder and Co-editor of fourteen editions of the Global Innovation Index, delivered a talk on Global Innovation Imperatives via videoconferencing. The Minister of Information Technology, Communication and Innovation, **Mr Darsanand Balgobin**, dwelt on Government's vision 2030 to propel Mauritius in the league of high-income countries while highlighting that technology, research and innovation are the enablers towards this objective, hence the importance of the innovation roadmap that will emanate from Les Assises. Finally, the President of the Republic, **Mr Prithivirajsing Roopun** delivered the keynote address and called upon key stakeholders from the private sector, governmental agencies, association of professionals and the civil society to join hands together to harness innovation for furthering socio-economic development. He then declared Les Assises officially open at the end of his statement.





FIGURE 4 - INAUGURAL SESSION

Day 1 – Setting the Scene (Are we an innovation savvy nation?)

The sessions after the inaugural session were conceptualized as quick TED-style talks of 10 minutes providing global and local perspectives on different aspects of technology and innovation and related to the six thematic areas which would be discussed on Day 2. These sessions saw the participation of local and international experts from several countries, such as Sweden, France, Finland, India, Ghana and Australia, to share reflections and best practices with regards to research and innovation. Nineteen TED-style talks were delivered to the audience, namely:



- **Prof Charles Edquist**, Member of the Swedish National Innovation Council and Chair in Innovation Research CIRCLE, Lund University (Sweden) on *Holistic Innovation Policy Story, Flaws, and Solutions*.
- **Dr Maya Cesari**, Conseillère Régionale déléguée Comité Régionale d'Innovation de La Réunion (Réunion France) on *Regionalisation Innovation*.
- **Mr Dev Hurkoo**, Managing Director Technology, Rogers Capital (Mauritius), on *Enabling Technologies for Innovation*.
- **Ms Maija Lönnqvist**, Director of Unit, Skills, Innovation and Renewal, Ministry of Economic Affairs and Employment (Finland) on *Global Perspectives for Innovation*.
- **Dr Drishty Ramdenee**, Head of Department Ocean & BIO Economy, Economic Development Board (EDB) (Mauritius) on New Sectors of the Economy.
- Mr Sydney Pierre, Chief Sales & Marketing Officer, Marriott International (Mauritius) on Re-inventing an Industry through Innovation: Tourism Industry.
- **Prof Lina Pelliccione**, Pro Vice-Chancellor & President, Curtin (Mauritius) on Implementing Innovative Technology: Towards the Transformation of Academia.
- Mr Shantanu Bhatawdekar, Scientific Secretary, The Indian Space Research Organisation (ISRO) (India) on Space, the Final Frontier of Innovation.
- **Dr Peggy Oti-Boateng**, Director of Science, Policy and Capacity, UNESCO (Ghana) on African Imperatives for Innovation.
- Mr Deelam Baichu, Founder, Zapproach Ltd on Future of ICT Sector in Mauritius.
- **Mr Avinash Meetoo**, Head of Experimentation Accelerator Lab and Digital Advocate, UNDP Mauritius and Seychelles (Mauritius) on *Creativity and Innovation in Mauritius*.
- **Mr Leon Chanter**, Business Development and Transactions, Australian Renewable Energy Agency (Australia) on *Sustainable Innovation in the World*.
- **Mr Mohamed Khan**, Chief Executive Officer, Financial Services Institute (Mauritius) on *Barriers to FinTech*.
- **Mr Eric Jeuffrault**, Directeur Régional, Centre de coopération Internationale en Recherche Agronomique pour le Développement (CIRAD) (Réunion-France) on *Innovation in Agriculture in the Region.*
- **Mr Yamal Matabudul**, Chief Executive Officer, Polytechnics (Mauritius) Ltd on Unlocking the Middle Trap: Technical Education as the Innovation Catalyst.
- Ms Ayooshee Dookhee, Head of Solutions Mapping Accelerator Lab, UNDP Mauritius and Seychelles (Mauritius) on Innovation for Social Change.
- **Mr Olivier Schmitt**, Chief Operating Officer, Health and Wellness, IBL Life (Mauritius) on *Changing Health and Wellness through Innovation*.
- Dr (Mrs) Vijayelaksmee Goorah, Lead Innovation, Advocacy & Entrepreneurship, National Productivity and Competitiveness Council (NPCC) (Mauritius) on *Productivity and Innovation*.



Day 2 – Sectoral Forum

Sectoral fora were held for the six thematic areas. Three parallel sessions were held in the morning for the Health and Wellness Innovation, Financial Innovation, and Travel, Tourism and Entertainment Innovation sectors. The three other sectors had their parallel sessions in the afternoon, namely the Blue and Green Innovation; IT, Emerging and Enabling Innovation; Social and Grassroots Innovation.



FIGURE 5 - MODERATED PANEL SESSIONS FOR HEALTH AND WELLNESS INNOVATION; FINANCIAL INNOVATION; AND TRAVEL, TOURISM AND ENTERTAINMENT INNOVATION (MORNING SESSION)





FIGURE 6 - MODERATED PANEL SESSIONS FOR BLUE AND GREEN INNOVATION; IT, EMERGING AND ENABLING INNOVATION; AND SOCIAL AND GRASSROOTS INNOVATION (AFTERNOON SESSION)

Each sectoral forum had a similar format: firstly, a bird's eye view presentation of the sector, followed by a presentation on the gaps and challenges, and improvements which can be brought to foster innovation, then showcasing of either private sector-led or academia-led innovation in the particular thematic area, and lastly, a moderated panel session with the participation of local and international experts to discuss about enabling factors for innovation and the innovation roadmap for the sector.

During the moderated panel session, two rapporteurs noted the discussions. Following the moderated panel session, the two rapporteurs collaborated with the respective moderator and the co-chairperson of the thematic area in order to shape the outcomes of the presentations and discussions for the following day.



Day 3 - Strategizing and Enabling innovation

The first part of the day was dedicated to the summary presentations of the outcomes of discussions and interactions which took place on Day 2 for each of the thematic areas. Each moderator was allocated 20 minutes.



QUESTIONS	Agree
For Mauritius to become a Digital Society and accelerate the growth of Fintech , Digital KYC and Customer Due Diligence must be embraced in all processes?	83%
Would you agree to use e-wallets rather than cash-based transactions in certain situations?	100%
Do you think Mauritius is experiencing a shortage of talent in digital, financial and entrepreneurial skills which is inhibiting the growth and modernisation of the financial sector?	93%
Can establishing a National Fintech Steering Committee , incentives for small fintech start ups and creating a tailor made policy for digital nomads or our own diaspora in this sector encourage financial innovation?	100%
Do you think the use of chatbots improve customer service eventually helping to automate back office functions ?	82%





FIGURE 7 - PRESENTATION OF OUTCOMES OF SECTORAL FORUM AND MODERATED PANEL DISCUSSION

Day 3 – Innovation Expert Session

The Innovation Expert Session was structured as a roundtable discussion. It was moderated by **Mr Avinash Meetoo**, Head of Experimentation Accelerator Lab and Digital Advocate, UNDP Mauritius and Seychelles (Mauritius).



FIGURE 8 - INNOVATION EXPERT SESSION

Panellists from left to right: Prof Theesan Bahorun, Executive Director, Mauritius Research and Innovation Council (Mauritius); Prof Charles Edquist, Member of the Swedish National Innovation Council and Chair in Innovation Research, CIRCLE, Lund University (Sweden); Prof Lina Pelliccione, Pro-Vice Chancellor and President, Curtin Mauritius (Mauritius) and Ms Maija Lönnqvist, Director of Unit, Skills, Innovation and Renewal, Ministry of Economic Affairs and Employment (Finland) via conference.

Mr Meetoo facilitated the discussion, inviting panellists to reflect on different aspects of research and innovation, namely on how to foster an innovation culture, what needs to be done to build the human capital required for jobs that will exist in the future, how to deal



with brain drain, how to translate the outcomes of Les Assises into concrete action, the need for grassroots innovation and social enterprises in Mauritius, and how to include more women and disabled people into the innovation process.

At the end of the Innovation Expert Session, Dr Kaviraj Sharma Sukon, the Chairperson of the Mauritius Research and Innovation Council, extended the vote of thanks and expressed his gratitude to one and all for such a successful event. Afterwards, a cocktail and gala dinner was held as part of the closing ceremony for this edition of Les Assises de la Recherche et de l'Innovation.



3.1 Proceedings of Les Assises de la Recherche et de l'Innovation 2022 (RodInov 2022)

Rodinov 2022 was held over two days on 27^{th} and 28^{th} July 2022 at Cotton Bay Hotel, Rodrigues.

Day 1 – 27th July 2022

Sectoral discussions were held for the Blue Innovation in the morning and the Green Innovation sectoral thematic areas in the afternoon.

The official ceremony also took place during the day. The welcome address was given by **Mr** Jean-Claude Pierre Louis, Island Chief Executive of the Rodrigues Regional Assembly, followed by a brief introduction by **Prof Theesan Bahorun**, the Executive Director of the MRIC. A short speech was then delivered by **Dr Kaviraj Sharma Sukon**, the Chairperson of the MRIC, following which the Minister of Information Technology, Communication and Innovation, **Honorable Darsanand Balgobin** gave the Keynote Address, where he dwelt on the key measures laid in the Budget 2022-2023 to promote development and progress and enhance the quality of life of Rodriguan citizens. He also emphasized on the necessity of RodInov 2022 to help build a solid foundation to set up strategies on the national level for research and innovation in Rodrigues. This was followed by an address by **Mr Jean Alain Wong So**, Commissioner for Tourism & Others.











FIGURE 9 - RODINOV DAY 1



Day 2 – 28th July 2022

Sectoral discussions were held for the Health, Wellness and Tourism and the Social and Grassroots Innovation thematic areas. In the afternoon, a roundtable discussion and interaction session took place with regards to innovation enabling factors in Rodrigues. Recommendations coming from the thematic sessions were validated after the roundtable discussion.



FIGURE 10 - RODINOV DAY 2

Panellists: Dr Annick Tolbize, Manager, RCEA; Dr Kaviraj Sukon, Chairperson, MRIC; Prof Theesan Bahorun, Executive Director, MRIC; Mr Jerome Felicite, Assistant Manager, Commission for Agriculture & Others; Mrs Rughoobur Bheekhee Artee, Hospital Director (QEH), Commission for Health & Others; Mr Thomas Genave, Departmental Head for Fisheries, Agriculture & Others. The High Level Panel was moderated by Ms Marietta Agathe, Coordinator, Gender Links (Rodrigues).

At the end of the Innovation Expert Session, Dr Kaviraj Sharma Sukon, the Chairperson of the Mauritius Research and Innovation Council, extended the vote of thanks and expressed his special gratitude to the RRA, Cotton Bay staff, MRIC Head Office and MRIC Rodrigues staff and all stakeholders for the successful event.



3.2 Proceedings of Validation Workshop of Les Assises de la

Recherche et de l'Innovation 2022

The Validation Workshop of Les Assises de la Recherche et de l'Innovation 2022 was held on Monday 17th October 2022 at Le Meridien IIe Maurice, Mauritius.



FIGURE 11 - WELCOME AND REGISTRATION

The welcome address was given by **Prof Theesan Bahorun**, the Executive Director of the MRIC followed by a short address by **Dr Kaviraj Sharma Sukon**. During his keynote address, the Minister of Information Technology, Communication and Innovation, **Mr. Darsanand Balgobin**, emphasised that Les Assises de la Recherche et de l'Innovation 2022 bears testimony to the efforts of his Ministry and the MRIC, in providing a platform that fosters nationwide scientific dialogue, while concurrently providing insights on emerging and frontier innovations. He commended the level of the interest, involvement and discussions that one and all indulged in to develop the National Roadmap for Research and Innovation and underlined that it embodies the efforts of all parties involved towards bettering the research and innovation ecosystem of the country.









FIGURE 12 - PROTOCOL SESSION



Following the protocol session, the report of each of the six thematic areas was presented and validated in the presence of stakeholders both physically present at the venue and those who viewing online. The achievements of the MRIC since its inception since September 2019 and some innovative products and services emanating from funded initiatives were showcased. Challenges with regards to current MRIC schemes were detailed. The Strategic Plan of the MRIC and the proposed new Smart Innovation Support Mechanism (SISM) were also presented and validated.







4.0 Strategic Plan of the MRIC

The MRIC is a corporate body set up on the 1st of September 2019 through the proclamation of the Mauritius Research and Innovation Council Act 2019. The Council acts as the apex body which advises the Government on matters concerning applied research, innovation and research and development issues.

The MRIC Act has been amended in July 2021 to extend the mandate of the MRIC to conduct research on identified national priority thrust areas in order to strengthen the Mauritian research ecosystem.

The Council's focus is being directed along strategic axes, namely Policy and Strategic Planning, Knowledge Generation and Prioritisation, Knowledge Management and Exchange, Knowledge Exploitation and Transformation and Innovation and Entrepreneurship Culture, all within a framework equipped with the tools for measuring and evaluating progress.

4.1 MRC Schemes

Prior to the change in the legislative framework of the MRC, a number of measures had been brought in anticipation of the new focus and orientation that was anticipated. In this respect, the Council had initiated a rethinking process on its activities and progressively phased out its 17 schemes which were more focused on classical and/or academic research.

4.2 Pre-MRIC Schemes

With innovation as the overarching philosophy and with the view of improving the competitiveness of Mauritius and enhancing the research and industry nexus, the Council embarked on a re-engineering and revamping exercise. The aim was to provide support for industry-led impactful research having a commercial potential on a matching grant mode. As such, schemes were developed to cater for the funding of innovative business ideas, collaborative research, development and innovation projects, and programmes.

Innovative business ideas and promotion of entrepreneurship is being supported through the National SME Incubator Scheme (NSIS). The Proof of Concept Scheme (PCS) allows companies to prove their concepts. Collaborative research, development and innovation projects are funded through the Collaborative Research and Innovation Grant Scheme (CRIGS) and the Research and Innovation Bridges (RIB). Centres of Excellence in focused areas are supported through the Pole of Innovation Grant Scheme (PoIGS). Emphasis is also given to societal issues through targeted funding under the Social Innovation & Research Grant Scheme (SIRGS). One important aspect of our work has also been towards providing advisory support for intellectual property under the Intellectual Property Promotion Scheme (IPPS). As of August 2022, under these schemes, the Council received around 531 applications with a project value of Rs 1.67 Billion. Contribution from other sources for these applications amounted to Rs 1.2 Billion.

4.3 Post-MRIC Schemes

While significant progress has been achieved in relation to the operation of schemes functioning on the principle of matching grants and cost sharing, after the transition to the MRIC, new schemes and calls for proposal have been developed to respond to a growing



need for sector-focused funding in the last two years. This need for industry-focused funding has been further entrenched by the economic crisis created by the COVID-19 pandemic.

The focus areas are shifting from the traditional sectors to new or emerging sectors, such as FinTech, Blockchain, Artificial Intelligence, Circular Economy, Smart Agriculture and Inclusive Innovation. In order to re-align with the fast-paced development of these emerging sectors, the Fast Tract Innovation Scheme (FII) was launched in March 2021. This scheme had as aim to support short term innovative projects in the above thematic areas.

The Council is also becoming more reactive to the issues of national importance, such as the COVID-19 pandemic and the oil spill caused by the Wakashio shipwreck. Two special calls (SCP COVID-19 and SCP Blue Resilience) were launched as a means to support innovative endeavours aiming at mitigating impacts from these mishaps.

The special calls generated significant interest which led to the submission of 589 applications for a project value of Rs 1.27 Billion.

Recognising the need to instil innovation in the Mauritian way of doing business under the "new normal", the Council has enlisted two novel schemes to boost innovation in both the public sector and in businesses. The Public Sector Transformation Scheme (PSTS) is aimed at supporting innovative collaborative projects that test new approaches/technologies by start-ups and companies for improving processes and enhancing service delivery in the public sector, while the Enterprise Innovation Booster Scheme (EIBS) aims at helping Mauritian companies grow, transform and be better equipped through innovation for the future and for the global market.

The need for internationalisation of research and innovation initiatives has been identified as an enabler for fostering innovation within the Mauritian ecosystem.

Acknowledging the need for a distinct approach in order to accelerate the development of the Republic's outer islands, the Rodrigues Research and Innovation Grant Scheme (RRIGS) has been formulated to promote research and innovation in Rodrigues and to address the specificities of Rodrigues.

The appetite for research and innovation funding can be seen through the applications received. Under the funding schemes of the Council, nearly 1120 applications have been submitted with a project value of Rs 2.94 Billion. The Council approved 329 applications for a project value of Rs 635 Million.

4.4 Our Vision

"Shaping up the Mauritius of tomorrow through research, technology and innovation."

4.5 Our Mission

"Promoting and pioneering research for sustainable development to enhance the quality of life of the people of Mauritius"

4.6 *Objectives of the Council*

The objectives of the MRIC as enunciated in the Act are to:

- (a) promote and coordinate applied research, innovation and research and development according to the needs of the country and to improve the quality of life;
- (b) foster a research, innovation and entrepreneurship culture;



- (c) encourage the development and application of advanced and innovative technology to meet the needs of industries;
- (d) enhance private sector participation in research and development and innovation;
- (e) promote commercial utilisation of the results of research and development and innovation, in the national interest;
- (f) act as the apex body which advises the Government on matters concerning applied research, innovation and development issues; and
- (g) establish international linkages and promote collaboration to further the National Research and Innovation Agenda.

4.7 Strategies

The strategies outlined thereafter aim at providing a renewed impetus to research, development and innovation realms of the country. These were proposed as cross-cutting recommendations during Les Assises de la Recherche et de l'Innovation and have been spelt out through this stakeholder consultation.

An action plan includes specific actions with corresponding resources, activities, output, key performance indicators (KPI) and enabling factors.



- Strategy One: Harmonisation of Research and Innovation Initiatives across the Country
 - To propose the establishment of permanent high level National Research and Innovation Steering Council
 - \circ To propose the creation of a harmonised Research and Innovation Act
 - To establish a national platform for facilitation of research and innovation
- Strategy Two: Development of Platform for Research and Innovation identification and Communication
 - To establish a unit for Innovation reconnaissance and scouting for rapid following/adoption of Innovation
 - To develop a national outreach/ communication platform for Research and Innovation
- Strategy Three: Conduct and Facilitation of Research on Identified National Priority Thrust Areas
 - \circ To identify national priority thrust areas
 - \circ $\,$ To understand the needs of the thrust area in terms of research and innovation
 - To engage in a national consultation exercise to develop a roadmap for research and innovation for the thrust areas
 - To coordinate and facilitate research and implementation of measures/ recommendations proposed
- Strategy Four: Comprehensive Revamping and Creation of Schemes/ Support Mechanisms
 - To review and revamp existing support schemes
 - To formulate new targeted schemes for key thrust areas
 - Handholding for support schemes with regards to facilitation of uptake and upscaling
 - To hold applications and proposal writing bootcamps
 - o Devising and implementing the Smart Innovation Support Mechanism



- Strategy Five: Advocating for an Entrepreneurial Mindset, starting from the Grassroots Level
 - To promote intrapreneurship and creativity in private and public organisations
 - \circ To provide nurturing environment for innovative business development
 - To position sunrise industries as potentially transformative ventures
 - To establish a Foster Centre for innovation and entrepreneurship by providing start-ups and SMEs with the tools and guidance needed to identify the market opportunity for their research
- Strategy Six: Positioning of Mauritius as a Regional Research and Innovation Hub
 - To engage in or develop regional/ international cross border research and innovation initiatives through linkages or partnership
 - To devise and implement regional competitions as a means to capture innovative ideas, start-ups and foster regional collaborations
 - To encompass and house all activities pertaining to innovation under a single building/ facility (The Nucleus)
 - To gear incubators towards servicing regional start-ups

• Strategy Seven: Creating Organisational Dynamism to achieve MRIC's Goals

- \circ $\,$ To revamp the structure of MRIC into a lean and agile organisation
- To support the multi-skilled team through promotion, recruitment, and continuous development
- \circ $\,$ To adopt emerging technologies into the day-to-day running of the Council
- To enhance MRIC's capacity to attract external funding and support for research and innovation
- To foster a creativity, innovation, solution-oriented and quality-centric organisational philosophy
- \circ $\,$ To periodically review the strategic plan of the Council



MRIC Strategies

Strategy One

Harmonisation of Research and Innovation Initiatives across the Country

Strategy Three

Conduct and Facilitation of Research on Identified National Priority Thrust Areas

Strategy Five Advocating for an Entrepreneurial Mindset, starting from the Grassroots Level



Strategy Two Development of Platform for **Research and Innovation** identification and Communication

Strategy Four Comprehensive Revamping and Creation of Schemes/ Support Mechanisms

Strategy Six Regional Research and Innovation Hub



Strategy Seven Creating Organisational Dynamism to achieve MRIC's Goals



Positioning of Mauritius as a



Outcome of Les Assises de la Recherche et de l'Innovation

The following are the individual reports for each thematic area, which includes a summary of the scope, guiding principles, situational analysis, target to be achieved, gaps and challenges vision, strategic orientations and proposed research and innovation projects that have emanated from the Technical Committees/ Working Groups, Sectoral Forum and Panel Discussions for each thematic area.

The vision and strategic orientations for each thematic may be subject to change as these will be finalised during the validation event which is being planned.



BLUE AND GREEN INNOVATION

"When the winds of change blow, some people build walls and others build windmills." - Ancient Chinese proverb

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5.0 Blue and Green Innovation

5.1 Introduction

5.1.1 Scope

The scope of the 'Blue and Green Innovation' thematic area is to promote and pioneer research and innovation for sustainable development to enhance the quality of life of the people in the Republic of Mauritius by focusing on agriculture, renewable energy and marine sector, and by incorporating blue and green strategies to boost economy.

The blue and green sectors addressed in this report are defined as below:

Blue economy: According to the World Bank, the blue economy is the 'sustainable use of ocean resources for economic growth, improved livelihoods, and jobs while preserving the health of ocean ecosystem.' The Ministry of Blue Economy, Marine Resources, Fisheries and Shipping defines the blue economy as 'the simultaneous promotion of economic growth, oceanic sustainability (sustaining ocean resources and ecosystem), and social inclusion.'

Green economy: The United Nations Environment Programme (UNEP) defines the green economy as one **'that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities.²**

In order to boost economy, innovative technology and business models are required. The core elements of innovative technology and business models are shown in Figure I as ecosystems, policy and incentives, individual mindset and investment models.



FIGURE 14 - CORE ELEMENTS OF INNOVATIVE TECHNOLOGY AND BUSINESS MODELS (SOURCE: ROGERS)

5.1.2 Aim and Objectives

The aim of this report is to set the foundations for the development of a roadmap to promote economic growth through research, innovation and commercialisation in the blue and green sectors of Mauritius. The objectives are to:

- Provide an overview of the blue and green sectors
- Identify the gaps, challenges and needs of the blue and green sectors
- Identify specific sub-fields within the blue and green sectors which may be targeted



- Identify emerging technologies which may be applied to the sub-fields
- Recommend incentives, schemes and policies to aid in the development of the subfields
- Determine activities and their duration to be performed to attain blue and green innovation
- Determine ways to promote commercialisation of innovative products emanating from local business

5.1.3 Guiding Principles

Sustainability

Sustainability ensures that economic growth is continuous while natural resources and social balance are sustained.

Collaboration and partnerships

Collaboration bridges the gap between entities to achieve a common goal. Regional and international partnerships provide access to globally dispersed knowledge and technology.

Circularity

A circular economy also helps to regenerate our natural assets. A circular economy lowers our dependency on imports from foreign countries by reducing, recycling, and reusing existing/waste products and materials. Food autonomy is crucial against unpredictable phenomena such as pandemics and war.



Regulatory reform

A regulatory reform provides incentives to promote adoption of new concepts and technologies to bolster innovation.

Capacity building

Capacity building contributes to develop and strengthen the Mauritian workforce.

Education, training and awareness campaigns

Education, training and awareness campaigns provide the community with the tools necessary to innovate, develop and adopt blue and green solutions.

Blue and green business incentives

Blue and green business incentives offer resources for local community to foster research and innovation.

Sustainable development goals

The blue and green sectors contribute to meeting the Sustainable Development Goals (SDGs).

5.1.4 National Target of Sector

The Government Programme (2020-2024) is centred on achieving an inclusive, innovationdriven, high-income and green Mauritius, including accelerating development of the blue economy. Moreover, in its "Vision 2030" strategy, the government stated the vision to transform Mauritius into an Ocean State by promoting blue economy as one of its main pillars of development. Budget 2021-2022 has also laid emphasis on the penetration of renewable energy adding that green energy would be a new pillar of the economy. A target of 60% of our country's energy needs to be produced from green sources by 2030 has been set.³ Moreover, the government is aiming to develop a biotechnology and pharmaceutical industry in Mauritius.⁴

In view of the above, the national target of blue and green innovation could be to enhance economic growth using technology to develop, implement and maintain smart, sustainable, inclusive, eco-innovative oceanic and agricultural activities.



5.1.5 International Innovation Trends related to the sector

Blue economy

The ocean, which is home to a cornucopia of natural resources, is regarded as a major economic engine and provides an intricate transport network.⁵ The blue economy promotes sustainable uses of ocean resources for economic growth and inclusive development, as well as preservation of the ocean ecosystem health.⁶ In view of diversifying their economies, owing to the expanding global competition and dwindling natural resources, countries are exploring new avenues in the oceans to promote sustainable and economic growth through the blue economy concept.⁵

Several strategic methods have been implemented at global level to sustainably harness the potential of ocean and marine resources. Substantial investment, technological innovations, fiscal incentives and multidisciplinary collaboration are major boosters that have propelled the sectors of blue economy to new heights.⁶ In a report, the EU analysed the scope of blue economy, and established emerging and innovative sectors for the development of the blue economy.^{7,8} Such sectors include blue bio-economy, desalination, marine minerals, coastal and environmental protection, and research and education, amongst others.^{7,8} Table I shows the different initiatives undertaken by selected countries to develop their blue sectors.

Countries	Initiatives	Techniques	References
Saint Lucia	Blue Recovery Hub with the collaboration of the Organisation for Economic Co- operation and Development and the World Economic Forum to determine how to use innovative finance to encourage blue economy transitions	Innovative finance and international partnerships	9
Seychelles	Launching the world's first sovereign blue bond Securing the first climate adaptation debt restructuring	Innovative finance	6
China	Establishment of six national marine economic innovation and development of demonstration areas Establishment of seven national industrial demonstration bases for boosting the marine industry Notable projects include: Shandong Peninsula Blue Economic Zone, Blue Silicon Valley and the strategic cooperation among marine parks and bases in the Yangtze River Delta region	Infrastructure and capacity building	10
India	Implementation of the SAGARMALA	Satellite	6,11
	programme for port-led development to	imagery	

FIGURE 15 - INITIATIVES UNDERTAKEN BY SELECTED COUNTRIES TO DEVELOP THEIR BLUE SECTORS.



Countries	Initiatives	Techniques	References
	boost India's logistics sector performance and promote coastal community development Application of satellite-derived data for the demarcation of potential fishing zone as a proxy to potential shoals of fish aggregation in the Indian waters		
Caribbean	Climate Adaptation Swap Initiative, including	Innovative	9,12
Iceland, Brazil	Use of fish skin as grafts (Approved by Food and Drug Administration)	Sustainable blue biomedicine	13–15
Kenya	Blue Fashion for Blue Growth with the collaboration of Commonwealth Secretariat, Commonwealth Fashion Council, Food and Agriculture Organization of the United Nations, and the Nordic Atlantic Cooperation	Blue fashion and international partnerships	16
Australia	Blue Economy Cooperative Research Centre – bringing together 43 industries, government and research partners from ten countries to lead targeted and industry focused research and training through national and international partnerships. Marine Bioproducts Cooperative Research Centre (MB-CRC) – Funding – \$270M over 10 years, consisting of a consortium of 68 industry, government and research partners to spiral the growth of the emerging export- focused marine bioproducts industry.	Innovative finance, capacity building and multilateral collaboration	17,18

Green economy

The world is slowly turning towards a new green economic paradigm where economic growth is decoupled from excessive resource use, environmental threats and social disparities.¹⁹ The benefits of a green economy are significant and within the reach of governments and the private sector.¹⁹ Table 2 shows different initiatives undertaken by selected countries to develop their green sectors.



Countries	Initiatives	Techniques	References
Morocco	Implementation of an integrated solar energy generation project to produce concentrated solar power systems to use mirrors or lenses to focus sunlight onto a small area to convert it into heat, which can then run a steam engine connected to an electrical power generator	Solar energy-based systems	20
Japan	Application of drone technology to pollinate flowers	Drone technology	21,22
Denmark, Germany, Latvia and Lithuania	Cows are fitted with ear tags with a wireless radio frequency identification antenna to identify each animal when they visit a smart robotic feeder. The feeder records the time each cow visits, along with exactly what dose of mineral feed supplements they were given.	AI, IoT and robotics	23,24
Spain	Development of drone and ground-based robots that can image the foliage on olive trees and grape vines, which when analysed using artificial intelligence algorithms can detect the early signs of crop disease.	Drone technology, robotics and Al	24
East African countries	Innovative crop pest control tool: elocust3 – used as a detection and early warning tool for Desert Locusts outbreaks	GIS, Satellite imagery and remote sensing	25

FIGURE 16 - INITIATIVES UNDERTAKEN BY SELECTED COUNTRIES TO DEVELOP THEIR GREEN SECTORS.

5.2 Sectoral Working Group

Mauritius has an Exclusive Economic Zone (EEZ) of 2.3 million km² and agricultural land spanning over 42% of its total area.^{1,31} The immense EEZ and agricultural land provide an opportunity for the green and blue sectors to be developed as sustainable economic pillars. In the same vein, a working group was set up with expert stakeholders related to the sectors to develop a roadmap.







The working group met on three occasions at the Mauritius Research and Innovation Council on Thursday 17th February 2022, Thursday 24th February 2022 and on Thursday 17th March 2022.

In the first meeting, members were given a brief introduction on Les Assises de la Recherche et de l'Innovation 2022. Specific tasks of the working group, including expected outcomes and outputs, were highlighted. Thereafter, discussion on key questions (gaps/challenges, aspirations/vision, new policies/laws/actions/support mechanisms) for the blue and green sector was held. Members were also requested to submit additional views and inputs on the key questions to be included in the draft report. Inputs on key questions were also requested from the Ministry of Environment, Solid Waste Management and Climate Change, Mauritius Port Authority and Ministry of Energy and Public Utilities.

In the second meeting held on 24th February 2022, after presenting the summary of the first meeting, key questions, proposed sub-themes under the blue and green innovation and recommendations were discussed. It was agreed to circulate a working draft of the report for members' inputs before next meeting.

During the third meeting held on 17th March 2022, the working draft of the report was discussed and validated. The members also considered the big questions and discussion point to be focused upon during Les Assises. Speakers and moderator for the thematic discussion during Les Assises were proposed.




FIGURE 18 - PROCESS FOR FORMULATING THE CONSOLIDATED REPORT BLUE AND GREEN INNOVATION



5.3 Sectoral Forum

During the Les Assises de la Recherche et de l'Innovation 2022, on day two, sectoral forum on Blue and Green Innovation was held. The forum was divided into two sessions, namely a presentation session and the panel discussion. The presentation session comprised of speakers from national, regional and international context.

Speakers:

- I. Dr Poonam Veer Ramjeawon, Mauritius Research and Innovation Council
- 2. Her Excellency Dr Kate O'Shaughnessy, Australian High Commission
- 3. Mr Poojanraj Khurun, Food and Agriculture Organisation
- 4. Dr Asha Dookun-Saumtally, Mauritius Sugar Industry Research Institute, MCIA
- 5. Mr Mehul Bhatt, Rogers & Company Limited
- 6. Mrs Anne-Françoise Zattara-Gros, Université de la Réunion

The panel discussion on blue and green innovation constituted of national, regional and international key stakeholders from the blue and green sector.

Moderator:

Dr Mitrasen Bhikajee, Quality Assurance Authority

Panelists:

- I. Mr Leon Chanter, Australian Renewable Energy Agency
- 2. Ms Mreedula Mungra, Mauritius Renewable Energy Agency
- 3. Dr Daniel Marie, Mauritius Oceanography Institute
- 4. Dr John Whittington, Australia's Blue Economy Cooperative Research Centre
- 5. Mrs Anne-Françoise Zattara-Gros, Université de la Réunion
- 6. Mrs Jacqueline Sauzier, Mauritius Chamber of Agriculture
- 7. Mr Jérôme Vuillemin, Qualitropic

Rapporteurs:

- I. Ms Hafsah Ramjane
- 2. Dr (Mrs) Nandini Savoo-Calotte



5.4 Situational Analysis

5.4.1 The Mauritian Context

Blue economy

The blue economy comprises mainly of the fisheries sector, marine and coastal resources, and shipping services. The World Bank estimates that the total ocean economy comprises around 10% of the national economy with tourism being the largest contributor (70% of the ocean economy). Port activities is the second largest ocean sector (20%) and fishing and fish processing comes third.³² The expanse of the EEZ offers us a plethora of marine resources from which to investigate and benefit.³³ Mauritius launched a roadmap to consolidate the tourism, seaport and fishing sectors and to develop the aquaculture, marine biotechnology and renewable energy sectors.⁹ Coastal fisheries produced 891 tonnes of fish and fish products (including artisanal and amateur fisheries) according to the annual report of 2020-2021 of the Ministry of Blue Economy, Marine Resources, Fisheries and Shipping. 3,957 tonnes of fish and fish products were produced from aquaculture. 82,780 tonnes of fish and fish products were exported.^{1,33}

Ocean related research in Mauritius is spearheaded by the Ministry of Blue Economy, Marine Resources, Fisheries and Shipping through the Mauritius Oceanography Institute (MOI) and Albion Fisheries Research Centre (AFRC), by the Department for Continental Shelf, Maritime Zones Administration & Exploration (CSMZAE) and by the University of Mauritius (UoM). The various stakeholders are working to promote research and innovation in the blue sector.

- The MOI is presently involved in the acquisition of sound and reliable oceanographic data, addressing global issues, such as climate change, coastal erosion and marine pollution, modelling of coastal and oceanic processes, exploration and mapping of resources in the nearshore and oceanic waters, and in the implementation of projects in emerging sectors, such as biotechnology and renewable energy, amongst others.
- The AFRC is involved in aquaculture and fisheries development, projects to restore, protect and maintain the marine ecosystems, and monitoring, control and surveillance to fight illegal unreported and unregulated fishing, amongst others.³⁴
- UoM conducts research in areas such as mangrove ecosystems, aquaculture and crustacean taxonomy and biodiversity.³⁵
- The department for Continental Shelf, Maritime Zones Administration and Exploration (CSMZAE) is currently working on the establishment of a new legal and regulatory framework (enactment of new Seabed Mineral Resources Act) to enable the development of the seabed minerals exploration and its sustainable exploitation.³⁶ The CSMZAE will implement marine spatial planning for the EEZ in view of the increasing demand for marine space for various purposes, particularly, fisheries and aquaculture, marine renewable energy, tourism and leisure. The CSMZAE, with the expertise of the Commonwealth Scientific and Industrial Research Organisation Oceans & Atmosphere, Australia, has also set up the Ocean Observatory E-platform. The E-platform is designed to support the marine spatial planning initiative of the



Republic of Mauritius by providing a platform to collect, store, organise and provide access to spatio-temporal data relevant to ocean exploration and development.

As local marine science research matures, it will become important for research institutions to move from coastal research into open sea research. However, unlike coastal research which can be undertaken by individuals, open sea research requires long term vision, institutional planning, substantial investment and considerable networking.

Green economy

- The green economy involves renewable energy, transport, agriculture and forestry. This report focuses on the renewable energy and agricultural aspect of the green economy. The current Mauritian agricultural system is based heavily on conventional methods; for instance, there is an excessive use of agrochemical products, and a significant dependence on non-renewable energies to operate machinery and factories. Hence, the Mauritian agricultural system remains vulnerable to factors such as the climate, pests, diseases and the availability of resources, and the country rely heavily on food imports. The pandemic- and the war-induced economic crisis is a wakeup call for Mauritius to improve its food production and decrease reliance on imports. The country needs to strengthen its existing capacity and promote modern agricultural systems based on new technologies and innovations to boost local production and bolster food security.
- Various stakeholders are striving to transform the current agricultural system into a modern, sustainable, advanced and autonomous system.
- The Ministry of Agro-industry and Food Security has prepared a strategic plan for the agricultural sector to provide key directions in this area.³⁷
- The Food and Agricultural Research and Extension Institute (FAREI) is working on enhancing crop productivity and quality improvement through the development of new crop varieties, sustainable agro-ecological farming practices, sheltered farming and hydroponics, amongst others.³⁸
- The Mauritius Chamber of Agriculture (MCA) launched a smart agriculture project with the aim to modify agricultural practices.³⁹
- The Bank of Mauritius (BoM) issued a guide for the issue of sustainable bonds in Mauritius. These financial instruments provide a wide range of stakeholders, including governments, with the opportunity to fund a wide variety of projects which have an environmental and/ or social impact. In accordance with the 'Guidelines for Issue of Corporate and Green Bonds in Mauritius' as issued by the Financial Services Commission, CIM Finance, a non-banking financial institution became the first Mauritian company to issue green bonds to promote the use of hybrid and electric vehicles.^{40,41}
- The Mauritius Sugarcane Industry Research Institute (MSIRI), MCIA engages in sugarcane research. Research covers various fields including genetics, breeding, agronomy, biotechnology, plant pathology, microbiology, entomology, sugar



technology and climate change.³⁷ In the past, MSIRI has been working on a number of crops including potato, tomato, maize groundnuts, palms and Pitaya. Currently, MSIRI activity is limited to sugarcane except on *ad hoc* basis where it is requested to provide support to a number of agricultural institutions.

• UoM investigates research areas such as biotechnology of endemic & medicinal plants, disease-resistance genes in plants, sustainable agriculture.⁴¹



5.5 Gaps and Challenges of Sector

5.5.1 Blue Sector

Policy/regulatory gaps and challenges

- Creation of new frameworks and better implementation of available framework for the management of our marine resources are required.
 - E.g. Rampant use of motorised sports, chemicals run-off into lagoons
- Spatial conflicts between sectors (tourism vs aquaculture) exist.
- Existing policies need to be reviewed to prioritise sectors of development, to define funding mechanisms and to facilitate collaboration.
- Insufficient measure to facilitate the development of blue carbon economics.

E.g. Sensitisation about carbon markets, regulations for carbon credits (blue and green) generation, verification and trade

- Insufficient incentives are available to promote conservation of biodiversity.
- Biodiversity and conservation need to be become a priority in decision and policy making.
- Updating existing regulations and development of marine related national standards and regulations are required.

E.g. Guidelines for coastal water quality, Standard for Good Mariculture Practices, Standard for operation of Desalination plants.

• There is a need to address conflicting regulations such as the demarcation of Marine Protected Areas and the Port area.

Enforcement gaps and challenges

• There is a need for robust enforcement of policies.

E.g. Excessive fishing in near-shore areas, pollution on land and in sea

- It is difficult to monitor the large EEZ due to inadequate resources and expertise.
- High cost of carrying out surveillance missions
- Lack of trained personnel/ logistics
- There is a need to empower more enforcement agencies.
- Enforcement of conservation measures is inadequate.



Technological gaps and challenges

• There is insufficient local technology available to work on blue and green economies.

E.g. Coastal energy production, marine surveillance technologies, incentives to allow the private sector to invest in research and development

- Appropriate technology to support the development of maritime industry is inadequate.
- Insufficient data on biodiversity importance

Knowledge gaps and challenges

- Consolidation of available marine living resources inventories while expanding scientific exploration is important.
- Stock assessment of each individual species requires more staff.
- There is need for marine spatial planning and cost-benefit analysis.
- There is a need for knowledge sharing of expertise and resources between institutions.
- There is insufficient data on the impact of climate change on fisheries.
- Absence of programme to explore the open ocean.
- Biodiversity and conservation related issues and knowledge needs to be shared among all stakeholders, including the government.
- Need to evaluate the contribution of conservation towards the economy

Resources gaps and challenges

- There is a need for improved access to oceanic natural resources.
- Lack of sea-going research vessels.
- Need for enhanced regional cooperation for prospection
- Need for capacity building

Incentives gaps and challenges

- Private institutions do not have financial depth post-pandemic.
- There are inadequate fiscal incentives for the development of ocean based and ocean related activities industries since the development is capital intensive and depends heavily on external investment.



Financing gaps and challenges

- Innovation in emerging sectors of blue economy is generally capital intensive.
- Ecosystem accounting is lacking.

Other gaps and challenges

- A national plan to encourage and facilitate innovation in the blue sector is required.
- Management of fish stock in the face of a changing climate is required.
- Insufficient data on the impact of Ocean Acidification on fisheries
- There is a need for local resources to deal with emergencies at sea such as oil spill.

5.5.2 Green Sector

Policy/regulatory gaps and challenges

- Insufficient incentives to support local production of seed and planting material
- Insufficient knowledge of the existing support schemes and initiatives among growers
- Inadequate operational framework conducive to investments
- There is a need for incentives to promote research at farm level.
- In comparison to import policy, there is no clear to promote local production.

Enforcement gaps and challenges

- An inclusive operationalisation phase is necessary
- Facilitate the development of green carbon economics

E.g. Sensitisation about carbon markets, regulations for carbon credits (blue and green) generation, verification and trade

Technological gaps and challenges

- Access to green technology is limited and resources are not geared towards supporting the adoption of such technologies
- Development of low-cost and high-impacting techniques for quicker adoption by farmers
- Limited mechanisation of farm activities



E.g. Pruning of fruit trees

- Design of low-cost structures for sheltered farming suitable for Mauritian climate
- Reluctance to adopt emerging technologies

E.g. Drone technology, satellite surveillance, artificial intelligence and internet of things (IoT) in agricultural activities

Knowledge gaps and challenges

- Raising awareness among end-users to support products emanating from green initiatives and to understand the inherent benefits
- Availability of local materials and expertise to implement green agriculture is inadequate
- Soil mapping and microbiological assessment need to be conducted to assess soil health
- Inadequate capacity building to develop a skilled workforce and the necessary technical expertise for emerging sectors

Resources gaps and challenges

- Need for innovation in agricultural sector
- Need for breeding programmes to improve varieties (crops and livestock)
- Insufficient adoption of biotechnology tools in agriculture
- Labour shortage
- Gradual reduction in trained labour force
- Ageing labour force combined with brain drain
- Competition for land from other sectors which are more remunerative
- Reduction in area and productivity of arable land
- Increasing costs of agricultural inputs
- Dependency on costly and scarce imported seeds, planting material and raw materials for animal feed
- Irregular supply of quality raw materials at competitive price
- Endangerment of biodiversity due to unsustainable human activities
- Inadequate research staff
- Insufficient pool of experts for the technical follow-up during implementation of business ideas
- Rigid and cumbersome administrative procedures to acquire resources



Incentives gaps and challenges

• Inadequate incentives to adopt alternative agricultural practices

E.g. Vertical and urban farming

- Insufficient infrastructural development for the promotion of agricultural research
- Lack of encouragement for the development of business ideas at secondary and tertiary level related to blue and green sectors
- Need for incentives to develop biodiverse forests and agro-forests
- Inadequate buy-in and commitment from organisations to adopt green and sustainable practices
- Coordinated action among stakeholders is insufficient
- Incentives and schemes are non-KPI oriented.

Financing gaps and challenges

- Inflated cost of production due to high cost of inputs and labour
- Lack of investment on promotion of smart farming to provide the current indoor agriculture industry with infrastructure to leverage advanced technology

E.g. Digital agriculture, automated systems

- Stringent conditions laid down by funding institutions deter potential innovators
- Substantial investment required to take a project beyond proof-of-concept stage and to start a business
- Insufficient financial support and incentives to encourage youngsters who wish to implement innovative projects

Other gaps and challenges

- Deleterious impacts of climate change and weather extremes on crop productivity *E.g.* Drought, heat stress and floods
- Poor management of agricultural produce and limited storage leading to losses and waste
- Green initiatives produce result on longer term with higher initial investment which is generally a deterrent element for local producers



- Difficult for local produce to reach global market
- Lack of knowledge about Mauritius as a destination to experiment with tropical agriculture
- Difficulty to invest in agriculture and agro-processing due to poor visibility of the future and lack of vision showed to all stakeholders.

5.5.3 SWOT Analysis

A SWOT analysis, based on the discussions during the working group meeting with various stakeholders on the state and needs of the sector, is summarised in Figures 4 to 7.

Strengths

- Different research institutions specialised in several areas of blue and green sectors
- Several projects already undertaken/ongoing to address blue and green issues
- Positive mindset of stakeholders in the blue and green sectors
- Existing framework to educate and create awareness
- Mauritius is a member state of the Indian Ocean Commission and part of the ECO fish Programme, one of the activities of the programme is the conduct of patrol surveillance mission in the EEZ of Mauritius.
- Mauritius has in place a vessel monitoring system for the tracking of fishing vessels in the EEZ of Mauritius. The NCG uses the same technology and Automatic Identification System for surveillance.
- Vessel monitoring system regulation is in place since 2005 and is being reviewed.
- Existing legal framework facilitate development of the Blue Economy
- Being a large ocean state offers considerable opportunities for the development of the blue economy sector in line with the Government Agenda
- Existing incentives to innovate
- Experienced farming and fishing community
- Interest of the private sector

FIGURE 19 – BLUE AND GREEN SWOT ANALYSIS (STRENGTHS)

Weaknesses

- Funding for research and innovation is limited
- Applied research requires proof of commercialisation



- Decline of land under cultivation
- Ageing farmer and fishermen population and shortage of labour
- Inflated cost of labour and agricultural/ marine input
- Inadequate research and innovation culture
- Inadequate investment in research, technology and capacity building
- Insufficient knowledge transfer
- Academic nature of schooling
- Limited uptake of emerging technology
- Lack of data sharing culture and collaboration amongst institutions
- Unpreparedness to face climate change
- Absence of norms and standards
- Poor coordination amongst research institutions
- Dwindling of purchasing power
- Reliance on import

FIGURE 20 - BLUE AND GREEN SWOT ANALYSIS (WEAKNESSES)

Opportunities

- Mauritius has an Exclusive Economic Zone (EEZ) of 2.3 million square kilometres including the Chagos region and a continental shelf of 396,000 square kilometres comanaged with the Republic of Seychelles.
- Strategic location (proximity to international sea routes)
- Opportunity to promote diversification on abandoned sugarcane lands
- Increase visibility of Mauritius through blue and green initiatives
- National and international partnerships to access innovative technologies and expertise
- Existing framework for export may be modified to include products of the blue and green market
- Existing framework to promote blue and green innovation (e.g. blue and green bonds by BoM, certification of agricultural products by MCA)
- Address food security and climate change issues
- Encourage public private partnerships



- New technologies (software) for the monitoring, control and surveillance in the waters
 of Mauritius. such as Automatic Identification System (AIS), Satellite Radar Imagery
 (RAI), synthetic Aperture Radar, Visible Infrared Imaging Radiometer Suite (VIIRS),
 Coastal radars, Maritime Information System that enables Aids to Navigation (AtoN),
 Maritime Domain Awareness (MDA) and electronic navigation systems. All these
 sources of data could be used for cross data analysis to determine Illegal, Unreported
 and Unregulated (IUU) activities and for more efficient sea and air patrol. Drones may
 also be used on patrol vessels or vessels where trained observers are present for an
 aerial surveillance to detect any illicit activities
- A database could be compiled from studies carried out in public sector and private sector even at the universities level. This will help in analysing gaps in information, thus new research work can be concentrated in these areas.
- Imposition of blue fees like payment for ecosystem services or conservation fee

FIGURE 21 – BLUE AND GREEN SWOT ANALYSIS (OPPORTUNITIES)

Threats

- Competition amongst different research institutions
- Brain drain
- Resistance to change
- Rigid and cumbersome procedures to gain resources to undertake research
- Competition for resources from other economic sectors
- Inadequate technical follow-up with farmers
- Decline in interest among the younger generation to go into agriculture, farming and fishing
- Climate change
- Difficulty in surveillance and monitoring of the EEZ
- Cost of purchasing, implementing and maintaining new technologies
- Piracy at sea

FIGURE 22 – BLUE AND GREEN SWOT ANALYSIS (THREATS)



5.6 Vision

The vision of the working group on Blue and Green Innovation is to promote and pioneer innovation in the blue and green sectors for sustainable development to enhance the quality of life and resilience of the people in Republic of Mauritius. This is in line with the Government Programme (2020-2024) and vision for the blue and green sectors spelt out by different stakeholders.

To achieve this vision, several strategic orientations could be undertaken:

- Enhancing nutritional quality and food security
- Enhancing food processing from local sources
- Circular blue and green economies
- Marine technology
- Marine and plant biomed
- Blue and green bioprospecting and bioprocessing
- Blue-green production and export



5.6.1 Strategic Orientation 1: Enhancing nutritional quality and food security

Targets:

- I. Productive and sustainable agriculture through precision and smart farming
- 2. Improved nutritional quality of food
- 3. Reduction of food loss and waste
- 4. Boost agricultural production and yield
- 5. Sustainable land and soil management
- 6. Development and use of novel breeding techniques
- 7. Improved agricultural practices and resource management (e.g. irrigation, fertiliser application among others)
- 8. Development and use of storage techniques to increase shelf-life of local produce

Economic and social benefits (Expected impact):

- Decouple economic growth from excessive resource use and its impact on environment
- Increase in qualified workforce
- Improving the health status of the population
- Higher quality yield and meat production
- Increased sales of locally produced food products
- Novelty of the field will attract youth to the sector
- Increase food safety

Expected outcome:

- Improved quantity and quality of local food
- Increase production of local healthy food
- Increase value addition of local produce
- Trust in source of food
- Encourage consumption in an intelligent manner
- Reduce trial and error
- Efficient use of resources



Relevant actionable/ strategy/ support¹

Project I

Satellite and aerial imagery (e.g. use of drones) for sustainable land use and targeted agricultural inputs

Agriculture is well suited for satellite and aerial technology because the data gathered may be integrated into the additional innovations taking place on the field. This project proposes to use data collected from satellites and drones to aid in agricultural tasks in a sustainable manner. Data to be collected involve changes in precipitation, temperature, crop yields and plant health.

Project 2

Development of smart machinery and equipment to improve farming practices

This project aims to innovate farm practices through the use of smart machines and equipment. Such practices include application of fertilisers and pesticides, irrigation and sowing of seeds, amongst others. This project will also target improved soil health and establish a robust soil management environment through the use of smart and innovative techniques.

Project 3

Blockchain food traceability

The activities of this project will include tracking the entire lifecycle of food products from

farm to fork and pinpointing the possible sources of contamination to eventually contribute

to contain outbreaks.

Project 4

Use of IoT to monitor livestock

This project will entail IoT-enabled livestock management solutions to monitor the health status and feeding patterns of the herd. Devices such as wearable collar or tag, <u>battery-powered sensors</u> to monitor the location, temperature, blood pressure and heart rate of animals which will wirelessly send the data in near-real-time to farmers' devices will be developed.

Project 5

Use of sugarcane fibres in nutrition

The potential prebiotic effect of fibre from sugarcane grown in Mauritius will be analysed against gut inflammation. Commercialisation potential will be assessed.

Project 6

¹ These are indicative projects subject to change.



Relevant actionable/ strategy/ support

Development of smart greenhouse horticulture structures ideal for the Mauritian tropical climate

The activities of this project will lead to the creation of a self-regulating, microclimate apt for plant growth by using sensors, and other monitoring and control systems that will lead to optimal growth conditions and automate the growing process. Horticulture systems which can be considered are hydroponics, aquaponics and aeroponics.

Project 7

Use of biotechnology tools for breeding, genetic resource exploitation, soil health rehabilitation and biosecurity purposes

Novel biotechnological tools, such as RNA interference (RNAi), trans-grafting, cisgenesis/ intragenesis, and genome editing tools, such as zinc-finger and CRISPR-Cas9, will be introduced. This project will involve capacity-building of local scientists. This project will also target improved soil health and establish a robust soil management environment through the use of smart and innovative techniques.



5.6.2 Strategic Orientation 2: Enhancing food processing from local sources

Targets:

- I. Improved nutritional quality of food
- 2. Reduction of food loss and waste
- 3. Boost agricultural production and yield
- 4. Boost livestock production
- 5. Added value
- 6. Increase storability of products

Economic and social benefits (Expected impact):

- Improving the health status of the population
- Even supply of food throughout the year
- Higher quality yield and meat production
- Increased sales of locally produced food products
- Increase food safety
- Boost marketing and distribution
- Job generation and business opportunities
- Even supply of food throughout the year

Expected outcome:

- Minimised food waste along the value chain
- Improved quality of local food
- Trust in source of food
- Encourage consumption in an intelligent manner
- Preservation of nutritional quality
- Enhancing availability and convenience



Relevant actionable/ strategy/ support²

Project I

Improved post-harvest techniques and development of intelligent storage facilities Post-harvest techniques, including storage facilities, will be developed and implemented to improve the shelf-life of fruits and vegetables to lower food wastage. This project will involve capacity-building workshops and public awareness events.

Project 2

Mapping of agro-processing zones

Agro-processing zones will be identified or developed to perform activities related to agroprocessing in areas of high agricultural potential. The aim is to sustain production, productivity and commercialisation of food products.

Project 3

Use of solar energy for post-harvest techniques

Post-harvest loss threatens locally-produced crops. Post-harvest loss is mainly caused by the high moisture content of these crops which render them bulky, highly perishable and costly to transport. Solar energy is a clean source of energy that can be used to power devices such as solar-powered cooling chamber and solar dehydrator for dehydration of food. This can contribute to provide the proper environment for storage and preservation. Further work can entail the development of low-cost solar cells and panels that will enable farmers to afford such technologies for a reduced cost.

Project 4

Using biotechnological tools to breed crops with a longer shelf life

Novel biotechnological tools, such as RNA interference (RNAi), trans-grafting, cisgenesis/ intragenesis, and genome editing tools, such as zinc-finger and CRISPR-Cas9, will be introduced. This project will involve capacity-building of local scientists.

5.6.3 Strategic Orientation 3: Circular blue and green economies

Targets:

- I. Circular blue economy
- 2. Circular green economy

Economic and social benefits (Expected impact):

- Bolstering of local economy
- Emerging business models
- Sustainable manufacturing industry, including bio-fashion

² These are indicative projects subject to change.



- Development of new skill sets
- Improving the security of the supply of materials resulting in sustainable supply chain
- Lowering of the carbon footprint
- Reduction of deleterious environment impact

Expected outcome:

- Efficient management of materials through re-use
- Increase in job opportunities
- Transform waste into resources
- Cost-efficient supply of materials



Relevant actionable/ strategy/support³

Project I

Blue and green fashion – innovative use of blue and green materials in the fashion industry The fashion industry is a major polluting sector. Fashion-related industrial processes lead to an increase in emission of carbon dioxide in the atmosphere. Sustainable alternatives may be developed by using plant materials, such as mangoes, pineapples and lemon skin and by using fish, such as tilapia.

Project 2

Phytocosmetics – innovative use of plant materials for cosmetics

The cosmetic industry is a lucrative industry. Phytocosmetics or plant-based cosmetics are natural products that are used for cosmetic purposes. The local flora presents an important opportunity for researchers to explore since they represent a rich source of active ingredients that are beneficial to the skin health. This project exudes potential for the development of commercial products from terrestrial and marine plant materials.

Project 3

Manufacturing of biodegradable and compostable blue and green products

The feasibility of manufacturing products, such as face masks from algae, swimsuits from fishing nets, bioplastic from seaweed, fibres from banana and pineapple peels and composts from green wastes for commercialisation will be analysed. This project aims at manufacturing and introducing these products on the market.

Project 4

Upcycling waste to develop future cities

The vast quantities of waste generated is leading to overflowing landfills in Mauritius. The wastes can be converted to sustainable building blocks and used to create the urban landscape of the future.

³ These are indicative projects subject to change.



5.6.4 Strategic Orientation 4: Marine technology

Target:

Innovative marine ICT

Economic and social benefits (Expected impact):

- Better management of EEZ
- Better management of marine resources
- Track assets at sea
- Better coordination of ships and vessels leading to increased safety
- Increase in local exploitation of the marine resources in the EEZ of Mauritius and therefore the revenue of locals
- Instil a sense of stewardship in the fishing communities and therefore promote marine ecosystem conservation and protection
- More effective monitoring, control and surveillance measures to deter and eliminate illegal unreported and unregulated (IUU) activities

Expected outcome:

- Business opportunities
- Software development



Relevant actionable/ strategy/support⁴

Project I

Using modelling tools for ship management and coastal management This project will involve the use of modelling tools to manage ships and to manage the use of the coastal areas. Staff will be trained to use the relevant modelling tools.

Project 2

EEZ monitoring – Leveraging on satellite observation and surveillance/ drone/ IoT This project entails the use of new technologies to integrate satellite imagery and cross analysis with AIS and Vessel Monitoring System (VMS) data. It will also involve the use of drones by trained observers on board fishing vessel or patrol vessels to cover a wider range of surveillance. This project will involve capacity-building workshops to train staff in the use of such technologies.

Project 3

Use of forecast technologies to predict weather phenomena

Forecast technologies will be developed and implemented. Changes in the weather will be predicted using the forecast technologies. This project will involve capacity-building workshops to train staff in the use of such technologies.

Project 4

Fish movement and monitoring

This project aims at studying fish movement to monitor the health of the ecosystem and determine conservation measures, and to identify potential fishing zones. Studies on the dynamics of fish movement for migratory species like albacore tuna in the EEZ of Mauritius will shed light on the spatial distribution of this resource, and this will ensure better vessel monitoring in the waters of Mauritius. Monitoring control and surveillance to combat IUU fishing is also targeted.

Project 5

Assessing marine genetic biodiversity and implementation of sustainable measures for resource conservation

The sustainability of marine ecosystems and their fundamental services is contingent upon marine biodiversity. Important tools such as genomics, robust marine biosensors (e.g., automated aerial, surface, and underwater drones equipped with sonar or acoustic monitoring), underwater cameras for detection of ocean fauna, and improved mathematical models can be used to assess marine genetic biodiversity and develop sustainable measures for resource conservation based on the data emanating from such studies. Mauritian researchers will benefit from training to adopt new technologies.

⁴ These are indicative projects subject to change.



5.6.5 Strategic Orientation 5: Marine and plant biomed

Target:

Development of medicine through marine and terrestrial resources

Economic and social benefits (Expected impact):

- Increase sustainability of the blue and green sector
- Knowledge generation
- Development of new skills

Expected outcome:

- Development of medical alternatives from locally available resource
- Create job opportunities

FIGURE 27 - STRATEGIC ORIENTATION 5 PROJECTS

Relevant actionable/ strategy/support⁵

Project I

Biological wound dressing from fish skin

Skin is the largest organ of the human body which has a complex structure. When the structural integrity of skin tissue is disrupted, infections can occur leading to delayed healing. Skin grafts are considered as a promising and effective solution for regenerative medicine in skin as compared to traditional wound dressing since it acts as a temporary barrier and provides anti-microbial properties. Tilapia fish skin has demonstrated promise as a stable and practical biological dressing to be used in wound and burn management. The wound healing potential of locally grown Tilapia fish skin can be analysed by researchers to be used as skin grafts for burn victims and wound management.

Project 2

Development of pharmaceuticals from marine organisms

Water covers 75% of the surface of the earth. However, research into the pharmacology of marine organisms is limited. This project aims at developing pharmaceuticals from marine organisms in Mauritian waters. These organisms will be screened for antibacterial, immunomodulator, antifungal, anti-inflammatory, anticancer, antimicrobial, neuroprotective, analgesic and antimalarial properties. Drug discovery programmes will be initiated.

⁵ These are indicative projects subject to change.



Project 3

Development of thalassotherapy units in coastal hotels

Thalassotherapy is an alternative therapy which draws on the medical properties of marine waters, characterised by their high mineralisation, high density and chemical composition rich in minerals, such as chlorides, sodium, magnesium, calcium, potassium and iodine. The development of thalassotherapy units in coastal hotels in Mauritius will be a huge booster to the tourism sector and will introduce novel research areas.



5.6.6 Strategic Orientation 6: Blue and green bioprospecting and bioprocessing

Target:

Health benefits from the blue and green sectors

Economic and social benefits (Expected impact):

- Improving the health status of the population
- Creation and development of nutraceutical industry
- Knowledge generation

Expected outcome:

- Applied research and innovation on potent local terrestrial/marine biofactors with high prospects for commercial ventures
- New commercial products
- Create job opportunities

FIGURE 28 – BLUE AND GREEN STRATEGIC ORIENTATION 6 PROJECTS

Relevant actionable/ strategy/support⁶

Project I

Investigation of health benefits from marine biodiversity

The rich marine biodiversity existing in Mauritius remains an underexplored resource in terms of their application to health and wellness, exuding immense potential for nutraceutical development. Research and development activities on the therapeutic potential of metabolites produced by marine organisms are being conducted in Mauritius, albeit at an embryonic stage. More efforts are required to upscale these studies into pilot projects and eventually production of commercial products. More advanced equipment such as manned submersibles and remotely operated vehicles (ROVs) can be adopted in Mauritius to access marine biodiversity found in unreachable and difficult to access zones of the oceans. Correct taxonomic identification and classification techniques need to be assessed and employed to avoid compromising any drug discovery process.

Project 2

Investigation of health benefits from terrestrial biodiversity

The local flora has been extensively studied by national and international researchers. These studies have unearthed a comprehensive list of terrestrial flora that present highly beneficial therapeutic potential. More efforts are required to upscale these studies into pilot projects and eventually production of commercial products. A targeted approach to identify high-

⁶ These are indicative projects subject to change.



Relevant actionable/ strategy/support⁶

priority plants can be initiated to identify plants that can be used in the short and medium term to develop nutraceutical products. More precise structure elucidation techniques will be devised and implemented to unveil the complex structure of potent metabolites.

Project 3

Development of the blue nutraceutical industry

A number of metabolites produced by marine organisms are considered as high-value commercial products for both the cosmetic and pharmaceutical industries. Developing a blue nutraceutical industry requires a reorganization of the market, elaboration of new strategies, adoption of technologies, accommodating nutraceutical in the current legislation regulating pharmaceuticals in Mauritius, and critical changes in the regulation applied to nutrition and to health claims.

Project 4

Development of the green nutraceutical industry

A number of metabolites produced by terrestrial flora are considered as high-value commercial products for both the cosmetic and pharmaceutical industries. Developing a green nutraceutical industry requires a reorganization of the market, elaboration of new strategies, adoption of technologies, accommodating nutraceutical in the current legislation regulating pharmaceuticals in Mauritius, and critical changes in the regulation applied to nutrition and to health claims.

5.6.7 Strategic Orientation 7: Blue-green production and export

Target:

- I. Broaden the energy sector
- 2. Increase use of renewable sources of energy
- 3. Promote exportation

Economic and social benefits (Expected impact):

- Lower dependence on non-renewable energy
- Bolstering economic growth
- Development of a local market

Expected outcome:

- Business opportunities
- Raw materials appropriate for the local climate



Relevant actionable/ strategy/support⁷

Project I

Feasibility study for an offshore hydrogen plant

Offshore wind generates electricity in a sustainable manner. The electricity may be converted to hydrogen through the electrolysis of seawater and distributed through gas pipelines. A hydrogen plant produces green hydrogen gas from sustainable electricity. Hydrogen gas may replace natural gas in industrial processes. Hydrogen gas may also be used as a fuel for transport and may be stored as an energy carrier. The feasibility of constructing an offshore hydrogen plant and its implications will be determined.

Project 2

Feasibility study of exportation of hydrogen as fuel

A study will be carried out to determine whether hydrogen gas may be exported as a fuel to other countries. Exportation of hydrogen gas as fuel will help to boost local economy and will provide green energy alternatives. This project will serve as an initial step towards fuel autonomy in Mauritius.

Project 3

Local manufacturing and export of raw materials for renewable energy production Raw materials, such as photovoltaic panels, will be manufactured and introduced to the local and international markets to boost local economy and to promote the use of solar energy locally and in other countries.

Project 4

Conversion of biomass to transportation fuel

Biomass generates bioenergy, which is a sustainable alternative to fossil fuels. Biomass involves renewable sources such as plants and waste. Biomass conversion involves new technologies, such as the application of the Fischer-Tropsch process to create synthetic green LPG from crop residues. This project aims at testing these technologies in the Mauritian context.

Project 5

PV Power generation with aquaculture

The Ministry of Agro-Industry and Fisheries commissioned a report entitled **"Potential for Sustainable Aquaculture Development in Mauritius"** in 2007 and the Board of Investment came forward with "Développement de l'Aquaculture à l'Île Maurice Étude du Potentiel Aquacole" in 2007 illustrating the different possibilities and technical aspects to adapt this new sector in the Mauritian context. Following the study, many initiatives were taken for this sector to take off such as providing Small Medium Enterprises (SMEs) with a financing scheme, which includes small-scale fishing industry value chains and development of an 'Aquaculture Master Plan' by the Ministry of Blue Economy, Marine Resources, Fisheries and Shipping.

⁷ These are indicative projects subject to change.



The aquaculture sector requires electrical energy for several devices, such as water pumps, aeration systems, light, machines, fridges, ice production, *etc.* Most of the energy consumption might be from the grid or from diesel generators.

Solar energy is one of the energy sources for aquaculture in many countries in the world, including China, America, Canada, Germany, Korea and Vietnam. It is applied for the culturing of many aquatic species, including fresh water and seawater. PV power can be used for the aeration of fishponds and new energy technologies are applied for marine fish hatchery production.

A feasibility study to combine PV and aquaculture to bring forward the different benefits of renewable energy production as well as space optimisation could be carried out to assess the viability of such projects in Mauritius.

A feasibility study may be carried out to assess the viability of setting up floating PV.

Project 6

Feasibility for production of electricity from coconut oil in outer islands

The Mauritian Archipelago consists of Mauritius, Rodrigues, Agalega and St Brandon. Mauritius and Rodrigues are currently deploying renewable energy technologies to contribute to their need in electricity. The Agalega island has a population of 359 and faces its own specific problems caused by factors such as lack of land surfaces, remoteness, geographical location, frail ecosystems, lack of regular transport and communication, inadequate natural resources, limited fresh water supplies and heavy dependence on imports from Mauritius. Since December 2005, electricity is provided to only three villages of Agalega on a 24-hour basis.

The only resource available on these islands is coconut. With its 2 600 hectares of land, Agalega has around 70 000 standing coconut trees distributed over an area of 500 hectares or around 20% of the total surface area.

A feasibility study to match the existing resource of the island of Agalega and the need to develop the electricity production while in parallel reducing the dependency on imports from Mauritius could be made. Developing such a project could serve as a pilot project and be duplicated on other outer islands, such as Rodrigues and St Brandon where coconut cultivation could rise as a new economic sector.

Project 7

Feasibility study for implementing net zero energy buildings in Mauritius

A net zero energy development means a development that consumes no more energy than is provided by a combination of:

- renewable energy generated on-site, or
- > renewable energy procured from off-site sources.

The development of net zero buildings in Mauritius could contribute largely to reduce the electricity consumption from the grid and helping to achieve the 60% of renewable energy target in electricity mix and to reduce greenhouse gas emissions by 40% in 2030 while optimising space for deployment of renewable energy technologies for electricity production. Net zero buildings bring direct benefits to the community by achieving health savings through reduced pollution, as well as cost savings through reduced infrastructure requirements. It will also help to build greater resilience within the community in the face of climate change. In terms of the economy, net zero buildings can help to:



- create jobs and demand for new skills in the energy efficiency (design and operation) component of the building construction and management sectors, as well as in the renewable energy sector
- reduce the need to build additional energy infrastructure, potentially reducing costs
- lower operational costs
- drive growth in the renewable energy sector
- drive innovation in the sustainable building sector. The environment will benefit from the overall contribution to the global effort to reduce emissions.



5.7 Short term Action Plan

5.7.1 Action Plan 1 – Enhancing nutritional quality and food security

Implementing agency(ies):

- Ministry of Agro Industry and Food Security
- Food and Agricultural Research and Extension Institute
- Mauritius Sugarcane Industry Research Institute, MCIA
- Mauritius Chamber of Agriculture
- University of Mauritius
- Economic Development Board
- Mauritius Research and Innovation Council

Enabling factors

- Regulatory framework
- Promotion strategies
- International collaboration
- Capacity building, training and knowledge transfer
- Schemes for the procurement of equipment and expertise
- Public-private partnerships

Implementation strategy/plan

- Feasibility studies
- Proof of concept initiatives
- Enforcement of Intellectual Property Act
- Policy to increase public funding in research and innovation
- National consultation
- Engaging human and natural resources with high priority to green initiatives
- Operationalise fully the seed act
- Finalise and operationalise the organic agriculture bill
- Promote organic food production
- Amendment to the Use of Pesticide Act to include organics/natural fertilisers
- Enactment of Animal Health and Production Bill

Indicative Activities

- Satellite and aerial imagery for sustainable land use and targeted agricultural inputs
- Development of smart machinery and equipment to improve farming practices
- Blockchain food traceability
- Use of IoT to monitor livestock



- Use of sugarcane fibres in nutrition
- Development of smart greenhouse horticulture structures ideal for the Mauritian tropical climate
- Use of biotechnology tools for breeding, genetic resource exploitation, soil health rehabilitation and biosecurity purposes

Hurdles

- Heavy reliance on import of food and food products
- Reluctance to adopt recent and novel technologies
- Inadequate local expertise
- Initial cost barrier

I IGORE SO DECEARD GREEK SHORT FERM ACTION FEAR ET OTENTIAE RISKS AND MITTGATION MEASORES

Risks	Mitigation measures
Cyberattacks Risk of losing data during downtimes	Set up a unit to monitor and contain cyberattacks
Unpredictable phenomena (Pandemic/	Encourage food autonomy
War etc.)	

FIGURE 31 – BLUE AND GREEN SHORT TERM ACTION PLAN 1 ESTIMATED INVESTMENT

Actions/ Programme	2022-2023	2023-2024	2024-2025
Short Term			
Productive and sustainable agricultur through precision and smart farming	e750,000	3,000,000	3,750,000
Improved nutritional quality of food and food security	4750,000	3,000,000	3,750,000

(The figures represent seed funding to initiate the proposed actions/ programmes)



5.7.2 Action Plan 2 – Enhancing food processing from local sources

Implementing agency(ies):

- Ministry of Agro Industry and Food Security
- Food and Agricultural Research and Extension Institute
- Mauritius Sugarcane Industry Research Institute, MCIA
- Mauritius Chamber of Agriculture
- University of Mauritius
- Economic Development Board
- Mauritius Research and Innovation Council

Enabling factors

- Regulatory framework
- Promotion strategies
- International collaboration
- Capacity building, training and knowledge transfer
- Schemes for the procurement of equipment and expertise
- Public-private partnerships

Implementation strategy/plan

- Feasibility studies
- Proof of concept initiatives
- Enforcement of Intellectual Property Act
- Policy to increase public funding in research and innovation
- National consultation
- Engaging human and natural resources with high priority to green initiatives



Indicative Activities

- Improved post-harvest techniques and development of intelligent storage facilities
- Mapping of agro-processing zones
- Use of solar energy for post-harvest techniques
- Using biotechnological tools to breed crops with a longer shelf life

Hurdles

- Inadequate policy implementation
- Reluctance to adopt emerging technologies
- Inadequate local expertise
- Initial cost barrier
- Importation from intermediaries
- Resistance of business owners to diversify due to pandemic- and war-induced economic crisis

Risks	Mitigation measures
Supply chain disruption due to factors such as weather and storage constraints	Assess factors and plan for alternatives
Food contamination	Designing equipment and processes to limit the risk of contamination
Safety hazards due to heavy machinery	products are free from contaminants Proper training of employees

FIGURE 32 – BLUE AND GREEN SHORT TERM ACTION PLAN 2 POTENTIAL RISKS AND MITIGATION MEASURES

Figure 33 – Blue and Green Short Term Action Plan 2 Estimated Investment

Actions/ Programme	2022-2023	2023-2024	2024-2025
Short Term			
Enhancing food processing from loc	al500,000	2,000,000	2,500,000
sources			

(The figures represent seed funding to initiate the proposed actions/ programmes)



5.8 Medium term Action Plan

5.8.1 Action Plan 1 – Circular blue and green economies

Implementing agency(ies):

- Ministry of Blue Economy, Marine Resources, Fisheries and Shipping
- Ministry of Agro Industry & Food Security
- Ministry of Industrial Development, SMEs and Cooperatives
- Business Mauritius
- Fashion and Design Institute
- Economic Development Board
- Mauritius Research and Innovation Council

Enablers

- Regulatory framework
- Promotion strategies
- International collaboration
- Capacity building, training and knowledge transfer
- Schemes for the procurement of equipment and expertise
- Proximity to existing market
- Public-private partnerships

Implementation strategy/plan

- Feasibility studies
- Proof of concept initiatives
- Pilot projects
- Public-private partnerships



Indicative Activities

- Blue and green fashion innovative use of blue and green materials in the fashion industry
- Phytocosmetics innovative use of plant materials for cosmetics
- Manufacturing of biodegradable and compostable blue and green products
- Upcycling waste to develop future cities

Hurdles

- Inadequate local expertise
- Initial cost barrier
- Cost of production
- Reluctance to invest in start-ups

FIGURE 34 - BLUE AND GREEN MEDIUM TERM ACTION PLAN 1 POTENTIAL RISKS AND MITIGATION MEASURES

Risks	Mitigation measures
Low return on investment Competition with existing alternatives	Business development strategies Marketing and promotion strategies Subsidies and fiscal regime Digital platform for marketing and commercialisation


FIGURE 35 - BLUE AND GREEN MEDIUM TERM ACTION PLAN 1 ESTIMATED INVESTMENT

Actions/ Programme	2022-2023	2023-2024	2024-2025
Medium Term			
Innovative use of marine and biomaterials for manufacturing products	1,000,000	4,000,000	5,000,000

(The figures represent seed funding to initiate the proposed actions/ programmes)

5.8.2 Action Plan 2 – Marine technology

Implementing agency(ies):

- Ministry of Blue Economy, Marine Resources, Fisheries and Shipping
- Ministry of Information Technology, Communication and Innovation
- Department of Continental Shelf, Maritime Zones Administration & Exploration
- Mauritius Oceanography Institute
- Mauritius Port Authority
- National Coast Guard
- Business Mauritius
- Economic Development Board
- Mauritius Research and Innovation Council

Enablers

- Regulatory framework
- Maritime safety, security and surveillance programme
- Promotion strategies
- International collaboration
- Capacity building, training and knowledge transfer
- Schemes for the procurement of equipment and expertise

Implementation strategy/plan

- Feasibility studies
- Proof of concept initiatives
- Procurement of relevant software

Indicative Activities

- Using modelling tools for ship management and coastal management
- EEZ monitoring Leveraging on satellite observation and surveillance/ drone/ IoT
- Use of forecast technologies to predict weather phenomena
- Fish movement and monitoring



• Assessing marine genetic biodiversity and implementation of sustainable measures for resource conservation

Hurdles

- Inadequate local expertise
- Initial cost barrier
- Reluctance to invest in start-ups

FIGURE 36 - MEDIUM TERM ACTION PLAN 2 POTENTIAL RISKS AND MITIGATION MEASURES

Risks	Mitigation measures
Cyberattack Risk of losing data during downtimes	Set up a unit to monitor and contain cyberattacks Continuous backup



FIGURE 37 - BLUE AND GREEN MEDIUM TERM ACTION PLAN 2 ESTIMATED INVESTMENT

Actions/ Programme	2022-2023	2023-2024	2024-2025
Medium Term			
Innovative Marine ICT (modelling software, Satellite surveillance, Remote	1,000,000	4,000,000	5,000,000
sensing technologies, forecast			
technologies etc.)			

(The figures represent seed funding to initiate the proposed actions/ programmes)



5.9 Long term Action Plan

5.9.1 Action Plan 1 – Marine and plant biomed

Implementing agency(ies):

- Ministry of Blue Economy, Marine Resources, Fisheries and Shipping
- Mauritius Oceanography Institute
- Centre for Biomedical and Biomaterials Research (CBBR)/ University of Mauritius
- Ministry of Health and Wellness
- Economic Development Board
- Mauritius Tourism Promotion Authority
- Mauritius Research and Innovation Council

Enablers

- Schemes for fish breeding and rearing
- Regulatory framework
- Promotion strategies
- International collaboration
- Capacity building, training, and knowledge transfer
- Schemes for the procurement of equipment and expertise

Implementation strategy/plan

- Call for projects/ programme/ ideas
- Feasibility studies
- Proof of concept initiatives
- Public-private partnerships

Indicative Activities

- Biological wound dressing from fish skin
- Development of pharmaceuticals from marine organisms
- Development of thalassotherapy units in coastal hotels

Hurdles

- Inadequate technical expertise
- Initial cost barrier
- Inadequate infrastructure and resources
- Underlying comorbidities of patients
- Cultural and religious barriers



Risks	Mitigation measures
Underlying comorbidities of patients	Extensive clinical trials
Access to marine biodiversity in unreachable	Sampling techniques need to be honed to
and difficult to access zones of the oceans is difficult	allow collection of samples
Access to biodiversity is controlled by the	The Nagoya protocol needs to be applied
Convention on Biological Diversity (CBD)	harmoniously in different countries and
Yield of bioactive components from marine	regions
sources varies	Improving extraction techniques by
	rendering them more productive, sensitive
	and robust will enable the screening of small
	amounts of samples with low concentration
A large number of marine and terrestrial	issues
fauna and flora lack taxonomic identification	Both the classical and molecular methods
	need to be employed in determining the
	taxonomic identification and classification of
Inexperienced therapists for thalassotherapy	a species
	Training of staff by experts followed by
	evaluation of skills

FIGURE 38 - BLUE AND GREEN LONG TERM ACTION PLAN 1 POTENTIAL RISKS AND MITIGATION MEASURES

FIGURE 39 - BLUE AND GREEN LONG TERM ACTION PLAN 1 ESTIMATED INVESTMENT

Actions/ Programme	2022-2023	2023-2024	2024-2025
Long Term			
Marine and plant biomed	500,000	2,000,000	2,500,000

(The figures represent seed funding to initiate the proposed actions/ programmes)



5.9.2 Action Plan 2 – Blue and green bioprospecting and bioprocessing

Implementing agency(ies):

- Ministry of Blue Economy, Marine Resources, Fisheries and Shipping
- Ministry of Agro Industry & Food Security
- Mauritius Oceanography Institute
- Centre for Biomedical and Biomaterials Research (CBBR)/ University of Mauritius
- Mauritius Sugarcane Industry Research Institute, MCIA
- Economic Development Board
- Mauritius Research and Innovation Council

Enablers

- Regulatory framework
- Business development strategies
- Promotion strategies
- International collaboration
- Capacity building, training and knowledge transfer
- Schemes for the procurement of equipment and expertise
- Public-private partnerships

Implementation strategy/plan

- Feasibility studies
- Proof of concept initiatives

Indicative Activities

- Investigation of health benefits from marine biodiversity
- Investigation of health benefits from terrestrial biodiversity
- Development of the blue nutraceutical industry
- Development of the green nutraceutical industry

Hurdles

- No well-established industry
- Ethnomedicinal knowledge on marine organisms is extremely limited
- Inadequate technical expertise
- Initial cost barrier
- Inadequate infrastructure and equipment



FIGURE 40 - BLUE AND GREEN LONG TERM ACTION PLAN 2 POTENTIAL RISKS AND MITIGATION MEASURES

Risks	Mitigation measures
Low return of investment due to cheaper	Marketing strategies
alternatives on the local market	
Difficult to develop an export market for	Subsidies and fiscal incentives
nutraceuticals	
Access to marine biodiversity in unreachable	Sampling techniques need to be honed to
and difficult to access zones of the oceans is	allow collection of samples
difficult	The Nagoya protocol needs to be applied
Access to biodiversity is controlled by the	harmoniously in different countries and
Convention on Biological Diversity (CBD)	regions
	Improving extraction techniques by
Yield of bioactive components from marine	rendering them more productive,
sources varies	sensitive and robust will enable the
	screening of small amounts of samples
	with low concentration issues
A large number of marine and terrestrial fauna	Both the classical and molecular methods
and flora lack taxonomic identification	need to be employed in determining the
	taxonomic identification and classification
	of a species

FIGURE 41 - BLUE AND GREEN LONG TERM ACTION PLAN 2 ESTIMATED INVESTMENT

Actions/ Programme	2022-2023	2023-2024	2024-2025
Long Term			
Blue and green bioprospecting and	500,000	2,000,000	2,500,000
bioprocessing			

(The figures represent seed funding to initiate the proposed actions/ programmes)



5.9.3 Action Plan 3 – Blue-green production and export

Implementing agency(ies):

- Ministry of Blue Economy, Marine Resources, Fisheries and Shipping
- Ministry of Energy and Public Utilities
- Mauritius Renewable Energy Agency
- Central Electricity Board
- Economic Development Board
- Mauritius Research and Innovation Council
- Department for Continental Shelf, Maritime Zones Administration and Exploration

Enablers

- Regulatory framework
- Business development strategies (business-friendly permits and clearances)
- Infrastructure development to encourage testing in the EEZ
- Promotion strategies
- International collaboration
- Capacity building, training and knowledge transfer
- Schemes for the procurement of equipment and expertise
- Schemes for infrastructure development
- Public-private partnerships

Implementation strategy/plan

- Procurement of expertise
- Feasibility studies
- Setting-up of pilot projects

Indicative Activities

- Feasibility study for an offshore hydrogen plant
- Feasibility study of exportation of hydrogen as fuel
- Local manufacturing and export of raw materials for renewable energy production
- Conversion of biomass to transportation fuel
- PV Power generation with aquaculture
- Feasibility for production of electricity from coconut oil in outer islands
- Feasibility study for implementing net zero energy buildings in Mauritius

Hurdles

• Inadequate technical expertise



- Initial cost barrier
- Inadequate infrastructure and equipment

FIGURE 42 - BLUE AND GREEN LONG TERM ACTION PLAN 3 POTENTIAL RISKS AND MITIGATION MEASURES

Risks	Mitigation measures
Inability to move from pilot stage to	Fiscal regime and concessions
implementation stage due to high cost	Benchmark local products according to
Difficult to develop an export market due to	international standards
international competition	

FIGURE 43 - BLUE AND GREEN LONG TERM ACTION PLAN 3 ESTIMATED INVESTMENT

Actions/ Programme	2022-2023	2023-2024	2024-2025
Long Term			
Blue-green production and export	1,000,000	6,000,000	10,000,000
(The figures represent seed funding to initiate the proposed actions/ programmes)			







FIGURE 44 - BLUE AND GREEN INNOVATION ROADMAP

- •Satellite and aerial imagery for sustainable land use and
- •Development of smart machinery and equipment to
- •Development of smart greenhouse horticulture structures ideal for the Mauritian tropical climate •Use of biotechnology tools for breeding, genetic resource exploitation, soil health rehabilitation and

•Innovative use of blue and green materials in the fashion

- Phytocosmetics innovative use of plant materials for
- •Manufacturing of biodegradable and compostable blue
- Upcycling waste to develop future cities
- Biological wound dressing from fish skin
- •Development of pharmaceuticals from marine organisms Development of thalassotherapy units in coastal hotels
- Feasibility study for an offshore hydrogen plant Feasibility study of exportation of hydrogen as fuel
- •Local manufacturing and export of raw materials for
- Conversion of biomass to transportation fuel
- PV Power generation with aquaculture
- •Feasibility study for production of electricity from
- ·Feasibility study for implementing net zero energy

5.11 Conclusions

Blue and green innovation entails economic growth through the use of technology for smart, sustainable, inclusive and eco-innovative oceanic and agricultural activities to address Mauritian needs. In this vein, working groups were set up with different stakeholders from the blue and green sectors. Stakeholders discussed the current state and the way forward to promote and implement research and innovation in the blue and green sectors.

Salient points stemmed from the discussions of the working group and sectoral forum, including the pronounced need for research and innovation to improve the blue and green sectors of Mauritius. This report spells out innovative strategic orientations in the short, medium and long terms. Under each strategic orientation, action plans were presented with proposed activities, indicative seed funding and implementing agencies. Discussions with stakeholders also highlighted certain cross-cutting needs, such as a Research Act and STEAM education, amongst others.

The action plans proposed in this roadmap are expected to boost the Mauritian economy while focussing on sustainability in the blue and green sectors. The action plans consist of activities which will be implemented in collaboration with relevant agencies in Mauritius.



FINANCIAL INNOVATION

516.05

1,327.04

"The secret of change is to focus all of your energy, not on fighting the old, but building on the new."

- Socrates

6.0 Financial Innovation

6.1 Introduction

6.1.1 Scope

The scope of the Financial Innovation thematic area is to understand the implications of Financial Innovation for our jurisdiction, and foster growth in the existing financial services sector by bringing about the elements of Financial Innovation.

Financial Innovation can be defined as the creation and popularization of new financial products, processes, markets, and institutions (Llewellyn, 1992; White, 1997; Tufano,2003; Mishra, 2008; Sánchez, 2010; Delimatsis, 2011; Gubler, 2011; Lerner and Tufano, 2011) leading to improvements in products, processes and institutions. To leverage on the innovative and creative processes, it is fundamental to streamline the processes as well as the use of technologies, so as to upgrade the standard of financial services that can be offered in an especially competitive area where new players are constantly emerging and succeeding.

This report provides an overview of Financial Innovation in Mauritius and explains the contribution of technology in the development of innovative financial products and services. It elaborates on the situational analysis and on the actual position of Mauritius as an international financial centre. The report outlines the gaps and challenges in the financial services sector, as well as the vision forward and the means to achieve this vision.

The report also relies further on the discussions and ideas that emerged from the sessions held during Les Assises de la Recherche et de l'Innovation to develop/ design the action plan for the future.

6.1.2 Aim and Objectives

The financial services sector is bound to remain one of the key pillars of our economy and it has been the focus of policy makers for a while. We have noted that it is a sector which has shown resilience and growth during the COVID-19 pandemic.

Policy makers expect that this sector will double its contribution to the GDP of Mauritius by 2030. It is therefore critical that this sector leverages on technological development and keep pace with international trends in innovation.

Hence, it becomes important and relevant to re-initiate the dialogue on the way forward for the financial sector which represents such an important pillar of the Mauritian economy and which has also demonstrated its resilience and robustness over the years.

The aim of this report is to set the foundations for the development of a roadmap for the promotion of innovation in the financial sector of the country and to provide policy recommendations to address the challenges faced by the relevant stakeholders in the industry. The objectives of this report are to:

- I. Provide an overview of innovation in the financial sector.
- 2. Identify how the use of technology can lead to innovative financial products/ services.
- 3. Identify the gaps and challenges and the importance of research in the financial sector.



4. Provide policy recommendations in the area of Financial Innovation.

6.1.3 Guiding Principles

The way forward for the Mauritian financial sector has been visualised by keeping the following parameters in mind:

- Alignment with the domestic regulatory and institutional framework;
- Compliance with international norms, best practices and standards set up by international organisations operating in the sector;
- Upholding of the good repute of Mauritius as an International Financial Centre (IFC);
- Adherence with the Anti-Money Laundering/ Combating Financing of Terrorism (AML/ CFT) framework;
- Capacity building;
- Promotion and awareness campaigns;
- Positioning Mauritius as a FinTech Hub for the African region;
- Ease of doing business.

6.1.4 International Innovation trends related to the financial services sector

6.1.4.1 Liechtenstein

Liechtenstein is an innovation-friendly country and is also in demand as a FinTech location. In 2017, the Financial Market Authority processed about 100 enquiries regarding FinTech. In August 2018, the mark of 150 inquires was already exceeded. Business models included virtual currencies in general, initial coin offerings, crypto funds, InsureTech, digital e-money, payment services solutions and trading platforms for security tokens.

Liechtenstein did not set a regulatory sandbox which provides separate rules for FinTech companies but assesses the applications of FinTech-companies according to the principle "same business, same rules". From the perspective of Liechtenstein, adjusting the general rules in order to suit "FinTech"-characteristics offers a greater legal certainty as well as the avoidance of market distortion regarding the established service providers. Liechtenstein therefore chose to implement a different approach, the so-called "Regulatory Lab", which provides a contact person for all FinTech companies as well as a dedicated expert team with both know-how in all sectors of financial market regulation and technology. By offering direct contact to answer practical questions in fast and efficient manner, the regulatory lab can give direct input on legislative issues, for example if new business models are established that are relevant to the overall goals of the government but not yet covered by the current legislation. On the regulatory front, the Liechtenstein Parliament passed the Token and Trusted Technology Service Provider Act (TVTG)- in the past known as the "Blockchain Act." With the new law, Liechtenstein is the first country to have a comprehensive regulation of the token economy. The law regulates civil law issues in relation to client protection and asset protection. On the other hand, adequate supervision of the various service providers in the token economy will be established. In addition, there are measures to combat money laundering by making service providers subject to anti-money laundering and combating the



financing of terrorism rules. Furthermore, the law provides clarity with regard to digital securities.

6.1.4.2 Estonia

Estonia is a cashless society with over 99% of financial transactions occurring digitally. Electronic ID and Blockchain are widely used in FinTech applications. 80+ FinTechs ranging from innovative startups, such as TransferWise to Blockchain leader Guardtime make Estonia a global centre of excellence for FinTech.

However, there is no general FinTech regulation under the Estonian law. This means that a company operating on the field of financial services must follow and act in compliance with relevant general regulations applicable for such activities. If a FinTech firm falls under regulation of the Estonian Credit Institution Act, the Investments Funds Act, the Estonian Creditors and Credit Intermediaries Act, the Estonian Securities Market Act or the Estonian Payment Institutions and E-money Institutions Act, it must apply for relevant licenses in accordance with applicable regulations and follow the requirements deriving from such laws. Estonia has not adopted any specific regulations for companies providing services related to cryptocurrencies or for crowdfunding platforms. However, Estonia has launched a new legislative framework in the field of cryptocurrencies and blockchain to spot and remove possible obstacles from existing laws and regulations that stop implementing blockchain-based business models.

There are currently no regulatory "sandbox" options for FinTech businesses in Estonia. 6.1.4.3 France

In the last few years, France has jumped into the race to become Europe's top FinTech jurisdiction. Although France cannot boast any world-scale FinTech "unicorn", the scene is very active and a lot of promising startups were born or reached a significant scale in the last few years. French FinTech startups are supported by a strong network of business angels, venture capital funds, and professional organisations and associations. In addition, established financial institutions have adopted an open stance regarding FinTech. Some of them have created FinTech or Insurtech incubators, and most of them regularly establish business partnerships with startups. Buyouts of FinTech startups by large banks or insurance companies are also frequent.

Changes to the FinTech-related regulatory architecture in France

- A comprehensive legal framework for crowdfunding and crowdlending activities
- The French government introduced innovative legislation allowing blockchain technology to be used to issue, register and transfer unlisted securities.
- The major impending FinTech-related legislation is the Loi Pacte. The Loi Pacte was discussed at length by both chambers of the Parliament and was finally adopted on 11th April 2019 by the Assemblée nationale. La Loi Pacte contains a patchwork of measures aimed at facilitating the growth of small and medium-sized enterprises ("SMEs") and giving employees and stakeholders more control over corporations. More importantly, the Loi Pacte introduces a comprehensive regulatory framework for Initial Coin Offerings and crypto-assets service providers.



IMF Bali FinTech Agenda

In 2018, Mauritius participated in the Annual Meeting of the IMF whereby the Bali FinTech Agenda was announced to help countries harness the economic advantages of fast-growing financial technology. The Agenda, consisting of 12 policy elements, was expected to guide the member countries of the IMF in creating their own domestic policies to enable FinTech services, financial sector resilience, addressing risks that may arise, and promoting international cooperation. The Agenda gave Mauritius a new perspective to pursue its FinTech journey.

6.2 The Working Group on Financial Innovation

A Working Group/ Technical Committee was set up for the Financial Innovation thematic area whereby key stakeholders in the financial sector were invited to participate and through active discussions with regards to drafting a roadmap for Technology, Research and Innovation for this particular sector.

The Working Group/ Technical Committee met on three occasions at the MRIC on:

- Wednesday 16th February 2022
- Wednesday 23rd February 2022
- Friday 4th March 2022

A summary of discussions for each meeting was prepared and circulated to members of the Technical Committee for any corrections/ amendments which they deemed necessary.

6.3 Situational Analysis

6.3.1 The Mauritian Context

From the early 1990s, Mauritius started treading on the path of financial diversification and innovation. It started moving from traditional activities like banking and insurance to other novel and challenging areas, like offshore businesses, securities and commodity trading. With the implementation of the global business sector, the economic and financial landscape of the island witnessed a dynamic and constant evolution, despite the various external and internal shocks. The IMF even recognized the robustness of the financial sector in a post-2018 financial crisis.

In a more recent past, Mauritius has been one amongst the member countries of the IMF with major plans for the growth of its financial services sector. Since 2015, the jurisdiction has set its sail for the FinTech journey and it has been a priority item on the agenda of the government. The Financial Services Commission, the Bank of Mauritius as well as the Ministry of Financial Services and Good Governance have all been constantly addressing and reviewing the policies, measures and decisions that can lead to and contribute to the expansion of this novel concept of financial services.

The FinTech and innovation-driven Financial Services Regulatory Committee chaired by Lord Desai worked on a regulatory framework for FinTech firms. On the 18th May 2018, the FinTech Committee submitted its report titled "Mauritius: Roadmap for a Regional FinTech Hub" to the relevant authorities in Mauritius. The report includes recommendations on the



need to introduce new sets of regulations for FinTech and innovation in priority areas, such as Initial Coin Offering, custody services in relation to digital assets and trading of digital assets. One of the first moves towards enabling FinTech development in Mauritius was the introduction of the Regulatory Sandbox Licence (RSL) in September 2018 to allow technology-based companies that do not fit into existing licensing frameworks to conduct their operations. To further the re-engineering of the procedure for the RSL, the National Regulatory Sandbox License Committee was set up in September 2018 which acts as a focal point for assessing all FinTech related RSL applications.

Additionally, The Mauritius Africa FinTech Hub (MAFH) was set up in 2018 with assistance from the Mauritian government and Economic Development Board to bring some substance to the environment needed to promote Mauritius on this front. This hub brings together innovators, entrepreneurs, government agencies and corporates, as well as working with other African FinTech Hubs to allow financial service providers and FinTech companies to work together to create products in a safe, innovative and nurturing environment.

Gradually, new regulations were put in place to encompass businesses operating in the FinTech space. These included several changes in 2019, such as a regulatory framework for the Custodian Services (Digital Asset) Licence and the recognition of Digital Assets as an asset class for investment by sophisticated and expert investors. Additionally, the FSC recently issued guidance notes on securities token offerings and rules on peer-to-peer lending. In 2021, the Banking Act and the Financial Securities Act were amended to provide for the establishment of a Financial Innovation Hub and a Digital Lab, and issue of Regulatory Sandbox Authorisation by these regulators.

Furthermore, Cabinet approved the setting up of a Technical Committee at the level of the Ministry of Financial Services and Good Governance to look into emerging issues being encountered by the industry stakeholders for carrying out FinTech activities in Mauritius. The Committee comprises of key stakeholders, namely the Financial Services Commission, Mauritius Africa FinTech Hub, the Bank of Mauritius, the Ministry of Information Technology, Communication and Innovation, the Economic Development Board, the Mauritius Bankers' Association, amongst others. The main responsibility of the Technical Committee is to take stock of the current state of FinTech and to explore ways in which the industry, regulators and policymakers can work together to ensure the promotion and development of the FinTech sector in Mauritius.

In order to position Mauritius at the forefront of technology and to support Government's Digital Agenda, the Ministry of Information Technology, Communication and Innovation has implemented the Digital Mauritius 2030 Strategic Plan. The Strategic Plan lays emphasis on the formulation for an innovative, effective and sustainable public sector and at the same time creating an enabling environment for business facilitation development. Emerging technologies like artificial intelligence, blockchain, robotics, internet of things, FinTech and big data are also expected to assist in the digital transformation process. The Ministry of Information Technology, Communication and Innovation is implementing several measures that will foster the growth of the FinTech industry as follows:

I. Setting up of a second Certification Authority which is planned to operate under the National Computer Board and provide digital signatures at an affordable cost.



- 2. Setting up of a National Authentication Framework for authenticated single sign on. This facility may eventually be extended to the private sector.
- 3. The Ministry has set up the InfoHighway platform for data sharing in the public sector. The InfoHighway is currently providing 492 data sharing e-services and links up 58 Ministries and Departments for that purpose. It is intended to extend the platform to serve the private sector in line with the provisions under the Electronic Transactions Act.
- 4. Blockchain technology is being introduced across sectors, which could be the basis for setting up a control mechanism for preventing tampering and fraud in FinTech activities.
- 5. On its part, the Bank of Mauritius (BOM) has taken various initiatives that will support the Government's vision as follows:
 - The National Payment Systems Act, a comprehensive framework for the regulation, oversight and supervision of national payment systems and payment systems operated in Mauritius, came into force on 31st January 2019 followed by the National Payment Systems (Authorisation and Licensing) Regulations in May 2021, which provide a licensing framework for payment service providers and payment system operators.
 - In August 2019, the BOM implemented a National Payment Switch, which has two components, namely, a Card Payment System, and an Instant Payment System (IPS) through which licensed non-financial institutions can access bank accounts of customers. This ecosystem provides a level playing field for FinTechs to operate.
 - The BOM is working on a centralized e-KYC system and on a connection to the InfoHighway to support remote digital customer on-boarding.
 - The BOM is also working on the potential introduction of a Central Bank Digital Currency in Mauritius. These projects could involve the use of novel state-of-the-art technologies.
 - Section 52 of the Bank of Mauritius Act was amended in July 2019 to enable FinTechs providing peer-to-peer lending facilities to have access to information from the Mauritius Credit Information Bureau.

The BOM started digitalization of payments in Mauritius in early 90's. This process underwent a major breakthrough with the implementation of the Mauritius Central Automated Switch (MauCAS) which, inter alia, enables integration of operators offering payment services through mobile phones and other electronic channels. MauCAS is a game changer in the payments ecosystem. It has disrupted traditional financial services landscape by enabling new entrants to leverage technology to deliver new and existing services in more relevant and convenient ways to consumers and businesses. Furthermore, the BoM has adopted a regulatory openness policy which is based on transparency, no bias and level playing field for all operators domestic as well as foreign.

It has been demonstrated that innovation in the financial sector can lead to incremental or breakthrough changes which have an impact in terms of how financial services are delivered to the public. There have been substantial innovation incentives for FinTech in Mauritius.

Since December 2021, Mauritius is one amongst the few countries to have implemented a dedicated legal framework for Virtual Assets through the Virtual Assets and Initial Token Offering Services Act 2021 (VAITOS 2021).



Whilst each institution in the financial services sector is taking their own measures individually, up to now, there is no national strategy for short-term, medium-term or long-term financial innovation. Evidently the development of a coordinated national strategy with the inputs from the various stakeholders concerned will be crucial for Mauritius to achieve its aim of becoming the Leading African FinTech Hub.

It is undeniable that there is still work to be done, to instil a coordinated approach to ensure that the country can leverage the potential of blockchain technology, cryptocurrency and virtual assets to attract sophisticated and expert investors, and investment funds.

6.4 Gaps and Challenges of the Sector

FinTech has become the global buzzword and many countries have embarked on FinTech development. Mauritius needs to adapt itself quickly and dynamically in terms of implementation of adequate policies and regulations, development of appropriate skills and talent, setting up of incubators and accelerators, taxation strategies, funding and re-assessment of the roles of the regulatory bodies to meet its ambition to position itself as a renowned FinTech centre. A holistic approach is privileged as services are all-encompassing and the innovation in financial services is also expected to be socially impactful.

This will increase the potential to accelerate the transformation of Mauritius into an exemplary FinTech hub which will help the island to establish itself as a pro-active and marketdriven jurisdiction. Furthermore, it is believed that humans tend to resist to changes, therefore, a practical perspective to innovation needs to be adopted. The corporate world, the entrepreneurial ecosystem as well as the public should be motivated towards financial innovation. Both operators and users should embrace the FinTech evolution with trust and confidence.

Another challenge concerns the regulatory framework. It is well-known that the regulatory responses often lack the dynamism that the financial sector operates with. In addition, the framework bears the burden of regulating in parallel the traditional financial services and products. Thus, it is important to implement a regulatory environment that can regulate traditional products, innovative products as well as traditional products now delivered in an innovative manner.

Administration should be eased. The procedures should be user-friendly, multi-disciplinary and should be welcoming to new products. A focus should be placed on how to ease the institutional processes. The jurisdiction may host the best of the innovative products and services but if the processes are complicated and time-consuming, the innovation is doomed to failure.



6.4.1 SWOT Analysis

Below is a SWOT Analysis for FinTech in Mauritius

Strengths	Weaknesses			
 Strengths Bilingual population Strong financial literacy rate Well-developed and stable political system Trustworthy judiciary Ranked as best sub-Saharan economy for ease of doing business Sustainable growth for financial services Risk mitigation framework established with several African countries (IPPA) Numerous free trade agreements (FTAs) signed with other countries (China, India, etc.) COMESA, SADC memberships Compliant with FATF's compliance and anti-money laundering standards Robust legislation to support a range of IFC activities 	 Weaknesses Poor connectivity to other countries Strong competition from other countries, such as Rwanda, Kenya, etc. Small population as compared to competitors – client base is important for FinTech companies Shortage of professionals with the deep specialisation required for certain IFC activities (biggest challenges are attracting expatriate professionals, developing local talent in the relevant skills, and retaining skilled and experienced staff) Infrastructure-poor flight connections, especially with key locations in Africa, basic ICT infrastructure with comparatively poor connectivity and low digital maturity Lack of awareness about the IFC's attractiveness. The improvements it has made in transparency. 			
compliance and anti-money laundering standards - Robust legislation to support a range of IFC activities	 poor connectivity and low digital maturity Lack of awareness about the IFC's attractiveness. The improvements it has made in transparency, compliance with the highest international standards and attractiveness as a jurisdiction with deep specialisation in certain 			



financial services are not widely

known

Opportunities

- Robust banking system
- Quickly evolving financial services sector
- Untapped market for FinTech products
- Regulatory Sandbox License
- Ideal environment for investors/FinTech companies
- Mauritius offers a level playing field for new investors
- Cross-border investment
- Private banking and wealth management

Threats

- Unstable geopolitical situation
- Strong competition from other nations (which offer advantages such as lower investment structure setup costs, less time and complexity to set up a business, better credit ratings, access to a wider range of DTAAs)
- Cybercrime can potentially undermine the integrity of the entire financial system

FIGURE 45 - FINTECH SWOT ANALYSIS

6.5 Vision

6.5.1 Vision

The financial services sector was contributing to around USD 1.1 Billion to the GDP as at 2018 which represented around 11% of total GDP. The Ministry of Financial Services and Good Governance and the Financial Services Commission mandated McKinsey to prepare a Blueprint for the financial services sector which is a 10-year roadmap. The objective of the Blueprint is to double the contribution of the financial services industry to GDP by 2030.

6.5.2 Core development areas necessary for innovation in the financial sector

Core development Area 1: Enhancement of KYC and CDD Target:

In order for Mauritius to become a digital society and accelerate the growth of FinTech, it is important that Digital KYC and CDD procedures be embraced in all processes. The Bank of Mauritius Act 2004 (as amended) makes provisions at Section 52A for the establishment of the Central KYC Registry. The digital journey cannot be complete if users still have to physically walk in for identification. Digital KYC is an important component for enabling remote on-boarding of customers. The Ministry of Information Technology, Communication and Innovation (MITCI) has taken several initiatives in that area. The BoM is coming up with a framework to provide a necessary channel for databases which would be accessible from the InfoHighway that has been set up by the MITCI. The MITCI has also developed a MoKloud platform where personal documents of citizens of Mauritius are accessible and can be used in the digital identification of customers.

Expected Outcome: A Mauritius e-KYC platform and a framework for digital identification.



New technology will be used for authentication and identification whereby the technology will be able to identify whether an individual is using a genuine or a fake document.

FIGURE 46 - FINANCIAL INNOVATION CORE DEVELOPMENT AREA 1 PROJECTS

Relevant Actionable/ strategy/support

<u>Project l</u>

Setting up of a National FinTech Steering Committee to coordinate FinTech activities, especially regarding new developments in this area.

Project 2

An e-KYC regulatory framework where both banks and non-banks can come into the system.

Project 3

The creation of an ecosystem driving digitalisation of payment was emphasized by the Bank of Mauritius (BOM). The latter is currently involved in the digitalizing process of the payment platform of government agencies, such as Registrar of Companies (ROC), National Transport Authority (NTA) and Registrar General.

Project 4

Setting up of Open API to support the FinTech industry in its endeavor to deliver innovative financial solutions to the market which will also include the concept and implementation of Robotic Process Automation (RPA) and Artificial intelligence (AI).

Core Development Area 2: Training and Skills Development of Human Resources

Target:

FinTech growth is dependent on the availability of technical and financial service expertise and the strength of entrepreneurial environment. Like many jurisdictions in the world, Mauritius is experiencing a skills gap that is inhibiting the growth and modernization of its banking, financial services and FinTech sector. This gap consists of a shortage of talent in digital, financial and entrepreneurial skills. Mauritius is yet to develop its talent retention policy.

Economic and Social Benefits (Expected impact):

Financial innovation is indirectly contributing to around 8% of GDP. In terms of new products, it is important to make these products accessible and existing technologies can be developed to contribute towards the economic activities of the country in a formalised way. The aim is to grow and develop the financial services sector and to ensure that the contribution of this sector to the GDP doubles by 2030. This will contribute positively to the economy in creating



employment and reduce youth unemployment and help in gender equality with more female professionals entering the job market.

Expected Outcomes:

- Upskilling in FinTech, blockchain and artificial intelligence.
- New university programs in FinTech, blockchain and artificial Intelligence.

FIGURE 47 – FINANCIAL INNOVATION CORE DEVELOPMENT AREA 2 PROJECTS

Relevant Actionable/ strategy/support

<u>Project I</u>

Financial literacy programme by the government to create awareness and trust of the population in new innovative financial products.

Project 2

While there are courses like FinTech in Law or MSC in FinTech, it was remarked that these courses were not sufficient for the expertise required in the financial sector. New courses on virtual assets, blockchain technology, robotics, artificial intelligence and metaverse are needed.

Project 3

Reviewing the school curriculum and introducing the concept of coding and FinTech to the students as from Grade 7.

Project 4

Creation of a tailor-made policy for digital nomads and financial innovation

6.6 Strategic Orientations

Based on the identified gaps and challenges and the situational analysis of the sector in Mauritius, members of the working group identified six strategic orientations, which are listed as below:

- I. Digitalization in the financial sector
- 2. Facilitate access to funds for individuals and companies to promote economic activities in the country
- 3. Personal finance/ treasury management
- 4. Use of technology in capital markets
- 5. Technology in fundraising activities
- 6. Compliance with international best practices

6.6.1 Strategic Orientation 1: Digitalization in the Financial Sector

The financial system is undergoing a major transformation as we move from a cash-based to cash-lite society where the concept of e-wallets and e-money is gaining traction, new payment infrastructures are established, money transfers are made easier and money management is less tricky. The primary objective of digitalization in the financial sector is to enable convenient and reliable access to financial services using technology. However, digitalization comes with



its lot of challenges. Novel technologies can amplify operational, cybersecurity and data privacy risks. It is therefore important to ensure that these risks are mitigated to maintain the trust in the financial sector. One of the major concerns is cybersecurity risks.

The digitalization of insurance includes the establishment of insurtech companies, telematics insurance, insurance market aggregators, peer-to-peer insurance and insurance operational improvements.

6.6.2 Strategic Orientation 2: Facilitate Access to Funds for Individuals and Companies to Promote Economic Activities in the Country

FinTech solutions have been rapidly changing the financial services industry which has led to a shift from manual processes to digital. The use of digital financial services supports the economic development of the country which can also lead to poverty reduction. With COVID-19, digital financial services have become important in providing secure, low cost and contactless financial services to citizens and governments. The use of technology in lending can lead to improvements in customer-lender interactions which would lead to better user experience, faster processing times and lower operational costs. Furthermore, technology can be used to improve the screening and monitoring processes for loans. The use of technology in the banking industry can lead to faster and more reliable banking processes which can also lead to more transparent transactions. Moreover, if more and more banks are adopting technology in their operations, they become more competitive and customers benefit from better services.

6.6.3 Strategic Orientation 3: Personal Finance/ Treasury Management

Savings is an important factor in determining investment and countries with higher savings have a faster economic growth compared to countries with lower savings rates. Programs to promote domestic savings should be prioritized so that capital can be invested in the economy which will boost economic activities of the country. Financial literacy is crucial as it enables people/ companies to distinguish between favorable and cheap financial decisions and in helping make savvy decisions.

6.6.4 Strategic Orientation 4: Use of Technology in Capital Markets

Digital technology is considered as the main driver that will propel capital market evolution over the coming years as these technologies include cloud technology, open architecture, artificial intelligence, mobile computing, blockchain and internet of things. These technologies improve the efficiency of digital banking procedures and enable financial services to meet market demands more swiftly. Technology in the brokerage industry has led to tech-driven platforms whereby brokers can operate with less overheads leading to a reduction in fees. Moreover, with technology, brokers facilitate trading anytime and anywhere through smartphone apps and during the pandemic, investors were able to trade through their smartphones.



6.6.5 Strategic Orientation 5: Technology in Fundraising Activities

Financial inclusion is a building block for poverty reduction as it means that people/ businesses have access to useful and affordable financial products and services that meet their needs, and which are being delivered in a responsible and sustainable way. Digital financial services provide an alternative way to reach financially excluded people with a range of financial services in a cost-effective and sustainable manner. One way in which funds can be raised is through crowdfunding as it improves access to finance and opens access to funding and investment opportunities which are not available to 'Bottom of Pyramid' customers. Asset tokenization is becoming the focus of many industries as it offers the opening to a global base of investors which will lead to higher growth. Asset-backed tokens are digital claims on a physical asset which are backed by that asset and it is becoming the focus of many industries which are interested in adapting and surviving the next economic revolution.

6.6.6 Strategic Orientation 6: Compliance with International Best Practices

International best practices can be defined as an international set of ethics, ideas and/or guidelines that represent the most efficient course of action in a business situation. In terms of regulation and risk management, the identification of risk per se is not enough to make the financial system risk-free, but rather evaluation and mitigation of risks remains an indispensable part of compliance. Risk assessment is a systematic process of evaluating potential risk which may be involved in a projected activity or undertaking. Customer risk management refers to fraud and credit risk management which requires close monitoring. Customer onboarding allows collection of customer information as well as the identification of identity in a more coherent and reliable manner. RegTech solution is another significant element which refers to compliance with local and international regulations. Compliance will also include imposing a duty on regulators to supervise and monitor companies that they are regulating.

In considering action plans for the development of the Financial Innovation sector, several models have been looked at, especially those mentioned in the Saudi report on FinTech which proposes a comprehensive approach.



6.7 Short Term Action Plan

6.7.1 Short Term Action Plan: Digitalization in the Financial Sector

1. Payments and Currency Exchange

Potential Implementing/ Collaborating agency(ies):

- I. Bank of Mauritius
- 2. Financial Services Commission
- 3. Mauritius Finance
- 4. Ministry of Information Technology, Communication and Innovation
- 5. Mauritius Africa FinTech Hub
- 6. Mauritius Bankers Association
- 7. Ministry of Financial Services and Good Governance

Definition

Payment is the transfer of funds from one entity (individual or company) to another in exchange for goods or services. Currency exchange relates to the transfer of funds into a different currency. FinTech solutions operating in this area are either creating new payment business models or improving the existing payments and currency exchange systems.

FIGURE 48 – FINANCIAL INNOVATION SHORT TERM ACTION PLAN 1.1: PAYMENTS AND CURRENCY EXCHANGE PROJECTS

Relevant actionable/ strategy/ support

Project I

Payment Gateways

Payment Gateways support online and offline retailers who take non-cash payments, such as debit card and credit card payments. They provide an interface between the customer and the retailer and usually work with partner banks that process the payments. This reduces the reliance on retailers having to accept cash. This project will focus on developing new payment gateways.

Project 2

Payment management

Payment management solutions is a broad area related to the automation of payment activities that may have previously had to be carried out manually. This could include automating regular monthly payments (e.g. a regular bill) or paying a large number of individuals at the same time. The project will aim at encouraging the development of more competitive solutions in this area.

Project 3

Peer-to-Peer payments/ Money Transfer

Peer-to-peer payment solutions provide a platform that enables an individual to make a payment to another individual easily, cheaply, or quickly. This could be through banks or through a distributed ledger that allows payments to be made without banks being involved in the transaction. The transfer could occur domestically or internationally and in the same



currency or as a currency exchange. This project will encourage development of new, competitive solutions.

Project 4

Payment infrastructure

FinTechs developing payment infrastructure solutions are involved in making the existing processing of payments faster, cheaper and easier. This project will promote the development of innovative processes with existing payment processors to help improve their solutions.

Project 5

Customer Onboarding

Customer Onboarding solutions support financial institutions to speed up or improve the process of customer onboarding. This could include automating parts of the process, using alternative methods to collect customer information or using alternative data sources to verify the customer identity. This project will aim at supporting the development of technology-based solutions in this area.

Expected impact:

- Cheaper payments
- Faster payments
- Enable smaller companies to accept digital payments
- Support the development of a cash-lite society

Expected outcomes:

- Increased resilience of payment infrastructure
- Enhancing availability of rapid and cheaper processing of payments

Hurdles:

- Cybersecurity
- Access to data
- Harmonization of legislation
- Regulation in banking systems concerning online payment solutions
- Current high transaction fees may limit attractiveness of online payment solutions
- Ageing population not comfortable with the use of online payment solutions (for example, more clarity on return policies linked to e-commerce)
- Risks associated with online fraud and customer protection services which are not yet fully aligned with online transactions
- Lack of collaboration among relevant stakeholders

Implementation Strategy:

• Structuring of focused calls for proposals to provide support to technologicallyintensive start-ups and SMEs operating in the financial services sector



Estimated Investment:

- MUR 2 Million per project
- Estimated total for payments and currency exchange is MUR 10 Million

2. Business Tools and Information Provision

Potential Implementing/ Collaborating agency(ies):

- I. Bank of Mauritius
- 2. Financial Services Commission
- 3. Mauritius Finance
- 4. Ministry of Information Technology, Communication and Innovation
- 5. Economic Development Board

Definition

- Business tools are solutions that help companies manage their business activities better. Solutions developed in this area use technology to provide cheaper, faster, and more personalized solutions to businesses. Importantly, they offer the possibility of catering to SMEs that may not have previously been able to access such services.
- Information provision relates to providing customers information that enable them to make better financial decisions, such as providing a comparison between different banking products or providing analysis on particular investment opportunities. Solution providers operating in this area can use technology and new business models to automate the provision of information and/or gather better information.

FIGURE 49 – FINANCIAL INNOVATION SHORT TERM ACTION PLAN 1.2: BUSINESS TOOLS AND INFORMATION PROVISION PROJECTS

Relevant actionable/ strategy/support

Project I

Business Operation Tools

Technology providers developing business operation tools help companies to reduce their costs, save time and manage their businesses better. Examples of business operation tool areas include payroll management, managing employee expenses, automating accounting functions, automating VAT returns, etc. Although there are existing tools, this project will focus on other opportunities that exist for developing solutions that are more accessible and are adapted to enterprises, especially SMEs.

Project 2

Cybersecurity

Cybersecurity solutions are involved in protecting client's IT systems against cyber hacking, data breaches, etc. Examples include anti-virus software, monitoring cyber-attack incidents and tools that identify suspicious communication. This project will encourage development of adaptable solutions for addressing cybersecurity.



Project 3

Data Management and Analytics

Data management technology-based solutions help businesses to better organize and maintain their data. This could include making it easier to access data across the business, structure the data so it can be integrated into different products or improve the quality of the data recorded. This project will focus on providing support for the development of improved data management and analytics solutions, especially among businesses operating in the finance sector.

Project 4

Marketplace Aggregators

Marketplace aggregators consist of technical solutions that aggregate information on different financial products (e.g. savings accounts, mortgage products, credit cards, etc.) into a tool that customers can use to find the best products to meet their requirements. This project will focus on the development of marketplace aggregators that can offer solutions that are adaptable to different client bases.

Expected impact:

- Lower cost of doing business
- Increased customer security
- Wider choice for customers
- Provision of more personalized recommendations

Expected outcome:

- Development of new and/or alternative solutions
- Potential for creation of job opportunities

Hurdles:

- Access to data
- Legislation pertaining to cybersecurity
- Lack of talent to develop these tools
- Acceptance and adoption of new business tools
- Access to funding

Implementation Strategy:

• Structuring of focused calls for proposals

Estimated Investment:

- MUR 2 Million per project
- Estimated total for Business Tools and Information Provision is MUR 8 Million



3. Insurance

Potential Implementing/ Collaborating agency(ies):

- I. Insurers Association of Mauritius
- 2. Bank of Mauritius
- 3. Financial Services Commission
- 4. Mauritius Finance
- 5. Ministry of Information Technology, Communication and Innovation
- 6. University of Mauritius

Definition

Insurance is where an individual or company receives financial protection or reimbursements from an insurance company against risks/ losses they may face; for example, a health insurance company may provide health insurance to an individual for which the individual would pay a premium to the health insurance company. If the individual requires medical treatment, the health insurance company would cover the cost of the medical treatment.

Solution providers operating in the insurance industry (also referred to as insurtech solutions) use technology and new business models to drive innovation in insurance.

FIGURE 50 – FINANCIAL INNOVATION SHORT TERM ACTION PLAN 1.3: INSURANCE PROJECTS

Relevant actionable/ strategy/support

Project I

Full Stack Insurer

Full stack insurtech companies provide their own digital insurance solutions competing directly with existing insurance companies. The main advantage full stack insurtech companies have over established insurance companies is that they do not have legacy systems and processes. This therefore allows them to develop faster, cheaper and more personalized solutions for customers. This project will support the development of new, innovative digital insurance solutions.

Project 2

Telematics Insurance

Telematics insurance solutions use data to develop a better understanding of the client and assess the risk of them making a claim. This provides a more accurate pricing of insurance, for example, car insurance providers may ask drivers to add a sensor in their car to collect data on their driving performance and use this to provide a more accurate quote based on how well the customer is driving. This project will aim to encourage the development of telematics insurance solutions.

Project 3

Insurance Marketplace Aggregators

Insurance marketplace aggregators are involved in aggregating information on insurance products from different insurance providers into a tool that customers can use to find the best products based on their requirements. This project will support the development of new and improved insurance marketplace aggregators.

Project 4

Peer-to-Peer Insurance



Peer-to-peer insurtech solutions enable individuals to come together to form a group and apply for insurance as a group. The insurer will insure the entire group and the cost of the premium will be divided between all individuals. This may result in lower premiums than if each individual went to the insurer directly. Technology-based solutions aimed at peer-to-peer insurance will be supported in this project.

Project 5

Insurance Operational Improvements

Operators in this area provide services to insurance companies to help them either reduce costs, increase efficiency or increase revenue. Examples include customer service chatbots or use of blockchain to automate the pay-out of claims. This project will support the development of services that bring improvements to insurance operations.

Expected impact:

- More accurate insurance pricing
- Larger insurance choice
- More efficient insurance companies resulting in lower costs for customers
- Provide individuals and companies access to insurance they were not previously able to access

Expected outcome:

- Business opportunities
- Greater number of insurance operators adopting new technology-based solutions

Hurdles:

- Access to data in order to develop solutions to provide real-time updates and tracking
- Cyber Risks (cybersecurity, cyberfraud)
- Acceptance of new processes/ procedures which are meant to address known issues in the insurance sector (lack of transparency in processes, such as claim approval, limited support in submitting claims and supporting documents, time duration in reaching settlement, no online reporting)

Implementation Strategy:

• Structuring of focused calls for proposals

Estimated Investment:

- MUR 2 Million per project
- Estimated total for Insurance is MUR 10 Million



6.8 Medium Term Action Plan

6.8.1 Medium Term Action Plan 1: Facilitate Access to Funds for Individuals and

Companies to Promote Economic Activities in the Country

1. Lending and Finance

Potential Implementing / Collaborating agency(ies):

- I. Bank of Mauritius
- 2. Financial Services Commission
- 3. Mauritius Finance
- 4. Ministry of Information Technology, Communication and Innovation
- 5. Mauritius Africa FinTech Hub
- 6. Mauritius Bankers Association
- 7. Ministry of Financial Services and Good Governance

Definition

A lender provides a loan to a borrower for a certain period during which the lender charges the borrower interest. The loan maybe secured against an asset (e.g. property for mortgage) or maybe unsecured.

Historically, lending has been carried out by banks that use money from savers to lend out to borrowers. FinTech lending solutions can either make the existing process of lending more efficient or create new business models through which borrowers and lenders can interact directly.

FIGURE 51 – FINANCIAL INNOVATION MEDIUM TERM ACTION PLAN 1.1: LENDING AND FINANCE PROJECTS

Relevant actionable/ strategy/ support

<u>Project I</u>

Loan processing

Loan processing FinTech solutions can speed up and reduce the cost of loan processing and monitoring. This project could be developed using technology to automate the loan process, create better data structures to manage the information required for the loan application or using transactional data combined with machine learning to predict when a borrower is likely to go into default before they do.

Project 2

Credit scoring

Credit scoring FinTech solutions can speed up the credit scoring process, providing a more accurate credit score through the use of alternative data (e.g. social media data). Outcomes from this project could provide consumers with the ability to access their credit score and undertake activities to improve it.

Expected impact:

- Cheaper borrowing cost
- Better returns for lenders
- More accurate credit assessment
- Reduction in the cost of managing loans
- Ability to lend smaller amounts



- Ability to lend to people on lower income/ higher risk

Expected outcome:

- Improved access to funds
- Increased trust in the new services
- Lowered inhibition to undertake small-scale development through smaller borrowing costs
- Opportunities for efficient use of resources by lenders

Hurdles:

- Need for developing a clear path for approval of technology-based solutions, including setting of benchmarks to measure success
- Uncertainty regarding the adoption of new tools by institutions
- Interactions between regulations and the trust in financial innovations
- Availability of qualified staff to undertake and implement these projects (shortage of high skilled workforce which is crucial for FinTech development)
- Addressing consumers habits and approaches with regards to innovative products

Implementation Strategy:

• Structuring of focused calls for proposals

Estimated Investment:

- MUR 2 Million per project
- Estimated total for Lending and Finance is MUR 6 Million

2. Banking and Banking Infrastructure

Potential Implementing/ Collaborating agency(ies):

- I. Bank of Mauritius
- 2. Financial Services Commission
- 3. Mauritius Finance
- 4. Ministry of Information Technology, Communication and Innovation
- 5. Mauritius Africa FinTech Hub
- 6. Mauritius Bankers Association
- 7. Ministry of Financial Services and Good Governance

Definition

Banking and banking infrastructure is related to the operations of banks. Technology-based operators in this space are involved in:



- Banking: Operating as challenger/ digital banks that provide banking services (lending, savings, currency exchange, etc.) to clients and compete with established banks.
- Banking Infrastructure: Providing solutions to banks to help them improve efficiency, reduce costs or increase revenue. Banks may suffer from legacy systems and innovative solutions in banking infrastructure can help overcome some of these legacy issues.

FIGURE 52 – FINANCIAL INNOVATION MEDIUM TERM ACTION PLAN 1.2: BANKING AND BANKING INFRASTRUCTURE

Relevant actionable/ strategy/support

<u>Project l</u>

Challenger/ Neo-Banks

Services that operate as neo-banks/ challenger banks are focused on providing fully digital/ branchless banking solutions. The main advantage challenger banks have over traditional banks is that they do not have legacy systems and legacy processes. They can therefore use technology to automate many of their processes and apply first principles approaches to provide customers with a better experience.

This project can encourage the development of faster, more personalized and potentially cheaper solutions for customers.

<u>Project 2</u>

Application Programming Interface (API) providers

FinTechs that provide Application Programming Interfaces (APIs) create a bridge between banks, or between banks and third parties (including other FinTechs), to allow the systems of the respective parties to talk to each other. Third parties may want to do this to access bank data to include it as part of their solution (e.g. a house buyer website providing mortgage information), or they may want to access customer information held by the bank to provide the customers with a more personalized service. Banks may want to provide a "white labelled" solution to their customers which is powered by a FinTech and connected through an API. This project will encourage the development of APIs by providers aiming to target this area.

Project 3

Banking operational improvements

FinTechs operating in this area provide services to banks to help them either reduce costs, increase efficiency or increase revenue. Examples include chatbots that may help improve customer service or software that helps automate back-office functions. This project will focus on providing opportunities for FinTechs to develop improvement services for banks.

Expected impact:

- More efficient banks
- More choice for customers at a lower cost
- More personalized solutions for customers
- More collaboration between FinTechs and banks

Expected outcomes:

- Business opportunities for FinTechs to develop solutions in partnership with banks
- Improved banking operations that can translate into reduced costs for customers



Hurdles:

- Poor integration through the use of API and open banking systems
- Regulatory constraints and customer demands
- Cybersecurity

Implementation Strategy:

• Structuring of focused calls for proposals

Estimated Investment:

- MUR 2 Million per project
- Estimated total for Banking and Banking Infrastructure is MUR 6 Million

6.8.2 Medium Term Action Plan 2: Personal Finance/ Treasury Management

Potential Implementing/ Collaborating agency(ies):

- I. Bank of Mauritius
- 2. Financial Services Commission
- 3. Mauritius Finance
- 4. Ministry of Information Technology, Communication and Innovation
- 5. Mauritius Africa FinTech Hub
- 6. Mauritius Bankers Association
- 7. Mauritius Revenue Authority

Definition

Personal finance/ treasury management relates to the management of savings that individuals and companies may have. The focus of operations in this area is on support for companies and individuals linked to:

- Budgeting/ saving: better understanding of how much money they have saved, where they saved it, what returns they are receiving on their saving, and providing ways to save more.
- Investing: how they could invest the money better to provide a better return for the company/ individual.



FIGURE 53 – FINANCIAL INNOVATION MEDIUM TERM ACTION PLAN 2.1: PERSONAL FINANCE/TREASURY MANAGEMENT PROJECTS

Relevant actionable/ strategy/support

<u>Project l</u>

Customer Account Aggregators

If customers have investment products/ bank accounts with a number of different providers, customer aggregation technical solutions can help aggregate customers financial information in one place to help users manage their money better. This project will open up the potential for developing technical solutions that can provide easily accessible and are competitive on the market.

Project 2

Intelligent Cash Management

Intelligent cash management technology-based platforms are involved in the management of cash. Solutions focused on companies may support the company's treasury functions with making investments, improving working capital management, invoice management etc. Solutions focused on individuals may involve supporting clients to understand their expenditure, how much money they can afford to save and then recommending saving/ investment products.

Individual-oriented solutions could include saving tools to support individuals to save more. Examples of saving tools include apps that enable users to save for specific items, or tools that round up payments made with the difference being put into a savings account.

This project will encourage development of platforms and solutions that offer versatility in addressing cash management.

Expected impact:

- Individuals and companies have a better understanding of their overall cash balance.
- Individuals and companies can manage their cash better and get a better return on their savings.
- Increased overall levels of savings.
- Wider range and cheaper investment options.

Expected outcome:

• Range of solutions offered for more efficient cash management.

Hurdles:

- Addressing consumers habits and approaches with regard to innovative products
- Interactions between service providers and banking institutions
- Managing risks with treasury solutions

Implementation Strategy:

• Structuring of focused calls for proposals


Estimated Investment:

- MUR 2 Million per project
- Estimated total for personal finance/ treasury management is MUR 4 Million



6.9 Long Term Action Plan

6.9.1 Long Term Action Plan 1: Use of technology in Capital Markets

Potential Implementing/ Collaborating agency(ies):

- I. Bank of Mauritius
- 2. Financial Services Commission
- 3. Mauritius Finance
- 4. Ministry of Information Technology, Communication and Innovation
- 5. Mauritius Africa FinTech Hub
- 6. Mauritius Bankers Association
- 7. Independent Commission Against Corruption
- 8. Ministry of Financial Services and Good Governance

Definition

Capital markets is a broad term used to describe the part of a financial services industry involved with raising capital through dealing in shares, bonds and tradable investments. Technology-based services operating in this area focus on improving different parts of the capital markets, including listing of companies, investment execution, trading, investment advisory services, etc.

FIGURE 54 – FINANCIAL INNOVATION LONG TERM ACTION PLAN 1.1: USE OF TECHNOLOGY IN CAPITAL MARKETS PROJECTS

Relevant actionable/ strategy/support

Project I

Capital Market Operations

Operators in this area can use technology to improve the efficiency of the capital market operations. Examples include tools that automate part of the listing process or tools that enabling trades to be executed faster. This project can encourage development of tools that enhance the processes of operators in this area.

Project 2

Investment Brokering

Investment brokering solution providers can use technology or new business models to make it easier, cheaper or faster for investors to purchase securities. Examples could include mobile apps that allow investors to purchase stocks quickly or tools that gamify stock market investment. This project can support developments designed to provide access to individuals that previously were not able to invest in the stock market.

Project 3

New trading models

Companies involved in this space can use technology to develop innovative trading models. Examples include

Robo-advisors that use automated algorithms (with little or no human intervention) to invest in the capital markets or social trading models, where investors can observe investment behavior of peers and follow their investment strategies. This project can support the development of trading models that involve the use of artificial intelligence (AI).



Expected impact:

- Enlarged accessibility for investment in capital markets
- Improved efficiency in the capital markets
- Potential for opening investment in the capital markets to individuals that were not previously able to access it

Expected outcomes:

- New technology-based solutions
- More efficient models for the capital markets

Hurdles:

- Regulations
- Cybersecurity
- Benchmarking and industry standards

Implementation Strategy:

• Structuring of focused calls for proposals

Estimated Investment:

- MUR 2 Million per project
- Estimated total for Capital Markets is MUR 6 Million



6.9.2 Long Term Action Plan 2: Private Fundraising

Technologies in Fundraising

- Potential Implementing/ Collaborating agency(ies):
- I. Bank of Mauritius
- 2. Financial Services Commission
- 3. Mauritius Finance
- 4. Ministry of Information Technology, Communication and Innovation
- 5. Mauritius Africa FinTech Hub
- 6. Mauritius Bankers Association
- 7. Independent Commission Against Corruption
- 8. Ministry of Financial Services and Good Governance

Definition

Private fundraising is a term related to private businesses or projects raising funds to support their operations. Historically, such companies had to employ an advisor that approaches investors on their behalf. More recently, technology-based service providers have started developing new business models that allow companies to raise funds faster, while making such investment opportunities accessible to more individuals.

FIGURE 55 – FINANCIAL INNOVATION LONG TERM ACTION PLAN 2.1: PRIVATE FUNDRAISING PROJECTS

Relevant actionable/ strategy/support

<u>Project l</u>

Equity Crowdfunding

Equity crowdfunding technology platforms allow investors to invest a relatively small amount of money into private companies that are listed on the platform in exchange for equity in the companies. The platforms enable the private companies to aggregate the funds raised from a large pool of investors. This project will provide support for the development of new equity crowdfunding platforms.

Project 2

Rewards-based Crowdfunding

Rewards-based crowdfunding platforms enable individuals to donate relatively small amounts of money to companies or projects in return for non-equity based rewards (e.g. funding the development of a new toy in exchange for receiving one of the first toys that are produced). This is often compared to e-commerce as it can be used by companies to forward sell products and fund the development of new products in the pipeline. This project will provide support for the development of new rewards-based crowdfunding platforms.

Project 3

Asset-backed Tokenization

(It is to be noted with the new VAITOS Act the legal framework is already present and same is being licensed by the FSC. However, it is an interesting initiative to give the right



space and environment to allow local inventors to come up in collaboration with FSC as well as, they have announced their Innovation Lab to use it in the most efficient manner.) Asset-backed tokenization is a relatively new area of development where investors can purchase "tokens" in a project (such as a real estate project, infrastructure project or a company) to help fund the project. The owners of the project release tokens in the project (e.g. a MURI million project may have I million x MUR I tokens) and investors can purchase the tokens to fund the project. Tokens may also be tradeable on a private exchange to allow investors to buy and sell tokens. However, tokens may not allow investors to have any control or ownership of the project funded. This project will support the development of new technology-based solutions for asset-backed tokenization.

Expected impact:

- Provide individuals access to investment opportunities that they were not previously able to access
- Companies can raise smaller amount of funds
- Cost of fundraising is lower
- Fundraising may be carried out faster
- Supports innovation and entrepreneurship

Expected outcomes:

- Business opportunities
- Enhanced acceptance and use of asset-backed tokenization

Hurdles:

- Cybersecurity
- Regulatory constraints
- Building trust in platforms dedicated to private fundraising

Implementation Strategy:

• Structuring of focused calls for proposals

Estimated Investment:

- MUR 2 Million per project
- Estimated total for Private Fundraising is MUR 6 Million



6.9.3 Long Term Action Plan 3: Compliance with International Best Practices

Regulation and Risk Management **Potential Implementing/ Collaborating agency(ies):**

- I. Bank of Mauritius
- 2. Financial Services Commission
- 3. Mauritius Finance
- 4. Ministry of Information Technology, Communication and Innovation
- 5. Mauritius Africa FinTech Hub
- 6. Mauritius Bankers Association
- 7. Independent Commission Against Corruption
- 8. Ministry of Financial Services and Good Governance

Definition

Regulation and risk management cover activities related to identifying, evaluating and mitigating risks in the financial services industry. These include solutions that help financial services companies manage their operational risks and improve their regulatory compliance as well as solutions that help regulators to better supervise and monitor companies that they are regulating.

Operators in this area can use technology and new business models to reduce the cost, improve the speed or improve the accuracy of regulation and risk management.

FIGURE 56 – FINANCIAL INNOVATION LONG TERM ACTION PLAN 3.1: COMPLIANCE WITH INTERNATIONAL BEST PRACTICES PROJECTS

Relevant actionable/ strategy/support

Project I

Customer Risk Management

Technology-based solutions can be developed that support financial institutions to better manage their customer risks in areas such as fraud monitoring and credit risk. These solutions may use tools such as machine learning to more accurately identify potential fraud or predict when a customer is likely to become a credit risk. This project will aim at supporting the development of technology-based solutions in this area.

Project 2

Regulation Tech (REGTECH)

RegTech solutions enable regulated financial companies to comply with regulations, both locally and internationally. These can include solutions that help financial companies to automate their responses to regulators, or services that keep up to date on the latest regulation changes and requirements. This project will encourage the development of RegTech solutions.

Project 3

Supervision Tech (SUPTECH)

SupTech solutions enable regulators to better supervise and monitor companies that they are regulating. SupTech solutions could help regulators to automate parts of the authorization processes, speed up the responses to requests from financial companies or use machine learning to identify non-compliance. This project will encourage the development of SupTech solutions.



Expected impact:

- Easier for financial institutions to comply with regulation
- Easier for regulators to supervise regulated financial companies
- Better regulated financial institutions
- Improve customer on boarding process
- Improve customer risk management

Expected outcome:

• Provision of resilient and reliable solutions to support regulatory compliance in the banking and financial services

Hurdles:

- Appropriate legislative framework required to accompany technology-based solutions
- Collaboration between institutions

Implementation Strategy:

• Structuring of focused calls for proposals

Estimated Investment:

- MUR 2 Million per project
- Estimated total for regulation and risk management is MUR 8 Million





FIGURE 57 - FINANCIAL INNOVATION ROADMAP





Strategic **Orientation 6 Regulation & Risk Management**

Customer Risk Management

> Regulation Tech (REGTECH)

Supervision Tech (SUPTECH)



6.11 Conclusions

This report aims to propose the way forward to drive Financial Innovation in Mauritius and is based on the recommendations which emerged following the discussions of the key stakeholders on the subject area. The main conclusion is that Financial Innovation is possible when there is adaptation, and where innovative products and processes are developed in close collaboration with stakeholders in the sector. Ensuring that Financial Innovation succeeds requires adoption of a holistic approach because this area encompasses actions that cut across different sub-sectors, each with potentially important social impacts.

Initially, Financial Innovation was mainly concerned with banks used to perform paper-based transactions. The evolution of technology has forced traditional financial institutions to face a new reality. Products, services and business models that have worked for decades are no longer an option in the digital world. Operations and infrastructure must therefore be augmented by new and more efficient technologies. Adopting an altogether different approach by incorporating mobile banking applications, as mentioned by a banking executive in Mauritius, reflects a desire to make financial services accessible to everyone by using the MauCas network of the Bank of Mauritius to drive Mauritius as a cashless society.

While banking has been considered to be the most mature of the financial services subsectors when it comes to embracing technology-based opportunities, at the same time, Financial Innovation has moved beyond banks, with non-banking operators such as those involved in insurance and asset management making strong in roads. In Mauritius, non-banking institutions, such as My.T and Emtel, have introduced mobile wallets, such as My.T Money and Blink, respectively, demonstrating the impact that Financial Innovation can leverage with society.

The financial services industry is undergoing a significant shift. Emerging technologies, such as artificial intelligence, machine learning, blockchain and the internet of things, together with higher expectations and more refined preferences of customers, are redefining how financial institutions deliver services.

There is growing pressure on financial institutions to remain competitive and this leads them to undertake major transformation efforts – moving from complex traditional environments to more efficient operations and creating more responsive compliance processes that can meet evolving local and international regulations. Indeed, financial institutions see start-ups in the Financial Innovation sector (commonly referred to as FinTechs) as a major component of the digital future.

In moving forward, based on discussions of the Technical Committee and the panel session, the following are to be considered in the context of the development of FinTech as a key component of Financial Innovation in Mauritius:

- Financial institutions are increasingly interested in collaborating with FinTechs, but often have difficulty to interact effectively with faster-moving FinTech developers;
- Financial institutions often do not have a clear path for FinTech approval and development, and consequently struggle with setting benchmarks to measure success;



- To alleviate these issues, financial institutions should implement a fast-fail approach towards development of FinTech-based solutions, and establish a precise engagement pathway;
- FinTechs must also develop approaches to align with real-world challenges and demonstrate both industry and technical expertise;
- The success of initiatives in the area of Financial Innovation will be enhanced in situations where technology-based solution providers:
 - capitalize on new technology platforms,
 - have access to open data sources, and
 - propose solutions that can be easily adapted for a wide range of business and services.

Mauritius has just come out of the FATF list and EU List. It is the right time for the financial services sector to leverage on the visibility it has received, and come up with best ideas. We should not forget our international competitors and regional competitors. Continued innovation is the best way to beat competition. At the rapid rate the sector is evolving, financial products and services, as well as the technological infrastructure underpinning financial institutions, will look remarkably different in a decade compared to how they look today.

The MRIC can support development in Financial Innovation through targeted funding of projects with key stakeholders that leverage on technology to provide solutions that can be built quicker and cheaper, and which bring improved efficiency through resolving issues or capitalizing on opportunities in this sector.



75% 25% TRAVEL, TOURISM AND ENTERTAINMENT INNOVATION

"Innovation is progress in the face of tradition."

- Divad

7.0 Travel, Tourism and Entertainment Innovation

7.1 Introduction

7.1.1 Scope

The scope of the Travel, Tourism and Entertainment Innovation (TTEI) thematic area was to identify research, technology and innovation strategies that would help attract high valueadded, sustainability-minded, culturally-inclined tourists to Mauritius in the long run by offering high service quality in order to achieve socio-economic stability of all Travel, Tourism and Entertainment (TTE) stakeholders in Mauritius.

7.1.2 Aim and Objectives

The aim of this report is to set the foundations for the development of a roadmap for the recovery of the tourism industry in the aftermath of COVID-19 in Mauritius through research, technology and innovation in the TTE sector.

The objectives are to:

- provide an overview of the TTE sector;
- identify the gaps and challenges with regards to research, technology and innovation needs of the TTE sector;
- identify international emerging technologies and trends; and
- recommend projects, programmes, incentives, schemes and policies to assist in the recovery of the TTE sector in the aftermath of the COVID-19 pandemic.

7.1.3 Guiding Principles

Recovery from the COVID-19 crisis has presented an opportunity for the tourism industry to reshape itself for a more promising and sustainable future with socio-economic stability for all stakeholders. This report was drafted based on the following set of guiding principles.

• See the whole picture

Recognize that most tourism by its nature involves the destination as a whole, not only industry businesses but also its ecosystems, natural resources, cultural assets and traditions, communities, aesthetics, and built infrastructures.

• Sustainability

Respect the publicly available, internationally approved minimum criteria for sustainable tourism practices maintained by the Global Sustainable Tourism Council (GSTC) for both



industry and destinations. Ensure investments are linked to optimizing net-positive impacts for communities and the environment.

• Collaboration

Seek to develop tourism through a collaborative management structure with equal participation by government, the private sector, and civil society organizations that represent diversity in communities.

• Quality over quantity

Manage tourism development based on quality of visitation, not quantity of visitors, so as to enhance the travel experience while sustaining the character of the destination and benefiting local communities.

• Demand fair income distribution

Set policies that counter unequal tourism benefits within destination communities that maximize retention of tourism revenues within those communities.

• Protect sense of place

Encourage tourism policies and business practices that protect and benefit natural, scenic, and cultural assets. Retain and enhance destination identity and distinctiveness. Diversity of place is the reason for travel.

• Operate business responsibly

Incentivize and reward tourism businesses and associated enterprises that support these principles through their actions and develop strong local supply chains that allow for higher quality products and experiences.

7.1.4 Definition of Travel, Tourism and Entertainment Innovation

From the UNWTO Glossary of terms,

I.4.1 Definition of Travel/ Traveller

Travel refers to the activity of travellers. A traveller is someone who moves between different geographic locations for a purpose and a certain duration. The visitor is a particular type of traveller and consequently tourism is a subset of travel.

1.4.2 Definition of Tourism

Tourism is a social, cultural and economic phenomenon which entails the movement of people to countries or places outside their usual environment for personal or business/ professional purposes. These people are called visitors (which may be either tourists or excursionists; residents or non-residents) and tourism has to do with their activities, some of which involve tourism expenditure.



I.4.3 Definition of Tourism Sector

The tourism sector is the cluster of production units in different industries that provide consumption of goods and services demanded by visitors. Such industries are called tourism industries because visitor acquisition represents such a significant share of their supply that, in the absence of visitors, their production of these would cease to exist in meaningful quantity.

Sub-sectors within the Travel and Tourism Industry include:

- 1. Transportation, i.e., airline industry, car rental, water transport (ocean liners, ferries, cruise ships), coach services, metro
- 2. Accommodation, i.e., hotels, shared accommodation (e.g., AirBnBs), camping, bed and breakfast, farmhouse accommodation and agri-tourism
- 3. Food and beverage, i.e., restaurants, catering, bars, cafés
- 4. Connected industries, i.e., casino, shopping, tourist guides and tours, financial services (travel insurance, medical insurance, currency conversion, travellers' cheques), travel agents, tour operators, online travel agencies, tourism organizations (e.g., national tourism information companies, local tourist boards, tourism agencies, tourism charities and inspection agencies).

I.4.4 Definition of Entertainment Sector

The entertainment sector comprises of all businesses and activities that generate value by providing people with something interesting to do or watch. The entertainment sector is usually associated with vibrant and thrilling experiences and is sometimes interlinked with the concept of Culture and Creative Industries (also referred to as the Orange Economy).

Sub-sectors within the entertainment sector include:

- Media, i.e., film, music, radio, cinema
- Live sports and attractions (theme parks, zoos, water parks)
- Museums
- Events and conferences, i.e., cultural festivals, religious festivals, parades
- Performance art, i.e., theatre, comedy and magic shows, concerts, circuses
- Night economy, i.e., nightclubs and karaoke
- Arts, i.e., painting and sculpture
- Crafts and cultural products (e.g., local cuisine)

Note: For the purpose of this report, the entertainment sector will be taken as all activities/ businesses that bring value especially to tourists and contribute to projecting the uniqueness of Mauritius in terms of cultural tours, products, heritage, festivals, museums and crafts.



1.4.5 Tourism and Culture

Despite the immense synergies between tourism and culture, the two sectors often operate within government and administrative structures that are disconnected or poorly coordinated, resulting in less than optimal outcomes for national and regional development policies, planning and development. At a time of unprecedented tourism growth, it is important to emphasize the shared responsibility among culture and tourism, as well as the immense opportunities for both culture and tourism to develop new partnership models.

As per the UNWTO Framework Convention on Tourism Ethics (Article 7, paragraph 2),

"Tourism policies and activities should be conducted with respect for the artistic, archaeological and cultural heritage, which they should protect and pass on to future generations; particular care should be devoted to preserving monuments, worship sites, archaeological and historic sites as well as upgrading museums which must be widely open and accessible to tourism visits."

1.4.6 Definition of Innovation in TTE

The United Nations World Tourism Organization (UNWTO) defines innovation in tourism as a collaborative action between governments, academia, corporations, micro, small and medium enterprises (MSMEs) and start-ups, investors, supporting business partners (accelerators, incubators, etc.) and other stakeholders. Fostering a successful tourism innovation and entrepreneurial ecosystem require connecting all stakeholders to collaboration opportunities and prioritizing capacity building in tourism and technology. The stakeholders involve the following:

- Governments and public entities come up with policies that foster innovation, trade and the adoption of technologies, generally promote innovation in tourism.
- Academia creates frameworks and models on sustainable innovation in tourism, smart destinations, contribute knowledge to governments, start-ups, MSMEs and start-ups and supporting business partners.
- *Corporations* develop new technologies, raise awareness internally about innovation, and implement an organizational structure and vision for technology, invest in open innovation.
- Start-ups & MSMEs (micro, small and medium enterprises) develop and implement disruptive technologies in tourism, satisfy and reflect the needs and demands of travellers, create innovative solutions in tourism that support the SDGs.
- Investors invest in sustainable projects related to tourism and technology, support the growth and internationalization of corporations, destinations and MSMEs and start-ups.
- Supporting business partners support start-ups that directly or indirectly impact the tourism value chain.



Innovation in tourism has many faces and involves:

- *Product innovation* with new products and services, e.g., nanotechnology textile products in guest rooms, health tourism and agri-tourism;
- Process innovation with new ways of delivering tourism services, e.g., service robots, computerised surveillance systems;
- Logistic innovation with new ways supplying products or services to customers, e.g., contactless check-in at airports;
- *Market innovation* focusing on new ways of marketing and consumer behaviour, e.g., marketing through social media.

7.1.5 Outline of international emerging technologies and innovation trends

The tourism industry is constantly evolving and the pace of change is now faster than ever before, as emerging technology and shifting demographics alter expectations and standard practices. This has been further exacerbated by COVID-19, which has disrupted almost all aspects of travel and tourism. However, there are real opportunities for companies that keep pace with the latest travel and tourism trends and embrace new ways of doing business. It is important to stay on top of travel and tourism trends as customers expect businesses to offer the latest innovations and such businesses are able to remain relevant.

7.1.5.1 Factors responsible for emerging travel and tourism trends

A trend refers to a general development or change in behaviour and for something to be described as a trend, there will usually need to be either increased popularity or prevalence. Within tourism, the advent of new technology, lifestyle factors (e.g., concerns over health and animal welfare, increase in vegetarian and vegan diets, eco-friendly travel and focus on local experiences) and the COVID-19 pandemic are factors which have influenced these behavioural shifts.

1.5.2 New Travel and Tourism Trends

• Prioritisation of Hygiene and Safety

Since the beginning of the COVID-19 outbreak, focus has been placed on reducing the spread through hygiene and safety measures. Depending on the setting and local regulations, these measures may require travel industry companies to provide hand gel, facilitate social distancing, require mask-wearing and/or generally improve cleanliness. In Mauritius, many resorts and hotels have adhered to the Feel Safe label certification, developed by Laboratoire International de Bio Analyse (LIBA) that verifies whether the measures implemented in relation to hygiene, disinfection and safety practices are in conformity with the quality systems and procedures in place and in line with local and international standards as recommended by recognised institutions.



• Wider Adoption of Contactless Payments

Accepting contactless payments is a great way to convince customers that necessary steps are being taken to protect them by minimising the number of shared surfaces they need to touch.

• Personalisation

Personalised marketing takes data regarding a client and uses this to tailor advertising and promotion specifically to that person. A simple example would be the targeted ads that appear in web browsers when visiting certain sites, which use information derived from a person's browsing habits and prior purchases to show products that might be of interest to someone. A regular traveller might be offered deals on plane or rail tickets or useful gadgets, such as adapters, power banks or noise-cancelling headphones.

• Biometrics Identification

Biometrics refers to "the automated methods of identifying or authenticating the identity of a living person based on physiological characteristics." Examples include hand geometry, fingerprint analysis, facial recognition, voice recognition and retinal or iris scan.

- a) Voice control: A growing number of hotels are using voice-controlled devices within their hotel rooms. This provides guests with the ability to adjust their room's temperature, turn on the television, change channels, contact the front desk and much more, all using smart speakers or a voice-controlled hub.
- b) Face recognition: In two Marriott properties in China, guests have the option of going to a kiosk upon arrival and using facial recognition technology to check-in quickly and effortlessly, without any need to queue or wait for a hotel staff for that purpose.
- c) Iris scan: In Amsterdam Airport Schiphol, a premium service called Privium is offered whereby its 60,000 enrolled members use iris recognition technology to move through airport security lines and board their flights. Members do not have to present their passports, tickets or other travel documents. They simply look into an iris scanner and they are quickly and accurately identified – all without touching anything.

• Local Experience

Nowadays, travellers now crave for engagement with the people, cultures and landscapes of the countries they visit. Modern travellers are eager to eat local food, witness and participate in cultural experiences and local traditions.

• Artificial Intelligence



As customers require faster response times and more interaction, chatbots, which use artificial intelligence to automate and streamline many sales and customer service tasks, bridge the gap when human operators are not available.

• Internet of Things

Internet-connected and microprocessor-controlled devices (smart devices) have become increasingly prevalent. From dedicated iPad tablets used to provide information for museum-goers to smart hotel rooms where lights and HVAC systems can be controlled using voice commands, IoT is permeating every aspect of travel and tourism. With Amazon introducing a hospitality-oriented version of its popular Alexa virtual assistant, this trend is firmly set to continue. Guests can use Alexa for hospitality hub to control their room environment, book sessions at gyms or spas and ask for services.

• Eco Travel

Customers of today are more ecologically conscious than ever. Airlines, tour operators, car hire firms, hotels and a whole spectrum of businesses across the industry have embraced this trend, which is only set to become more prevalent in future. Some changes have been small and fairly simple, such as allowing air travellers to purchase carbon credits when they book a flight in order to offset the environmental impact. Another example would be vehicle hire companies that are now offering and even specialising in electrical vehicles.

• Augmented Reality

Augmented reality (AR) combines virtual elements with real-world experiences. AR travel trends include museum exhibits where visitors can view objects and structures in the real world, then see them overlaid with a reconstruction of their original appearance; for instance, Greek marbles with a virtual overlay of their original colours. Augmented reality can also be used to provide information about the location that a visitor is exploring - cultural or historical data or listings for entertainment and travel.

• Healthy and Organic Food

More health-conscious travellers are driving the demand for more wholesome food and options for those on special diets. Vegetarians, vegans, those who need to avoid gluten, lactose or other common allergens - all these groups are better served now than ever before. Hotels and resorts are combining health and leisure with innovative new cuisine, often with an emphasis on fresh local ingredients and regional recipes. Some resorts focus on specific goals, such as weight loss.



7.1.6 Innovative initiatives by competing destinations

The main regional players in tourism sector are Seychelles and Maldives and Sri Lanka. An overview of the actions and direction undertaken by the players who are the regional competitors in the section below.

7.1.6.1 Seychelles

Seychelles has traditionally focused on nature, the honeymooners market segment, the seasand-and-sun holidays and accommodation establishments. Seychelles is allocating more resources to promoting eco, marine and culture & heritage tourism. Seychelles is increasing product diversification: by assessing potential of niche tourism products including sports, agri and adventure tourism. Seychelles is growing its digital marketing and e-commerce capabilities, investing in market penetration and development. Seychelles is investing in local talent development and management. Investment is sustainable tourism practices is also being increased. Seychelles has transferred the management of iconic public beaches to Seychelles National Parks Authority and pursued blue flag certification. Seychelles aims at becoming a Global Sustainable Tourism Council (GSTC) certified destination by 2023 with half of the large hotels and guesthouses acquiring the "Seychelles Sustainable Tourism Label" (SSTL) certified by 2023. Seychelles is also developing a Marine tourism policy, establishing sustainable utilities services. It is also regularly assessing carrying capacity of major tourism sites. It is prioritising investment at the Pointe Larue International Airport. An Air Access Task Force has been setup to meet demand for air access and support is being allocated for Air Seychelles to remain financially viable.

7.1.6.2 Maldives

Maldives has created a public-private partnership for marketing and consolidated its position as remote island resort destination. Maldives has developed management plans for marine protected areas and designated sensitive environments. It has also developed a biosphere reserve programme by setting up marine reserves with in-house reefs or boundaries of resorts. It has implemented a climate change adaptation programme for tourist industry, low carbon program for tourism industry Maldives is engaged in a programme to engage local community to participate in tourism: careful planning on island-by-island basis to match community aspirations and social/cultural constraints with real market opportunities. Partnerships are being encouraged between resorts and local communities in island level economic and social development initiatives. Maldives is also exploring sectors, such as ecotourism, pro-poor tourism and inclusive development, culture and adventure tourism. Maldives has the vision of establishing itself as a conference/events destination and sport destination.

7.1.6.3 Sri Lanka



Sri Lanka developed one sustainable destination in each province with involvement of provincial and local communities. Sri Lanka also involves local communities through the development of adventure, culture and experience-based tourism. Sri Lanka engages in smart tourism and digitalization in tourism-related experiences, such as digital business ecosystem, digital intermediary between customers and services/products, digital tourism supply chain management, digital feedback system linked with review sites like TripAdvisor. Sri Lanka also uses virtual reality and artificial intelligence for tourism marketing and promotion.

7.1.7 Some technologies/ trends and their applications for the TTEI sectors in Mauritius

7.1.7.1 Virtual Reality

Virtual reality (VR) technology has been one of the breakthrough technology trends of recent times and its role within the travel industry exceeds almost any other area of usage. After all, VR allows for destinations to be showcased, properties to be viewed and attractions to be explored, all via a digital experience. VR refers to interactive images or videos which enable the viewer to explore the entire 360 degrees of a scene. Unlike a regular image of video, which is shot from a fixed viewpoint, VR production captures every part of a location. In TTE, VR can be used to capture tourism destinations in a unique and immersive way. Showcasing a destination and its experiences via VR is an interactive way for potential visitors to get a lasting impression once immersed in the story without even being there. Tourists can have a virtual walkthrough and catch a glimpse of the atmosphere of the destination they are about to book. More and more tourist offices and travel agencies are using innovative VR technology. According to a survey by the Australian Tourism Board, one in five consumers has already chosen their holiday destination using VR.

VR can influence consumer behaviour as a pre-experience destination marketing tool. The younger generation of tourists no longer have the patience to read through classical travel sales pitches and pamphlets. It has been shown that VR has stronger impact on mental imagery than traditional channels, creating vivid simulations of what it would be like to visit destinations. VR exposure led to higher levels of mental imagery and happiness predictions, which in turn was associated with stronger travel intentions and purchasing decisions.

The MTPA has installed 13 webcams around Mauritius which help showcase sunrise, sunset, all the beautiful sunshine in between, the colour of the lagoons and our stunning beaches in real time. The MTPA could also use virtual reality in tandem with social media to market our travel destination and hotels.

It is also to be noted that the MRIC is currently funding a project titled 'Development and Implementation of Virtual Tours for Mauritian Museums to promote national heritage' with the Mauritius Institute of Education as the main implementing company and the Mauritius Museums Council as research collaborator.

7.1.7.2 Service Robots



Automation is one of the key travel trends with many tasks that were once handled by humans now being taken over by robots or automated systems. According to the International Federation of Robotics (2020), a service robot is a type of autonomous robot that performs useful tasks for humans without human intervention. A familiar example would be the chatbots that have fallen into widespread use across the industry, which is designed to help people find and book tours, transport and accommodation by asking a set of questions. More sophisticated examples might include the robot "staff" used by a few hotels as receptionists, bellboys, museum guides, concierges, housekeepers, waiters and bartenders, luggage-storage staff, delivery robots, butlers and room service assistance, and online customer support staff.

Working Group members were of the view that tourists come to Mauritius to seek the authentic, warm and personal touch and attention of friendly hotel employees. However, the younger generation of adults could be more open to interaction with service robots. The perception of customers, hotel employees and hotel managers towards service robots and their possible application in specific activities which would increase efficiency and productivity could be investigated.

7.1.7.3 Use of dogs to detect COVID-19

In one of the most innovative approaches to ensuring passenger safety in the COVID-19 era, Dubai International Airport (DXB) has introduced coronavirus-sniffing dogs. Passengers take a swab of their own scent (from their armpit), which is then sent for a rapid-fire COVID-19 'sniff-test' that is claimed to have 92% accuracy. The dogs, in an isolated room, then sniff the samples. They have been trained to sit down if they pick up traces of the coronavirus. Results are made available within minutes.

The MRIC is currently assessing the feasibility of training dogs to detect specific odours associated with active infection of SARS-CoV-2 (i.e., COVID-19) and its variants with a high level of sensitivity and specificity, through a pilot study. The outcomes of this study will be used to inform the health authorities and provide conclusive scientific evidence for proposing this approach as a complement to currently available diagnostic tools.

7.1.7.4 Other Technologies

Many cities worldwide have adopted the use of Quick Response (QR) codes to better engage with tourists. QR codes can be implemented on signboards, tourist information boards, tourist attractions, tourist pamphlets, etc. to provide them with information such as directions, notes on historical significance, stories, reviews, emergency numbers, embassy contact information, and dos and don'ts. City administrators can track QR Code's scanning activity and provide valuable insights on how many people scan it, where did they scan it and when did they scan it, for instance. This can help them identify the most visited tourist attractions with a view to further enhancing those locations for an enriched experience. QR Codes on signboards across the state of Kerala in India were linked to the Kerala tourism webpage and to enable the recharge of metro cards to allow the payment of excess fares if



required. Beijing, China, has gone one step further by equipping 55 pilot stations with QR codes which scan and allow passengers to buy tickets.

In the aftermath of the pandemic, QR codes are being used as digital tags to allow businesses to track sanitization status in real-time. For instance, employees can simply scan a digital tag from their smart device to report sanitization at their workplace, while customers can do the same to check when the last time a particular room, conference hall, restroom, etc. was sanitized. Consumers can also request cleaning through the click of a button. Such digital tags are easily installed on any surface or material.

In Mauritius, tourist information boards could be designed with QR codes which when scanned could provide the related information in different languages depending on the choice of the tourist. Hotels, conference rooms, restaurants, restrooms, and their customers can also use QR codes to track, report and check real time sanitization status.

7.2 Sectoral Working Group and Sectoral Forum

7.2.1 Overview

Key stakeholders in the TTE fields were identified and invited to participate in the working group sessions.

Specific tasks

The main focus of the working group was to identify the needs of the TTE sectors in terms of research, technology and innovation with a view to developing a roadmap for this particular sector. The tasks of the Working Group also involved the following:

- To take stock of what innovative initiatives are being implemented by stakeholders in the TTE sectors;
- To identify gaps and challenges of the TTE sector;
- To recommend research and innovation projects, programmes, incentives, schemes and policies to aid in the recovery of the TTE sectors in the aftermath of the coronavirus pandemic;
- To identify and enlist speakers, moderator, and panel members for the thematic discussion during Les Assises;
- To contribute to the moderated panel discussions during Les Assises; and
- To contribute to and endorse the thematic roadmap for research, technology and innovation in the TTE sector.

The working group met on three (3) occasions on:

- Monday 28th February 2022
- Monday 7th March 2022
- Monday 28th March 2022
- A meeting was also held with Ms Ayooshee Dookhee, Head of Solutions Mapping at the UNDP on Wednesday 6th April 2022.



• A sectoral forum including a panel discussion was held on 28th April 2022 during "Les Assises de la Recherche et de L'Innovation" and the salient findings and recommendations emanating from the panel discussions were incorporated in the report.

7.3 Situational Analysis

7.3.1 Overview

Travelling is one of the main causes for the coronavirus spread across the world and consequently, government restrictions on human movement, including tourist traffic, became a general trend. Despite tourism is one of the largest and fastest-growing industries globally pre-covid and despite the pent-up wish by people to rediscover the pleasure of travel in the aftermath of the pandemic, global tourism is not expected to surpass 2019 levels in the near future. It has been forecasted that tourism levels may return to pre-crisis levels by 2024.

From the budget 2021-2022, for the tourism industry,

- The Government has spent more than Rs 8.5 billion to assist around 50,000 individuals in the travel and tourism sector through the Wage Assistance Scheme and Self-Employed Assistance.
- Rs 420 million has been allocated to the Mauritius Tourism Promotion Authority (MTPA) for the:
 - Promotion and destination marketing in France, Reunion, UK, Germany, Italy, South Africa and China;
 - Organisation of cultural tourism events locally and internationally;
 - E-promotion through e-marketing, online events and virtual road shows; and
 - \circ $\;$ Joint marketing with tour operators and airline companies.
- The EDB is setting up a special desk aiming to attract at least 50,000 foreign retirees in Mauritius during the next financial year, through a targeted marketing campaign in collaboration with MTPA. A dedicated portal for foreign retirees will be launched. It will provide practical information on accommodation facilities, cultural and leisure activities, and healthcare services.
- Taking into account the changing tourism landscape, UNDP is assisting Mauritius with repositioning the tourism industry to cater for new business segments.

Since 15th July 2021, Mauritius was open to all vaccinated visitors for resort tourism, with tourists allowed to leave the hotel after 14 days with a negative PCR test. Since 1st October 2021, there has been a complete reopening of borders in Mauritius; all vaccinated tourists with a negative PCR test have been allowed on the Mauritian territory without any restrictions. Despite the complete reopening of borders in October 2021, small and medium hotels are still suffering from low occupation rate. There has been a request for the Wage Assistance Scheme to be reactivated for small and medium hotels.

Coronavirus restrictions are gradually being lifted worldwide, the rationale behind being that in countries with relatively high vaccination rates, the spread of the omicron variant has not



led to a substantial increase in hospitalisation and death rates. However, scientists are still urging caution.

Mauritius has removed the need for a negative PCR test taken 72 hours before arrival and the day 5 antigen test during a holiday to Mauritius. Tourist arrivals in Mauritius

• Jan 2022: 40,028; Jan 2021: 1,232; Jan 2020: 137,419

Tourist arrivals from July 2021 to February 2022: 269,307

Total contribution of Travel and Tourism to Mauritian GDP

• 2019: 19.5%; 2020: 8.7%

Travel and Tourism Competitiveness Index 2019 (World Economic Forum)

• Mauritius 54th over 140 countries

Tourism Sustainable Development Index 2020

• Mauritius 140th over 190 countries (1.04 over 10)

Growth rate in arts, entertainment and recreation sector

• 2020: -31%; 2019: 4.2%; 2018: 4.6%

7.3.2 Target for Travel, Tourism and Entertainment Sector in Mauritius

In the budget 2021-2022, the aim was to have **650,000 tourists** from July 2021 to June 2022. On 21st February 2022, the Government announced a new target of achieving **I million tourists** by end of December 2022. In this context, new strategies will be put in place to promote collaboration of the authorities and all industry players with the slogan of "One Mauritius" being chosen to incite all stakeholders to work towards this target.

Following the end of the Strategic Plan 2018-2021 for the tourism sector, a short-term strategy for the tourism sector for the year 2022 was presented by the Minister of Tourism on 16^{th} March 2022. The three following dimensions were taken into consideration in the development of the strategy:

- i. Demand: increasing bookings from international markets to attain the 2019 level of tourist arrivals and encouraging increase in length of stay;
- ii. Supply: improving tourism facilities to increase tourism spending and enhancing overall customer experience; and
- iii. Air connectivity: ensuring optimal conditions for travel and access to Mauritius.



The following 'Strategic Thrusts' have been identified on the demand side to increase bookings from international markets to attain the objective, namely:

- i. Focusing on main markets;
- ii. Exploring opportunity markets;
- iii. Low season campaign;
- iv. Exploiting the full potential of meetings incentives conferences exhibitions; and
- v. Working as 'One Mauritius'.

As regards supply, the following strategic priorities have been identified:

- a. Ease sanitary restrictions;
- b. Long-stay tourism; and
- c. Enhancing customer experience through a public-private partnership.

An in-depth analysis has been carried out on the seat capacity required from each of the main markets of Mauritius to be able to attain the target of at least one million tourists by December 2022. Three main recommendations were formulated to ensure optimal conditions for travel to Mauritius:

- i. establish a close collaborative framework between tourism stakeholders and MTPA in order to support the take-off of Air Mauritius through provision of tangible support on jointly identified routes;
- ii. re-establish the same level of connectivity and seat capacity as in 2019 as quickly as possible; and
- iii. explore direct connectivity with new markets/new destinations not currently served.

As per the strategic overview for the Ministry of Arts and Cultural Heritage, a >5% real growth is being targeted in Arts, Entertainment and Recreation sectors for the years 2021-2022, 2022-2023 and 2023-2024.

7.3.3 Initiatives of the Tourism Authority

- Since 2018, the Tourism Authority (TA) has been working with the Collaborating Agency for Sustainable Consumption and Production (CSCP) in Germany to provide tour operators with training on how to incorporate features of sustainability in their operations such as the promotion of sustainable products, zero paper and plastic to protect and preserve the environment, engaging local citizen participation through local handicraft, explore historical and cultural attractions to attract tourists and adopt a local farmer initiative such as sensitizing tourists to plant a tree.
- The TA has been offering training to the staff of Mautourco Ltd to enable them to work together with eco-friendly partners and offer green packages to their clients.



- Other projects include rendering the services of boat operators, taxi operators and handicraft operators in an ecologically friendly manner. The project involves the training of boat operators to enable them to adopt new technologies such as electric boats, leading to low emission and lagoon pollution.
- The TA has conducted a number of webinars for hotels and tour operators, workshops with artisans followed by discovery tours, organized national clean-up campaigns in collaboration with NGOs to clean beaches, to engage in protection and conversation of mangrove trees and worked together with the REEF conservation society.
- The major challenge in sustainable tourism is green financing. At present, the TA is compiling a pamphlet to foster green financing in this industry.
- The TA will be organizing the Sustainable Tourism Mauritius Awards 2022 in May 2022. The aim is to keep the present project on sustainable tourism ongoing. The TA is currently working with big tour operators and hotel operators and they now want to focus on MSMES which is very challenging given that MSMES do not have a proper structure of operating. In parallel, they are trying to assess the impacts of businesses on the marine environment and look at the value-chain in the industry.

7.3.4 Initiatives of the Mauritius Tourism Promotion Authority (MTPA)

- The MTPA is launching a campaign entitled "Feel our island energy" in three phases: Short, medium and long term
- The MTPA is also launching the first "Mauritius Now" Campaign from May to September 2022, the aim of which is to attract more than 600,000 tourists annually by focusing on being more inspirational rather than informative. The main target market includes family and honeymooners.
- The campaign has embraced the social media strategy, including the Mauritius Liverpool partnership to increase the visibility of our island.
- Mauritius is in the process of positioning itself as one of the top MICE (Meetings, Incentives, Conferences and Exhibitions).

7.3.5 Mauritius Underwater Cultural Heritage (MUCH)

The Department for Continental Shelf, Maritime Zones Administration and Exploration (CSMZAE) responded to the need for identification, preservation, protection and awareness of underwater cultural heritage in our maritime zones and has initiated the Mauritius Underwater Cultural Heritage (MUCH) project. The MUCH project, which aims at developing a framework for the sustainable management of underwater cultural heritage sites in the maritime zones of Mauritius, has as main objectives:

- to provide capacity building in Underwater Cultural Heritage (UCH);
- to identify and document the marine archaeological resources in the maritime zones of Mauritius in a database;



- to ensure the integrity of the underwater cultural heritage identified through management plans;
- to investigate means to develop a sustainable underwater cultural heritage tourism; and
- to create awareness on marine archaeological resources.

The MUCH project is carried out in collaboration with Ministries, Departments and NGOs with policy/regulatory responsibilities and scientific/technical expertise relevant to underwater cultural heritage. A Coordinating Committee has been set up to look into UCH projects and the legal framework. CSMZAE is preparing appropriate legislation to regulate and authorise activities directed at underwater cultural heritage under sections 24, 25 and 26 of the Maritime Zones Act 2005. CSMZAE is also developing a database of wrecks located within the maritime zones of Mauritius on a Geographical Information System (GIS) platform. Information on scuttled vessels have been compiled from the Ministry of Blue Economy, Marines Resources, Fisheries and Shipping and the Mauritius Ports Authority (MPA).

7.3.6 Innovative Initiatives by Hotels

Hotels in Mauritius have always been responsive to foreign tour operator requirements in order to be enlisted as approved accommodation providers. This demand-driven approach has been reinforced over the years as tour operators became more demanding and specialised, hotels engaged into more B2C interactions, and technology drove better efficiency into the sector and its various business operations. Today, not only the provision of food and accommodation services is becoming more sophisticated but guests are also growingly demanding in their wide array of expectations and actual experiences – ranging from sustainable practices to local host community engagement, and across increasingly popular involvements such as conservation, reef rehabilitation, animal rights and avoiding long haul air travel. We are thus faced with immense challenges moving forward, as a remote tropical island holiday destination, but with lesser untouched natural beauty and more prominent man-made infrastructure. Examples from AHRIM tourism and hospitality operators that illustrate how the industry is forging ahead on innovation and business continuity is hereby annexed.

7.4 Gaps and Challenges of Sector

A number of gaps and challenges were identified pertaining to this particular sector as mentioned below:

7.4.1 Inconsistencies in Understanding the Innovation Perspective by Stakeholders

• The term "Innovation" means different things to different people. There is no common understanding of the definition of innovation by stakeholders which results in a lack of focus on creating a conducive environment for innovation to take place.



7.4.2 Issues related to Sustainable Tourism

- The term "Sustainability" has been used so vaguely that today it has become a meaningless concept. Its definition is understood differently by different individuals/organisations. A common public understanding of this term is of upmost importance to work towards achieving a common goal thereby leading to sustainability in the tourism sector.
- There is a lot of talk about digital literacy and financial literacy, amongst others. However, no emphasis is laid on sustainability education.
- The hotel industry and tourism industry are two different components of this sector. In Mauritius, more emphasis is laid on the hotel industry rather than on the tourism industry. Tourists mostly come to enjoy and stay in the hotels/ resorts rather than discovering the cultural aspects of the island. On the other hand, in Seychelles for instance, the whole country is engaged towards servicing tourism.
- Public beaches are left in a filthy condition after long holidays, long weekends and religious events.
- Lack of waste bins around tourist sites and public beaches.
- Encountering stray dogs (hungry, sick and suffering) may convey a sad and shocking image in the minds of tourists.
- It has been observed that the attitude of the Mauritian population towards tourists has changed over the years, for instance, the lack of hospitality, lack of a welcoming authentic approach and even a feeling of resentment towards the latter. Moreover, a number of thefts have even been noted on tourists and in certain cases, tourists have been charged excessively for products or services by local vendors.
- No proper advice from tourist guides of destination management companies resulting in tourists dressing up and behaving inappropriately when visiting religious places.
- While big hotels and resorts are already implementing solutions keeping in mind the SDGs, it is the smaller players, e.g., small and medium hotels, guest houses, tourist residences, restaurants, bars, and coffee shops that need to be sensitised with regards to waste disposal and circular economy solutions.

7.4.3 Lack of Infrastructure

- No proper road signage (abbreviated names of places in some cases) for tourists to be able to visit tourist sites on their own.
- Missing, damaged or outdated information boards at tourist sites. No QR codes implemented.
- Limited coordination between the Ministry of Tourism, district and municipal councils with regards to brown tourist information boards/ signs.



7.4.4 Lack of Marketing/Visibility

- Mauritius continually relies on the sun, sea, sand approach to marketing of the destination. While this is our reality, the Mauritian landscape does not match with the more rustic and natural offerings of competitor islands like Maldives and Seychelles which continually top the global best list of beach destinations.
- Limited online marketing campaigns, especially on social media unlike, e.g., Maldives which is fierce with its online presence and celebrity awareness campaigns.
- Limited awareness of tourists and Mauritians on the availability of a destination app called <u>My Mauritius</u> (https://play.google.com/store/apps/details?id=com.loungeup.mtpa&hl=en&gl=US)

7.4.5 Limited Human Resources and Capacity Building

- Mismatch between what academia is producing as human resources and what the current market is demanding. Many students join undergraduate courses in travel and hospitality because they were unable to secure a seat for a preferred course. Enrolling for courses in the field of travel and tourism at university level means people are looking for job opportunities at managerial level which are in fact limited.
- There is a huge challenge of labour turnover in the TTE Sector. Most people joining the tourism industry no longer do so out of passion, but because of the need to earn a living.
- School leavers with Grade 9 (Form 3) or Grade 11 (Form 5) are able to secure lowentry jobs (such as waiters, barmen and housekeeping). However, despite several years of experience, they are not able to secure a seat at university down the years to advance their career due to lack of an HSC.
- The industry needs more hands than brains, e.g., there are many vacancies for manual workers to clean up/ make the hotel rooms instead of managerial positions.

7.4.6 Constraints in Employment and Working Conditions

- With the attractiveness of the cruise ships and the pay packages being offered, Mauritians already working in the hotel sector are leaving their jobs to move to <u>cruise ships</u>. This is putting an enormous pressure on the hotel sector in terms of skills availability as many hotel operators are claiming that the cruise sector is depleting the local skills in certain trades.
- No attractive salary package for hotel employees, especially that their working conditions are frequently characterized as unsocial given their irregular working hours in the form of split shifts, week-end shifts, night shifts or even working during holiday periods.
- Even though tourism creates jobs and contributes significantly to GDP, this has not been totally translated into poverty reduction due to some hotels/ businesses not engaging in and encouraging the provision of services, crafts and food locally.



- For instance, Dodo artisanal crafts imported from China are being sold in local tourist shops instead of being procured locally from local businesses
- Despite having many hotels/ resorts/ villas along a large extent of the coastline of Black River, the benefits of tourism have not trickled down to the local community.

7.4.7 Issue regarding Data Capturing and Monitoring

- The main source of information for compiling tourism statistics is the disembarkation cards filled in by all incoming passengers. Fields gathered from the disembarkation card include: date of arrival/ departure, flight number, mode of travel, country of residence, nationality, date of birth, gender, port of embarkation and disembarkation and purpose of visit. However, more in-depth data is not available, e.g., a person departing from London may not necessarily be of British national. Other data, such as the country of origin or the cultural background of the tourists, could also be captured.
- Tourism satellite account last data available are for the year 2018.
- Forward-looking data is not being used to its fullest for forecasting purposes by TTE stakeholders.

7.4.8 Limited Focus on Cultural Tourism

- No data with regards to the number of visits by tourists to the different museums of the country.
- Currently, places of interest visited by tourists more often include commercial ventures which are privately owned and managed. No proper mapping of less-explored places of interest known to locals, e.g., viewpoints, hiking trails, natural caves, recreational parks, local bazars ('la foire'), etc.
- No proper mapping of locations or description of National Heritage Sites found on the <u>website</u> of the National Heritage Fund. (<u>http://www.nhf.govmu.org/English/National%20Heritage/List%20of%20National%20H</u> <u>eritage/Pages/default.aspx</u>)

7.4.9 Under-exploitation of Medical and Wellness Tourism

Mauritius offers a suitable alternative to the long waiting lists and expensive medical procedures in developed countries, along with its

- 1) Well-developed network of private clinics and specialist centres providing health care facilities and treatment in cosmetic surgery, hair transplant, dentistry, etc.
- 2) Location at the crossroads of Africa, Middle East and Asia,
- 3) World class hotel infrastructures and amenities, offering attractive and integrated packages combining healthcare, wellness and leisure at a very competitive price.



However, there is no marketing strategy to attract tourists with regards to <u>medical and</u> <u>wellness tourism</u>.

- The arrival of medical tourists in Mauritius is currently highly concentrated from the UK, France and the South West Indian Ocean regions. However, the long distance from Europe may not encourage the bulk of the patients to travel to Mauritius.
- Focus should therefore be on the regional market by capitalizing on Mauritius being a stable and peaceful abode as compared to high criminality rate in South Africa.
- Since 9/11 episode, the imposition of stringent immigration rules has drastically diminished the flow of Arab patients to the hospitals and clinics of the West. These clients are now being recuperated, to a large extent, by Turkey, India, Thailand and Malaysia.

7.5 Vision and Strategic Orientations

In line with the vision of the Ministry of Tourism which is 'A leading and sustainable destination', the vision of the Working Group on Travel, Tourism and Entertainment Innovation is to identify research, technology and innovation strategies that would help attract high value-added, sustainability-minded, culturally-inclined tourists to Mauritius in the long run by offering high service quality in order to achieve socio-economic stability of all tourism stakeholders in Mauritius.

Based on the identified gaps and challenges and the situational analysis of the sector in Mauritius, members of the working group identified five strategic orientations, which are listed in order of priority:

- 1. Strengthening efforts towards ensuring sustainable tourism
- 2. Human capital development and capacity building
- 3. Increased marketing/visibility of Mauritius as a tourist destination
- 4. Advocating for the use of forward-looking data and big data
- 5. Increased air connectivity and airline seat capacity

7.5.1 Strategic Orientation 1: Strengthening Efforts towards Ensuring Sustainable Tourism

Target: Improvement in the rank of Mauritius in the Tourism Sustainable Development Index

Expected outcomes:

- Optimal use of environmental resources, maintaining essential ecological processes and helping to conserve natural heritage and biodiversity
- Conservation of socio-cultural authenticity of host communities, built and living cultural heritage and traditional values
- Stable employment and income-earning opportunities to host communities, and contribute to poverty alleviation



FIGURE 58 - TTEI STRATEGIC ORIENTATION 1: STRENGTHENING EFFORTS TOWARDS ENSURING SUSTAINABLE TOURISM PROJECTS

Relevant Actionable/ strategy/ support

Project 1: Digital App for tourist nature-based activities

Sustainable Island Mauritius (SIM) project, under the Tourism Authority, encourages landbased activities which are less impactful to the environment and helps into the preservation of the natural heritage and culture. However, it is felt that these activities lack proper monitoring in terms of safety and security, anthropology, and signage of main interests. In the light of the recent incidents that occurred due to climate change, it is believed that a proper application of the nature-based activities would be of added value such as but not limited to:

- i. Check-in and check-out of visitors and in parallel head counts
- ii. Send out urgent messages to visitors in case of emergencies
- iii. GPS localisation of the visitors
- iv. Detailed stop overs with storytelling about facts (flora and fauna)
- v. Detailed tracks of safety and security hazards and do's and don'ts for visitors

Project 2: Digitalisation of the MauPHI Monitoring Tool

SIM has developed a template to monitor in a holistic manner the application and progress of the 11 sustainable criteria. However, the format is in Excel and there is the ambition to develop a tailor-made software for implementation and monitoring. With the software, the operator shall be able to easily input monthly data regarding footprints and handprints and have a comprehensive dashboard on work progress to take necessary corrective actions where required and to improve in relation to KPI's targets.

Project 3: Understanding community attitudes towards tourism development in Mauritius

The key reasons for considering the community attitudes towards tourist development are to ensure that the tourism in Mauritius will be developed and aligned with the needs, values and vision of the local community. An in-depth study on community attitudes will provide insights on issues, needs, challenges, opportunities and priorities to advance the tourism industry in Mauritius by making the community an inclusive partner of the tourism development and focusing on community building and sustainability.

Project 4: Understanding the needs, attitudes and behaviours of tourists in the

aftermath of COVID-19

In the aftermath of COVID-19, it has been observed that the needs of tourists have been changing constantly. The needs of tourists are no longer the same as was the case prior to the spread of the COVID-19. Hence, there is a need to reframe the services being provided



by the tourism industry as per the current needs of tourists coming from different parts of the world. A study could be conducted to understand their current needs as well as their attitudes and behaviours to allow the tourism industry to re-engineer itself.



Project 5: Developing social conscience and responsible citizens: Research on innovative international best practices

Investigating the mindset of the local population with a view to creating our own 'local' dimension of 'ownership, common public good and civic pride' for responsible behaviour towards sustainable tourism. While tourists are in a cocooned environment within the hotels with respect to a safe, clean and pristine environment, the same is not true when they venture into public places. It is common to see garbage tossed onto the street from running vehicles or reports of thefts. Public beaches are left in a filthy condition after long holidays, long weekends and religious festivals. This behaviour is incoherent with the image tourists have of Mauritius. Researching on international best practices that can be implemented at grassroots level to bring about a change in attitude and behaviour will be conducted, including specific study topics that are implemented at primary school to develop more responsible citizens.

Project 6: Setting up a sustainable agri-tourism village in Mauritius

One prospective avenue to valorise the unoccupied lands of small-scale planters is to integrate them into a broader project like the setting up of a sustainable agri-tourism village in Mauritius. For instance, Mahebourg already functions organically as an eco-tourism village at least to some extent. Ecolodges, small restaurants, fisher folks, operators of pleasure craft boats, individual tour guides, craft markets, hawkers, apiculture, spa, spiritual centres, local taxis and artists work inter-connectedly as a single ecosystem to sustain tourism for the benefit of the local population. Not only does this economic model help in the preservation and enhancement of the existing natural features of the village but it also supports the livelihood of the local people. Such an inclusive tourism economic model could be introduced inland emphasising on the construction of ecolodges on abandoned lands of small-scale planters nested amidst the existing natural, social and microeconomic facets of the designated area. A study could investigate the feasibility of setting up of an agri-tourism village in Mauritius.



7.5.2 Strategic Orientation 2: Human Capital Development and Capacity Building

Target: Higher service quality provided to tourists by employees in the TTE sector

Expected outcomes:

- Broad availability of quality education in TTE as a foundation for future training
- Continuous workplace training and lifelong learning enabling TTE workers to adjust to an increasingly rapid pace of change
- Solid bridges built between the world-of-work and training providers in order to match skills provision to the needs of the sector
- Anticipating and building competencies for future skills needs

FIGURE 59 - TTEI STRATEGIC ORIENTATION 2: HUMAN CAPITAL DEVELOPMENT AND CAPACITY BUILDING PROJECTS

Relevant Actionable/ strategy/ support

Project 1: Investigating the skills gap between tourism/hospitality graduates and industry expectations

According to the UNWTO, the new normal in the aftermath of the COVID-19 pandemic in the TTE industry is around the use of technology and innovation, knowledge and skills, which are emerging as game changers locally and internationally with regards to human resources and capacity building. There is a need to examine the performance of university graduates and graduates from Technical and Vocational Education Training institutes with the perspective of the private sector and determine emerging trends in human labour within the tourism and hospitality industry that educators should anticipate. The National Qualification Framework could be used to ensure standardized curriculum contents across training institutions.

Project 2: Turnover and turn-away intention of Travel, Tourism and Entertainment employees in the aftermath of the coronavirus pandemic

Many TTE employees lost their jobs during the lockdown and when the borders were closed as a result of the outbreak of COVID-19. As borders restrictions are gradually lifted and the tourism industry starts to recover, the TTE sector is experiencing a number of unfilled vacancies and more foreign labour being recruited in the hotels. A study could examine the factors affecting the high turnover and turn-away intentions of the Travel, Tourism and Entertainment employees in Mauritius in the aftermath of COVID-19.

Project 3: Demonstration experiments and assessing perception of customers

and hotel employees towards the introduction of service robots

Following demonstration experiments, a study could explore the factors determining the acceptance of customers and hotel employees towards the use of service robots and their potential adoption in hotels, restaurants, events, airports, car rental companies, travel agencies, tourist information centres, museums and art galleries for specific activities in order



to increase efficiency and productivity. Policy and compliance factors could also be determined.

7.5.3 Strategic Orientation 3: Increased Marketing/ Visibility of Mauritius as a

Tourist Destination

Target: Increased revenue as a result of diversified marketing of tourism activities in Mauritius

Expected outcomes:

- Brand awareness is generated
- Characteristics that make Mauritius stand out from competitors are highlighted and promoted
- Increased number of tourists visiting the country

FIGURE 60 - TTEI STRATEGIC ORIENTATION 3: INCREASED MARKETING/VISIBILITY OF MAURITIUS AS A TOURIST DESTINATION PROJECTS

Relevant Actionable/ strategy/ support

Project 1: Digital mapping of tourist attraction sites

Mauritius continually relies on the sun, sea, sand approach to market Mauritius as a tourist destination. While this is our reality, the Mauritian landscape does not match with the more rustic and natural offerings of competitor islands like Maldives and Seychelles which continually top the global best list of beach destinations. A study could help to bring forward other aspects of the Mauritian heritage including our unexplored nature and diverse cultures. Currently the places of interest visited and listed by tourists more often include commercial ventures which are privately owned and managed. The study will help put a spotlight on other must-do activities like hiking trails, waterfalls, life in a fishing village, living like a local, the local arts and crafts industry, local bazars etc., which many tourists look forward to engaging in when visiting new destinations.

Project 2: Design and implementation of digital interpretive signage at tourist sites

Interpretation is also regarded as a method of providing heritage values through disclosing the meaning of the place, culture or heritage or supplementing the tourist's understanding of the heritage sites and its spiritual, aesthetic, social, natural and physical contexts. Good interpretive signs are essential for knowledge and enjoyment of a destination, site or attraction. A study could investigate the design and implementation of digital interpretive media, such as video, animation, 3D simulation, virtual reality, and augmented reality, by moving from traditional interpretive signage such as tourist information boards, brochures, maps, leaflets and books.


Project 3: Credit-based system to compensate for the willingness-to-pay by Mauritian citizens for recreational services

Introducing entrance fees for Mauritian citizens may help sensitise them on the importance and need for preserving recreational services (e.g., at national parks) and would counteract the threat of inadequate public funds for conservation activities, site maintenance and management. A study could examine Mauritian citizens' willingness-to-pay for accessing recreational services, the nominal fee they would be willing to pay, and whether they would be open to alternatives, whereby citizens input details about their good practices (with evidence) into an app (e.g., recycling of plastic bottles) and earn credits which could be used to pay for recreational services.

Project 4: Translation of Mauritian Creole into other foreign languages

The importance of translation cannot be underestimated, especially by business and leisure travellers. Google Translate has set up a multilingual translation system and it is regularly used by people all over the world. While Haitian Creole is available, translation of the Mauritian Creole language is still not available on Google Translate or other platforms as the available size of the parallel corpora is quite small. A study could further the work initiated by <u>Sukhoo et al. (2014)</u> for the translation of Mauritian Creole into other foreign languages. The accomplishment of this initiative could encourage a massive influx of tourists from different parts of the world given that tourists would be able to translate Mauritian creole for their understanding.

Project 5: Investigating the contribution of domestic tourism in Mauritius during

complete and partial border closures in Mauritius

A study could be conducted to evaluate the contribution of domestic tourism in Mauritius since March 2020 as a result of a significant loss of international demand due to the outbreak of the Covid19 pandemic. The study could further investigate the extent to which the recovery marketing strategies implemented on domestic tourism markets during the closure of borders helped to sustain the local tourism industry. The findings could also be used as a base for the tourism industry to be better prepared for such future eventualities.

7.5.4 Strategic Orientation 4: Advocating for the Use of Forward-looking Data and

Big Data

Target: Deployment of a tourism dashboard with aggregated real-time data

Expected outcomes:

- Data available to all TTE stakeholders to take more informed policy decisions
- More precise forecasting of tourist arrivals and spending
- More targeted promotions and ad campaigns
- More chances to adapt to demand shifts and capitalise on revenue opportunities



FIGURE 61 - TTEI STRATEGIC ORIENTATION 4: ADVOCATING FOR THE USE OF FORWARD-LOOKING DATA AND BIG DATA PROJECTS

Relevant Actionable/ strategy/ support

Project I: Aggregation of forward-looking data from various sources

With the developments resulting from Covid-19, established travel patterns went out of the window and so did most TTE stakeholders' ability to make forecasts based on historical data. Without the right business intelligence data, it is difficult to identify shifts in traveller demand and to take advantage of all revenue opportunities. TTE stakeholders should transition from forecasting demand patterns based on historical data points to new methods, such as rolling short-term monthly forecasts and using forward-looking data. Forward-looking data is top-of-funnel data that allows predictions of upcoming demand and trends and is the key to quick responses to market shifts and to maximize all chances of driving revenue. Some examples of forward-looking data include: search volume for flights and hotels on search engines, which length of stay travellers are checking for, activity on alternative lodging and meta-review sites, events and holidays in the destination and competitor insights (e.g. pricing for the coming days/weeks/months, availability, predicted arrivals in a destination, predicted tourist spending), amongst many others. A study could investigate the harvesting of in-depth and real-time past and forward data on a monthly basis, worked and sorted by professional data engineers by using data of global magnitude to issue monthly advisory reports.

Project 2: Investigating the use of big data in the Mauritian tourism industry

Tourism-related big data fall into three primary categories: UGC data (generated by users), including online textual data and online photo data; device data (by devices), including GPS data, mobile roaming data, Bluetooth data, etc.; transaction data (by operations), including web search data, webpage visiting data, online booking data, etc. Carrying different information, different data types to address different tourism issues. A study could be conducted to analyse systematically each data type in order to obtain new perspectives on tourist behaviours, tourism management and tourist market.

Project 3: Open innovation and social big data

The huge amount of data generated on social media by tourists related to their travel experiences can be a valid source of open innovation. Social networks can play as enabling platforms for tourists' involvement and sources for the creation and management of valuable knowledge assets. However, very limited academic research has been conducted into tourism forecasting using big data from social media due to the difficulties in capturing, collecting, handling, and modelling this type of data, which is normally characterized by its privacy and potential commercial value. A study focusing on the development of a framework for tourism forecasting using social media's big data could be undertaken.



7.5.5 Strategic Orientation 5: Increased Air Connectivity/ Airline Seat Capacity

Target: Increase in air connectivity and frequency of airlines servicing Mauritius

Expected outcomes:

- Decrease in air travel costs for consumers and businesses
- Increase in number of tourists travelling to Mauritius and Mauritians travelling abroad for leisure and business
- Increase in number of global contacts and foreign direct investment

FIGURE 62 - TTEI STRATEGIC ORIENTATION 5: INCREASED AIR CONNECTIVITY/AIRLINE SEAT CAPACITY PROJECTS

Relevant Actionable/ strategy/ support

Project I: The influence of low-cost carriers on tourism demand and growth

It is widely argued that low-cost carriers (LCCs) lead to an increase in tourism demand. In 2016, AirAsia X had spread its wings in the Mauritian sky, but this was discontinued after only five months. Since December 2021, Flysafair, a low-cost carrier, is servicing the South Africa/Mauritius route. A study could analyse the tourism demand of a Full Service Network Carrier, such as Air Mauritius, and a LCC, such as Flysafair, and evaluate the satisfaction of frequent travellers on the South Africa-Mauritius route in the first instance.

Project 2: Tourism demand, airline capacity and trade: A case study of Mauritius

A study could investigate the three-way relationship between tourism, air transportation and trade for our main markets such as France, South Africa, India, and so on. A clear knowledge of the causal relationship between international inbound tourism (including business travellers and leisure travellers) and the growth of air transport activity in Mauritius may offer better estimation of its economic outlook. This could help air transport stakeholders to plan and schedule more flights and increase seat capacity on specific routes.

Project 3: Airline deregulation: A case study of other destinations and feasibility

study of Mauritius

Studies have shown that in the beginning, airline deregulation removed unnecessary and ineffective government controls, resulting in more efficient airline industries in countries such as the US and South Korea and decreasing airfare and increasing productivity. However, as time went by, there was a perception that the negative consequences were much greater than the benefits of airline deregulation. A study could explore whether airline deregulation is still relevant nowadays and analyze its possible benefits and consequences for Mauritius.



7.6 Short term Action Plan

7.6.1 Action Plan 1 – Strengthening efforts towards ensuring Sustainable Tourism

Implementing / Collaborating agency(ies):

- Ministry of Tourism
- Tourism Authority (TA)
- Mauritius Tourism Promotion Authority (MTPA)
- University of Technology, Mauritius (UTM)
- University of Mauritius (UoM)
- Ministry of Environment, Solid Waste Management and Climate Change
- Ministry of Arts and Cultural Heritage
- Ministry of Agro-Industry and Food Security
- UNDP, Mauritius
- Ministry of Housing and Land Use Planning
- Association of Hoteliers and Restaurants in Mauritius (AHRIM)
- Mauritius Research and Innovation Council (MRIC)

Enabling factors

- Tourism regulatory framework
- Public-private-academia collaboration
- Expertise in terms of Human Resources (Principal investigators and team members)
- Funding to undertake research, innovation and technology related projects
- Sensitization and Awareness Campaigns

Implementation strategy/ plan

- Feasibility studies
- Surveys/ focus group discussions/ interviews/ case studies
- Initiation of proofs of concept
- Enforcement of Tourism Regulatory Framework
- National consultations

Indicative Activities

- Digital app for tourist nature-based activities
- Digitalisation of the MauPHI Monitoring Tool
- Understanding community attitudes towards tourism development in Mauritius for policy making
- Understanding the needs, attitudes and behaviours of tourists in the aftermath of COVID-19 for policy making



- Developing social conscience and responsible citizens: research on innovative international best practices
- Proposal to set up a sustainable agri-tourism village in Mauritius

Hurdles

- Securing sufficient funding
- Time taken to complete project within targeted deadline
- Reluctance of local communities and tourists to participate in surveys and focus groups
- Convincing concerned authorities for implementation of projects
- Partnering with relevant authorities/ stakeholders
- Continuity of projects post-implementation

Potential Risks and Mitigation Measures

- Risk I: Loss of time and money if project is not implemented by relevant authorities
- Mitigation measure I: Partnering with relevant implementing agencies right from the proposal stage of the projects
- Risk 2: Human- health related incidents, such as the COVID-19 pandemic, has resulted in a significant drop of tourism arrival and hotel bookings
- Mitigation measure 2: To continuously impose additional health checks on incoming visitors in this pandemic era to ensure recovery of the tourism sector
- Risk 3: Natural disasters like earthquake, tsunamis and floods can devastate the coastal communities
- Mitigation measure 3: To implement initiatives such as suitable safety standards, providing suitable equipment, ensuring buildings are constructed to withstand earthquakes, and implementing adequate health and safety procedures.

Estimated Investment (Indicative Figures)

FIGURE 63 – TTEI SHORT TERM ACTION PLAN 1 ESTIMATED INVESTMENT

Programme	2022-2023	2023-2024	2024-2025
Strengthening efforts towards ensuring Sustainable Tourism	6M	-	-



7.6.2 Action Plan 2 – Human Capital Development and Capacity Building

Implementing / Collaborating agency(ies):

- Ministry of Education, Tertiary Education, Science and Technology (METEST)
- Mauritius Qualifications Authority (MQA)
- University of Technology, Mauritius (UTM)
- University of Mauritius (UoM)
- Polytechnics Mauritius Ltd (PML)
- Institut Escoffier
- Vatel Mauritius
- Ecole Hoteliere Sir Gaetan Duval
- Human Resource Development Council (HRDC)
- UNDP, Mauritius
- Association of Hoteliers and Restaurants in Mauritius (AHRIM)
- Mauritius Research and Innovation Council (MRIC)

Enabling factors

- Public-private-academia collaboration
- Alignment of formal education and training with industry expectations
- Expertise in terms of Human Resources (Principal investigators and team members)
- Funding to undertake research, innovation and technology related projects
- Knowledge transfer (operation/maintenance of service robots)

Implementation strategy/ plan

- Surveys / focus group discussions / interviews / case study
- Scheme for procurement of service robots
- Demonstration experiments
- Testing on a pilot basis

Indicative Activities

- Investigating the skills gap between tourism/ hospitality graduates and industry expectations
- Turnover and turn-away intention of TTE employees in the aftermath of the coronavirus pandemic
- Demonstration experiments and assessing perception of customers and hotel employees towards the introduction of service robots



Hurdles

- Cost implications (availability of funding)
- Time taken to complete project within targeted deadline
- Reluctance of TTE employees and tourists to participate in surveys and focus groups
- Reluctance on the part of relevant authorities to adopt emerging technologies
- Lack of local expertise to operate service robots

Potential Risks and Mitigation Measures

• Risk: Loss of time and money if project is not implemented by relevant authorities

Mitigation measure: Partnering with relevant implementing agencies right from the start

Estimated Investment (Indicative Figures)

FIGURE 64 - TTEI SHORT TERM ACTION PLAN 2 ESTIMATED INVESTMENT

Program	nme			2022-2023	2023-2024	2024-2025
Human capital development and				3M	IM	-
Capacity building						



7.7 Medium term Action Plan

7.7.1 Action Plan 1 – Increased marketing/visibility of Mauritius as a tourist destination

Implementing/ Collaborating agency(ies):

- Ministry of Tourism
- Tourism Authority (TA)
- Mauritius Tourism Promotion Authority (MTPA)
- University of Technology, Mauritius (UTM)
- University of Mauritius (UoM)
- Ministry of Arts and Cultural Heritage (MACH)
- Association of Hoteliers and Restaurants in Mauritius (AHRIM)
- Mauritius Research and Innovation Council (MRIC)

Enabling factors

- Public-private collaboration
- International collaboration
- Expertise in terms of Human Resources (Principal investigators and team members)
- Funding to undertake research, innovation and technology related projects

Implementation strategy/plan

- Feasibility studies
- Surveys/ focus group discussions/ interviews/ case study
- Proof of concept



Indicative Activities

- Digital mapping of natural heritage sites and other tourist attraction sites
- Design and implementation of digital interpretive signage at tourist sites
- Credit-based system to compensate for the willingness-to-pay of Mauritian citizens for recreational services
- Translation of Mauritian Creole into other foreign languages
- Investigating the contribution of domestic tourism in Mauritius during complete and partial border closures in Mauritius

Hurdles

- Cost implications (availability of funding)
- Time taken to complete project within targeted deadline
- Reluctance of TTE employees and tourists to participate in surveys and focus groups
- Reluctance on the part of relevant authorities to accept proposed initiatives

Potential Risks and Mitigation Measures

Risk: Loss of time and money if project is not implemented by relevant authorities
 Mitigation measure: Partnering with relevant implementing agencies right from the start

Estimated Investment (Indicative Figures)

FIGURE 65 - TTEI MEDIUM TERM ACTION PLAN 1 ESTIMATED INVESTMENT

Programme	2022-2023	2023-2024	2024-2025
Increased marketing/visibility of	5M	2M	-
Mauritius as a tourist destination			



7.8 Long term Action Plan

7.8.1 Action Plan 1– Advocating for the use of forward-looking data and big data

Implementing/ Collaborating agency(ies):

- Ministry of Tourism
- Tourism Authority (TA)
- Mauritius Tourism Promotion Authority (MTPA)
- Statistics Mauritius (SM)
- University of Mauritius (UoM)
- University of Technology, Mauritius (UTM)
- Ministry of Arts and Cultural Heritage (MACH)
- Association of Hoteliers and Restaurants in Mauritius (AHRIM)
- Mauritius Research and Innovation Council (MRIC)

Enabling factors

- Public-private collaboration
- International collaboration
- Funding
- Human Resources (collection and analysis of data)
- Analysis tools (to make forecast)

Implementation strategy/ plan

- Feasibility studies
- Proof of concept
- Case study

Indicative Activities

- Aggregation of forward-looking data from a number of sources
- Investigating the use of big data in the Mauritian tourism industry
- Open innovation and social big data

Hurdles

- Lack of local professional data engineers
- Cost implications (availability of funding)
- Time taken to complete project within targeted deadline
- Seeking collaboration of relevant stakeholders



Potential Risks and Mitigation Measures

• Risk: Loss of time and money if project is not implemented by relevant authorities Mitigation measure: Partnering with relevant implementing agencies right from the start

Estimated Investment (Indicative Figures)

FIGURE 66 - TTEI LONG TERM ACTION PLAN 1 ESTIMATED INVESTMENT

Programme	2022-2023	2023-2024	2024-2025
Advocating for the use of forward-	3M	2M	-
looking data and big data			



7.8.2 Action Plan 2 – Increased Air Connectivity/Airline Seat Capacity

Implementing / Collaborating agency(ies):

- Ministry of Tourism
- Tourism Authority (TA)
- Mauritius Tourism Promotion Authority (MTPA)
- Prime Minister's Office (PMO)
- Mauritius Research and Innovation Council (MRIC)

Enabling factors

- Public-private collaboration
- International expertise/consultants
- Funding
- International Collaborations (Airlines)

Implementation strategy/plan

- Feasibility studies
- Case studies
- Surveys/ focus group discussions

Indicative Activities

- The influence of low-cost carriers on tourism demand and growth
- Tourism demand, airline capacity and trade: A case study of Mauritius
- Airline deregulation in Mauritius: case study of other destinations and feasibility study

Hurdles

- Reluctance on the part of International Airlines to collaborate
- Lack of visibility of Mauritius as a tourist destination
- Time taken to complete project within targeted deadline



Potential Risks and Mitigation Measures

• Risk: Loss of time and money if project is not implemented by relevant authorities

Mitigation measure: Partnering with relevant implementing agencies right from the start

Estimated Investment (Indicative Figures)

FIGURE 67 - TTEI LONG TERM ACTION PLAN 2 ESTIMATED INVESTMENT

Programme	2022-2023	2023-2024	2024-2025
Increased Air Connectivity/Airline Seat	2M	2M	2M
Capacity			



7.9 General Recommendations

7.9.1 Understanding of the term "Innovation" in the tourism sector

- Innovation is more about changing the way we do things.
- Stakeholders in the tourism sector need to understand the context in which innovation takes place (i.e., the framed conditions) to be able to constitute the environment in which innovation is enacted and implemented, be it at technical, political, ecological or cultural level.
- Innovation is also about a simple process change with the ultimate aim of producing new processes, new techniques and new ways of doing things (in addition to physical infrastructure, soft infrastructure, technology, capital etc.). This is very important in the TTE sector.
- Innovation does not have to be complex. It should be easy and feasible. Putting the bar too high could do us much harm than being beneficial. It is good to be pragmatic, pick a few things for our competitors and implement them incrementally.
- Innovating the tourism industry could mean shifting from a hotel-based approach to an island-based approach where the whole island is part of an integral tourism project. It involves the integration of the whole community such that everyone could potentially earn a living of tourism.
- Social innovation to improve social outcome and to change our social practices which are highly relevant in the tourism and hospitality sector
- Innovation as a social phenomenon involves society/people. There is a need for behavioural/ attitudinal change on the part of all stakeholders.
- The framed conditions determine the approaches to innovation, the type of innovation and the pace at which the innovation takes place (they form the broader environment through which innovation can be enacted).
- There is also a need to lay a lot of emphasis on developing an innovation culture from society to society; from countries to countries; and from destinations to destinations

7.9.2 Ensuring Sustainable Tourism

- A paradigm shift could involve the introduction of sustainability and tourism as a core subject right from primary school.
- Need to innovate in the way we understand sustainability / in the way we conceptualize innovation.
- Need to have a clear strategy and common objective to move in one direction towards a common goal for achieving sustainability in the tourism industry.
- Protection of environment will lead to a sustainable society and obviously lead to an economy that will survive in the longer term.
- Incorporate sustainability education for all stakeholders.



- Integrating the SMEs who are highly vulnerable to the volatile nature of the tourism industry.
- Convert the whole island into a tourism destination by integrating the whole community such that everyone has the potential to earn a living via tourism.
- The big players such as hotels and resorts are already upcycling their waste by 30%. The small hotels are barely recycling 5% of their waste and therefore they need to be sensitized.
- Enforce laws to preserve the country in a state of cleanliness.

7.9.3 Development of an Observatory for the Tourism Industry

- Development of an observatory for Mauritius to:
 - study the best practices/emerging trends and strategies of direct competitors and understand their impacts on the economy;
 - understand and benchmark the performance of competitors worldwide;
 - propose improvements in infrastructures and amenities being offered;
 - recommend adoption of appropriate strategies and methods of improving and positioning Mauritius as a highly recommended tourist destination;
 - \circ $\;$ analyse the feasibility of implementing specific practices/strategies;
 - sustain and outshine in the tourism business during this Covid19 era based on the actions.

7.9.4 Transformation of the Tourism and Wellness Sectors

- To build a more resilient TTE sector, Mauritius must invest in transforming the tourism and health sectors in order to withstand any future crises;
- Conduct research on new business models, infrastructure development and digitisation, while scaling up on medical infrastructure and put in place world-class testing facilities;
- Need for a more focused approach towards the promotion of Mauritius as a medical/wellness tourism destination.

7.9.5 Addressing Skills Mismatch and Knowledge Gaps (Education, Training and Development)

- Universities and training institutions need to innovate in the way they educate and train students to address the problem of knowledge gaps and skills mismatch;
- The element of practice should be emphasized on rather than only focusing on theory;
- Teach students how to adapt in the face of the changing world Need to know how to deliver training such that it becomes adaptable to even a student who is not computer literate, for instance;



- To introduce adapted training programmes for different levels of the hospitality workforce (Managerial level; blue collar jobs versus white collar jobs) on improved understanding of evolving travel behaviours and subsequent approaches to be adopted;
- Introduce training for an improved understanding of travellers' behaviours given that travellers are becoming more and more sophisticated in terms of looking at all the features of the destination. Tourists travel to consume the integrated products which englobes the destination's culture including festivals; natural heritage; gastronomy; health and safety).
- In order to ensure successful training and development, there is a need to focus on knowledge, skills and desire;
- To conduct research on the development of human resources.

7.9.6 National Campaign to Attract and Retain Recruits

- Recruitment has been a priority concern for employers in TTE, which when compounded by the impact of COVID-19, has left many businesses struggling to recruit a full workforce, resulting in closures and scaled back service.
- A multi-channel advertising <u>campaign</u> could be launched, featuring a series of quirky eye-catching job descriptions across billboards, outdoor advertising and social media to attract attention and highlight the dynamic and fast-paced roles available and rewarding careers at all skills levels.
- The campaign could emphasise the need to attract new recruits to join an industry that is looking to come back, become bigger and better than ever.
- While the first challenge remains the recruitment of human resources, another challenge is how to maintain the workforce. Given that salary in the tourism industry is not attractive, it is important to create incentives and provide accompanied measures to motivate workers to stay in the industry.
- In the same logic it is important to encourage the youth to stay in Mauritius and join the tourism industry rather than seeking to become a migrant worker elsewhere.

7.9.7 Marketing/Visibility of Mauritius as a Tourist Destination

- There is a change in the cognitive process of tourists given that the way they look for information is different, especially with the outbreak of COVID-19;
- There is a need to keep pace with the travellers changing behaviours as tourists travel for edutainment (education/learn/discover new experiences);
- Need for the development of innovative marketing strategies to capture travellers' complex and sophisticated behaviours;
- Innovative ways of analyzing data;
- Use of online reviews from social media can help in understanding travellers' expectations and needs and can in turn help in the conceptualization process of tourist



products for consumption given that social media has a huge impact on travellers behaviour;

- Innovation could also mean starting the customer's journey right from creation of a story on social media to create interest. Then review the customer's journey every step on the way from booking of air seat to the hotels and so on through the lens of best practices;
- The use of artificial intelligence and machine learning techniques can be made to extract important information and data and also for analyzing reviews.

7.9.8 Need for Forward-looking Data/ Real-Time Data

- There is an urgent need for using forward-looking data and/or real-time data for improving and innovating the marketing strategies to attract more and more tourists;
- Innovation in our marketing strategies is central in understanding the tourists behaviour and in capturing the new tourists;
- Use of real-time data should be made to enable evidence-based policy making for more impacts;
- The use of more forward-looking data instead of backward-looking data for more informed policy decision making and for better projections of tourists' arrivals and spending as well as to enable proper planning of tourists' activities.

7.9.9 Tourism Regulatory Framework

- Although there are a number of tourism legislations in place in Mauritius and a number of guidelines for tourism activities such as helmet diving, parasailing activities, nightclub, private club, pub and table d'hote, it has been noted that there is no current tourism regulatory framework;
- A tourism <u>regulatory framework</u> could be embarked upon by the government with collaboration of all TTE stakeholders for the sustainable development of the tourism sector;
- Regulatory framework to innovate as it provides the conditions within which innovation takes place to provide the necessary mechanisms for implementation;
- To have a more flexible regulatory framework which can better adapt and address challenges in the light of demand and supply-side challenges;
- The framework should also take into account the welfare of host communities, the comfort of tourists, the profits of tour operators and destination management companies, and maintain the ecological balance so as to protect our valuable biodiversity. The framework could incorporate, among others:
 - $\circ \quad \text{A code of conduct for tourists}$
 - A code of conduct for tour operators/destination management companies
 - A Responsible Tourism policy
 - An eco-tourism policy



- A policy on community involvement in tourism
- Policy makers need to be well versed with the needs of the industry and the dynamics of the market. The regulators need to keep pace with the constantly evolving industry;
- **Labour regulations** to evolve given that it has huge implications on the travel and tourism sector. Currently, the hotels are increasingly relying on foreign labour. Presently, a number of issues exist as far as migrations and trade unions are concerned;
- Need for more research and understanding of what needs to be changed in our regulatory frameworks/ how these changes need to be brought for the benefit of the travel and tourism sector;
- Environmental regulations Assess the willingness on the part of tourists to pay for compensating the environmental damage they are making. How much (quantum) they are willing to pay;
- What type of communication strategies need to be implemented so that tourists understand the need and provide their willingness to pay. There should also be transparency regarding where the money would be invested.



7.9.10 Revamping of MRIC Funding Schemes

- Working Group Members were of the view that in the field of TTE, a significant amount of basic research is needed to gain knowledge about tourism statistics and perceptions of all stakeholders in order to help formulate informed policy decisions.
- It was proposed that a revised version of the Solicited Research and Innovation Grant Scheme (SRIGS) and the Unsolicited Research and Innovation Grant Scheme (URIGS) could be reinstituted to fund thematic studies about innovations in TTE. Such thematic studies could be co-funded by the MRIC and respective stakeholders.

7.9.11 Launching of Special Call for Proposals and Funding

- A special call for proposals could also be launched whereby research and innovation projects in the field of Travel, Tourism and Entertainment innovation could be funded.
- It was highlighted that grant making procedures are very complex and need to be simplified for ease of making grant applications to local research funding agencies.

7.9.12 Paving the way for regional success

- Enhancing regional infrastructure will enhance the ease with which travellers can move between countries, thus leading to an increase in tourist flows in these regions;
- This will lead to more people travelling to multiple countries on a single trip as opposed to visiting only a single destination before returning home;
- In creating better connectivity between Indian Ocean states, countries will be more inclined to work together to promote their collective success as a tourism destination.



7.10 Roadmap





away intention of

The influence of lowcost carriers on tourism demand and growth

Strategic Orientation 5 Increased Air Connectivity/Airline Seat Capacity

> Tourism demand, airline capacity and trade: A case study of Mauritius

7.11 Conclusions

During the sectoral forum on the thematic "Travel, Tourism and Entertainment Innovation", discussions were held with experts and innovation champions; hoteliers and other relevant stakeholders in the sector with a view of coming up with a number of possible initiatives and proposals that could be taken into consideration to improve the current state of the tourism industry in the country from a technology, research, and innovation perspective. Based on the above salient findings and recommendations, a number of research and innovation studies/ projects have been proposed including diverse recommendations for the travel, tourism, and entertainment sector to recover from the impacts of the Covid 19 pandemic. Some proposed areas of innovation interventions include: the use of digitalization tools to foster proenvironmental behaviour; community attitudes toward tourism; understanding need and behaviour of tourists; developing a responsible Mauritian tourism; training needs analysis; skills gap identification; labour turnover in the tourism industry; digital mapping of tourist attraction sites (natural heritage sites and cultural sites); interpretive signage; use of big data including forward looking data and real-time data; guest acceptance of service robots; and evaluating the impediments in current regulatory framework for innovation. The above areas are highly relevant in the current context and a prioritization of the research and innovation projects is deemed necessary to canalize funds to the most pressing issues which would necessitate immediate actions.



HEALTH AND WELLNESS INNOVATION

As you start to walk on the way, the way appears.

- Rumi

8.0 Health and Wellness Innovation

8.1 Introduction

8.1.1 Scope

Health is defined as the overall mental and physical state of a person; the absence of disease, while wellness refers to the state of being in optimal mental, physical and emotional health. It is about living a life full of personal responsibility and therefore taking proactive steps for one's entire well-being. This means that a person living life very well controls risk factors that can harm them. Risk factors are different types of actions or conditions that increase a person's chances for illness or injury. As health and wellness are two aspects that go hand-in-hand, this report converges these two major aspects to identify opportunities for innovation in these sectors.

The scope of the 'Health and Wellness Innovation' is to identify the research and innovation strategies in the multi-sectoral platform including medical, life sciences/ pharmaceutical, healthy lifestyle, sports, nutrition and health care, in view to developing high-value activities, such as hi-tech medicine, medical tourism, medical education and wellness. The long-term vision is a competitive, efficient and inclusive health and wellness innovation ecosystem that provides an enabling environment that can nurture and stimulate creativity for a healthier and wealthier Mauritius.

8.1.2 Aim and Objectives

Aim: To strengthen capacity for sustained, integrated, coordinated and collaborative research, innovation and translation for health and wellness.

Objectives:

- To identify broad strategic research and innovation directions in health and wellness for the country
- To develop and implement sustainable research and innovation initiatives in the health and wellness sector
- To generate new knowledge relevant to health and wellness and promote its translation into products, services, policies, and practices to improve health
- To promote data-sharing platforms and systems to facilitate health and wellness innovations
- To facilitate the adoption of emerging technologies to improve health and wellness

8.1.3 Guiding Principles

Leadership for innovation

Leadership for innovation includes proactive leadership in defining priority innovations informed by local needs.



Access to health care

Access to health care involves supporting the scale-up of innovations that improve global access to quality health care

Collaboration and partnership

The goal is to foster the spirit of collaboration among key stakeholders, including civil society, the private sector, and other actors, to work together to design improvements in service delivery, products and policies.

Inclusive innovation for all

Inclusive innovation for all involves mainstream community engagement, including people with disabilities and special groups, in the design and adoption of innovative solutions, by supporting them with tools and resources as innovators.

Gender mainstreaming and equity

Gender mainstreaming and equity entails mainstream participation of women in innovation development, including by making available tailored funding to encourage women's participation in the health innovation space.

8.1.4 National Target Sector

The Government Programme 2020-2024 is focused at achieving an inclusive, high income and green Mauritius. The Government aims at introducing measures to improve the health care sector. The budget speeches 2020-2021 and 2021-2022 were aimed at the transformation of the population's behavioral and nutritional habits towards improving lifestyle, by laying emphasis towards better nutrition and lowering cigarette consumption, increasing physical. Further, the use of traditional medicine was emphasized with the inclusion of a teaching hospital. Moreover, the Government is aiming at developing the biotechnology and pharmaceutical industry as well as the silver economy in Mauritius.

The Committee took stock of the National Vision of the Government in this sector as well as national policies. The following major national documents were consulted in the process:

- I. National Sport and Physical Activity Policy (2018-2028), Ministry of Youth Empowerment, Sports and Recreation
- 2. Health Sector Strategic Plan, 2020-2024, Ministry of Health and Wellness
- 3. Development of a nutraceutical framework and industry in Mauritius
- 4. Industrial Policy and Strategic Plan of Ministry of Industry (2020-2025).
- 5. Government Programme 2020-2024
- 6. Budget speeches 2020-2021 and 2021-2022
- 7. Emerging sectors for investment (EDB Website)

In view of the above, the national vision of health and wellness innovation is a competitive, efficient and inclusive health and wellness innovation ecosystem that provides an enabling environment that can nurture and stimulate creativity for a healthier and wealthier Mauritius.



8.1.5 International Innovation trends

An analysis of current international trends in health and wellness was conducted to identify new technologies, innovative strategies, best practices and potential new markets that the country could possibly consider.

Current Research Trends

The GII 2021 shows that investment in innovation has been resilient during the COVID-19 crisis and even reached new peaks in some sectors and regions. Before the pandemic, innovation investments were at an all-time high with R&D expenditure growing by 8.5% in 2019. When the pandemic hit, it was unclear what its impact would be on innovation. History suggested that innovation investments would be hard hit. However, throughout 2020, key indicators of innovation investment, namely scientific output, R&D expenditure, IP filings and venture capital deals continued to increase. These data point to a growing acknowledgement among governments and enterprises that new ideas, products and services are crucial for post-pandemic recovery and growth. As per the report, firms whose innovation was at the heart of measures to contain the pandemic and its fallout – notably (i) software and information and communication technology (ICT) services, (ii) ICT hardware and electrical equipment and (iii) pharmaceuticals and biotechnology – amplified their investments in innovation. In the pharmaceuticals and biotechnology industry, around 62% of companies reported an increase in R&D spending. There is a clear tendency that R&D expenditure in healthcare has increased.

The World Health Organisation has defined as a priority to harness the power of science, research innovation, data and digital technologies as critical enablers of the other priorities – for health promotion and disease prevention, for early diagnosis and case management, and for the prevention, early detection, and rapid response to epidemics and pandemics. The United Nations has also released a Research Roadmap for the COVID-19 recovery, encouraging targeted research for data-driven responses that focus particularly on the needs of people being left behind. The framework provides a strategy and blueprint for a robust socio-economic recovery from the pandemic, focusing on key actions across five pillars: 1. Health systems and services; 2. Social protection and basic services; 3. Economic response and recovery programs; 4. Macroeconomic policies and multilateral collaboration; and 5. Social cohesion and community resilience.

Besides the increasing research in the healthcare sector, increasing R&D expenditure was also noted in the ICT sector in the GII report 2021. Hence the application of digital and emerging technologies in the wellness industry was further explored.

Initiatives undertaken by selected countries to develop their Health and Wellness Sector

The working group identified healthcare tourism as a potential game changer which could rank as the second economic pillar of Mauritius after the Blue Economy on the long-term. In this context, two case studies were made to study best practices of Thailand and India which are top wellness destinations for tourists.



Thailand – A multi-billion industry around its blue ocean and medical tourism

Thailand relies on its own heritage when it comes to wellness tourism. Traditional Thai medicine which includes spiritual healing, traditional body practices and herbal medicines give a soothing effect to the mind and body. Medical and Wellness tourism are booming in Thailand, catering their services to different demands by tourists. Medical tourism, a combination of tourism and medical treatment, has become its own industry and has grown rapidly thanks to the blue ocean approach taken by a couple of healthcare players and savvy governments. As a result, Thailand has succeeded in positioning itself as a top destination for medical tourism. It became the number one medical tourism destination by volume of care in 2014 and attracted over 2.4 million foreign patients in 2017, while Thailand hospitals have emerged as industry leaders with impressive growth and profits.

To be recognized as a high-quality medical institution to attract foreign patients, Bumrungrad hospital focused its resources on getting internationally recognized accreditation which was successfully obtained in 2002 from the US-based Joint Commission International. To further mitigate perceived risks associated with foreign hospitals, Bumrungrad hospital brought in Thai nationals who had studied and practiced medicine in the US. Waiting times are kept to a minimum and results of tests are obtained quickly.

Diagnoses and treatment procedures are therefore determined quickly and the patients are spared long periods of waiting for results. Thailand made a blue ocean shift in the medical tourism industry to its great benefit; hence it can be a good case study for Mauritius which is also trying to combine its blue economy with healthcare tourism. A closely-related sector to the healthcare tourism is the international retirement industry (silver economy) and Thailand is already preparing for that opportunity and the potential set up of a 'medical city'.

The factors having contributed to the success of Thailand are:

- Use of cutting-edge technology for procedures and surgeries which result in shorter hospitalization time, less scaring, less muscle and tissue damage
- State-of-the-art laboratory and pathology facilities which result in quick lab tests and shorter waiting times between appointments and treatment
- The hospital has an established Interpreter Department to provide translation services to international patients
- GHA accredited – Ist hospital outside the USA to be accredited by the Global Healthcare Accreditation Program
- Joint Commission International Accreditation which improves patient safety and quality of health care

India

The Indian wellness industry is gaining momentum in India and is known as the Land of Ayurveda.

The Government of India has set up the Ministry of AYUSH (Ayurveda, Yoga, Unani, Siddha and Homoeopathy) in November 2014 to promote the country's indigenous alternative medicines including education and research. A traditional medicine centre to strengthen research, training and awareness of Ayurveda was set up by the World Health Organisation



in India in November 2020. Furthermore, in January 2020, IIT Delhi and the All India Institute of Ayurveda signed an MoU to study the therapeutic benefits of herbal formulations and wellness. Seven collaborations focusing on various ayurvedic formulations and practices have been planned for the next two years. Some of the research work will be to gauge if ayurvedic drugs help in early detection of cancer and assess response to these drugs in treating breast cancer.

It is noted that an academic chair for Ayurveda has been set up at the University of Mauritius to help promote this science in Mauritius. It is also noted that there is already a Ayurvedic and other traditional Medicines Act (1989) in terms of legal framework in that sector.

8.2 Sectoral Working Group

8.2.1 Overview

The recent pandemic situation has not spared the Republic of Mauritius facing a slow economic growth as faced by many other countries globally. This uneasy situation has proved the importance of having a full-fledged pharmaceutical sector. The Government of Mauritius highlighted the importance of innovation and emerging technologies for an economic recovery together with sustaining a healthy population.

In line to the development of a national roadmap for technology, research and innovation for the health and wellness sector, a working group with expert stakeholders was set up.

8.2.2 Meetings

The members of the working group met on five occasions:

- Ist Technical Committee 15 February 2022
- 2nd Technical Committee 22 February 2022
- 3rd Technical Committee 10 March 2022
- 4th Technical Committee 29 March 2022
- 5th Technical Committee 11 April 2022

The tasks undertaken by the working group were as follows:

- TASK I Review Scope, Guiding Principles, Aim & Objectives
- TASK 2 Situational Analysis
- 2.1 National Vision
- 2.2 Opportunities
- 2.3 Gaps/Challenges
- TASK 3 Discussion on the International trends
- 3.1 Research
- 3.2 Innovation in Health Care
- TASK 4 Broad Strategic Directions



8.3 Situational analysis

The working group identified priority fields requiring research and innovation efforts for a healthier and wealthier Mauritius

- I. Clinical research
- 2. Manufacture of medical devices
- 3. Nutraceutical industry
- 4. High value activities including hi medicine and telemedicine
- 5. Wellness tourism/ silver economy
- 6. Medical education
- 7. Developing a sports innovation ecosystem
- 8. Ayurvedic and other traditional medicines
- 9. Addressing NCDs and infectious diseases
- 10. Life science including pharmaceuticals and vaccine development

The existing framework particular challenges and other relevant issues related to the above 10 fields are tabulated in table 1.

Fields	Existing Framework	Particular Challenges	Comments
Clinical Research	 Clinical Trial Act 2011 in place Ethics Committee, Clinical Research Regulatory Council, Pharmacovigilance Committee already set up Five Contract Research Organisations operational Multi-ethnic population High rate of diabetes, Cardiovascular diseases, cancer, hypertension 	 Regulatory Framework for Pre-Clinical Trials to be established Ethics Committee and Clinical Research Regulatory Council need to be empowered with more resources 	
Manufactu re of Medical Devices	 Preferential market access (COMESA, SADC, IOC, EPA, AGOA, AfCFTA, CECPA, FTA) to Europe/USA/Africa The Comprehensive Economic Partnership Agreement with India (CECPA) and Mauritius- 	 Mauritius importing US\$30M worth of medical equipment 	Healthcare industry in Africa is expected to boom with more than US\$25bn medical devices required in 2020 In 2021, export of medical devices stood at Rs 1.6 bn. As at now,

FIGURE 69 - FIELDS IDENTIFIED FOR HEALTH AND WELLNESS INNOVATION SECTOR



	China Free Trade	the sector has a
	Agreement (FTA).	combined workforce of
•	Apart from Africa, China	1,026 persons.
	and India offer wide scope	
	for export of medical	
	devices by capitalizing on	
	preferential market	
	access.	
•	Rebate on air freight for	
	companies exporting	
	medical devices under the	
	Trade Promotion and	
	Marketing Scheme	
	(TPMS) is available for	
	export to Africa	
	(including Madagascar),	
	Australia, Canada,	
	Europe, Japan, Middle East	
	Countries, USA and	
	Vietnam.	
•	At the Ministry's level, a	
	dedicated Action Plan for	
	development of the	
	sector has been outlined	
	in the Industrial Policy and	
	Strategic Plan (2020-	
	2025) launched in	
	December 2020. The Plan	
	contains a set of 58	
	recommendations around	
	5 strategic thrusts, one of	
	which is:	
•	Developing appropriate	
	skills and competencies	
	and fostering research	
	and innovation.	
•	Presence of five medical	
	device manufacturers,	
	one manufacturer	
	engaged in production of	
	pharmaceutical products	
	and one manufacturer	
	engaged in aromatherapy	
	products	



	•	 1500 product lines exported to over 100 countries Legal Framework, Clinical Trial Act 2011 amended to allow testing of medical devices 8-year tax holiday and rebate on air freight for companies exporting medical devices to Europe 		
Nutraceut ical Industry	•	Existing national framework for setting up Nutraceutical industry in Mauritius	Legal and regulatory framework to be developed	
High Value Activities including High Medical Education and Telemedic ine	•	Sector of investment with high potential as per EDB's website Good internet connection on the island	Regulatory framework for telemedicine in public sector still to be developed?	Distance diagnosis tools, sensor kits and cloud-based software solutions likely to be in great demand
Wellness Tourism and Silver Economy	•	Sector of investment with high potential as per EDB's website Mauritius already faring well as a tourist destination	 Further treatments are needed e.g., Precision medicine, Genomic Medicine Super specialists are required Local specialists should be provided with: Enhanced capacity building High salary Possibilities to collaborate with diaspora Other requirements: Good telemedicine facilities to follow up with overseas patients Referral officers in other countries 	Potential to attract Tourists for both wellness and the blue ocean



		Framework needed for public		
		hospitals to offer such services		
Medical Education	 The Mauritius Institute of Health (MIH) is a parastatal body which caters for the training needs of health professionals. The MIH has set up a Virtual Health 	Setting up of teaching hospital requires a revamping of existing organigrams in place for public hospitals to integrate Academics Sound governance/institutional needs to be set up	1. 2.	Formulation of Postgraduate courses such as Family doctor Continuous professional development for
	 Library to encourage and support continuous medical education. Presence of a medical school in Mauritius 		3.	General practitioners To develop a strategy to attract medical student to
	 Higher education Act (2017) favours internationalisation of education Teaching hospital in Flacq 		4.	study in Mauritius Develop a seamless system with focus on research and publication of research work
	as announced in budget speech 2020-2021 could attract medical students to Mauritius		5.	Training of existing staff and recruitment of new skilled personnel
			6.	Existing medical practitioners must be empowered and given training from Super Specialists abroad
			7.	Set up the appropriate regulatory framework
			8.	University of Mauritius is collaborating with the Ministry of Health and Wellness and University of Geneva to set up a medical school to improve the health care system of Mauritius, to allow



			Mauritian authorities to have more control on the quality of medical training of health care manpower. The School of Medicine will be responsive to local needs as well as regional needs (humanitarian aspect) and will attract international students through the quality of its teaching
Developin g a Sports Innovation Ecosystem	 Already in the vision of the National Sport and Physical activity policy (2018-2028) Cote d'Or National Sport Complex - a State of the Art fully integrated Sports Complex 	 Lack of physical exercise by youngsters The culture and mindset to practice sports "as a play" does not exist Sport Innovation Center in National Sport and Physical Activity Policy still need to be implemented Lack of awareness in nutrition by Mauritian National Sport and Physical activity policy mentions a Mauritian sport innovation centre, a multi-sectoral and multi-institutional approach required for set up Lack of human resources at Cote d'Or Sports Complex Lack of physical exercise by youngsters The culture and mindset to practise 	 Collaboration with Sport Innovation Center to develop an informed nutrition plan for athletes "Possibilities of developing a high performance kitchen" - to teach athletes proper way of eating Formulate a roadmap to make Mauritius an "Active Sport Island" as per the National Sport and Physical Activity Policy – 2018 -2028 Exercise prescription/ referral to fight



		sports "as a play" does not exist	non- communicable diseases 5. App to promote access to sports facilities 6. Fitness and wellness app with alarm 7. Potential for sport tourism to emerge as another investment sector
Ayurvedic and Other Traditiona I Medicines	Existing ayurvedic and traditional medicine Act 1989 Academic chair in Ayurvedic Medicine at UoM MoU between Government of Mauritius and Government of India to promote Ayurvedic Medicine	Research on Traditional Medicine scarcely documented	Potential for linking ocean to traditional medicine Can be linked to wellness tourism
Addressin g NCDs, Infectious Diseases, HIV and AIDS	Regulatory and Legal Framework I. Ongoing preparation of 2 food bills - Food Bill and Food Standards Bill 2. Already have a legal framework to regularise level of pesticides - Pesticides Act 2018. However, existing laws should be enforced. Awareness Campaigns of Ministry of Health	 Lack of nutrition knowledge - poor dietary practices Lack of resources to conduct the research on nutrition Obesity is a key that leads to diabetes and hypertension - no action plan to manage obesity in Mauritius No observatory to monitor claims made on different food products on health There is no health research agenda 	PotentialfornutritionstudiesI.TodevelopahealthyMauritianplateaccessibletodifferentincome groups2.ToallowconsumertoobtainnutritionalInformation at aglanceglance-ResponsibleConsumerCommunicationandAdvertisingcampaignonHealth ClaimsInformationInformation



	3.	To ensure a
		safe and quality
		nutrition for
		the Mauritian
		population
	4.	Setting up of a
		platform/
		database to
		track
		nutritional
		information for
		the Mauritian
		population
	5.	Production of a
		booklet/
		brochure to
		create
		awareness on
		nutrition
	Educati	on and Awareness
	١.	To provide
		consumers with
		the skills and
		knowledge to
		consume safe
		and healthy
		food - Inclusion
		of Nutrition
		and food quality
		in Primary
		School
		Curriculum of
		study
	2.	Teachers need
		to have a
		minimum
		knowledge in
		nutrition -
		should be
		included as a
		criterion when
		recruiting
		teachers
	3.	Food rating e.g.
		how much of
		carbohydrates



			or fats or sodium per gram - if laws can rate Mauritian food, this could lead to certain awareness - these laws can counter setbacks from industry Use of Digital Technologies I. Personalised
			nutrition app 2. Plant-based protein app 3. Healthy nutrition beverage app Exercise prescription/
Life Sciences including Pharmace utical and Vaccine Developm ent	New measure in budget speech 2020-21 for Mauritius Institute of Biotechnology for manufacture of vaccines and other pharmaceutical products Potential market in Africa 8-year income tax holiday for companies operating in pharmaceutical sector	Lack of skills for manufacture of pharmaceuticals Limited market Roadmap to implement the MIB still needs to be developed	referral to fight NCDs I. Potential of diaspora to provide skills should be tapped into 2. In view of forthcoming Mauritius Institute of Biotechnology, private, public and academic networks should be established 3. The required skills to operate the Mauritius Institute of Biotechnology



	should	be
	forecasted	

FIGURE 70 - HEALTH AND WELLNESS INNOVATION BROAD FINDINGS

Broad findings:

- 1. Digital technologies in the Health and Wellness sector provides an opportunity for start-ups to be set up around these fields while providing both the required services and generate jobs and revenue for the country
- 2. Many of the identified fields rely on proper policy making using sound and reliable information. Hence, data collection to develop sound and evidence-based policies is a cross-cutting recommendation
- Innovation lies in the overlapping of multiple disciplines and in collaborative efforts between different sectors including health professionals, academics and IT experts. Public/ private partnerships and inter-institutional/ inter-ministerial partnerships would be a key strategic action relevant to all fields.
- 4. Science communication and data sharing are key for the development of the health sector

8.4 Gaps and Challenges

The working group took note of the main health challenges facing the Mauritian population as well as the gaps and difficulties in implementing research and innovation initiatives in the present context.

8.4.1 Health Challenges in Mauritius

I. Non-communicable diseases (NCD) are the leading cause of premature mortality and disability in Mauritius. In 2016, the country lost 413,536 disability-adjusted life years (DALY), of which 340,551 (82%) were from NCD; 43,977 (11%) from communicable, maternal, perinatal and nutritional conditions; and 29,008 (7%) from intentional and unintentional injuries. Malignant neoplasms, diabetes mellitus, mental and substance use disorders, cardiovascular diseases and respiratory diseases accounted for 70.7% of NCD-related DALY loss in 2016. The Committee also agreed that obesity is an important underlying causal factor for the NCDs and should be properly addressed. Prevalence of obesity in the Mauritius adult population is 11.1% for men and 25.8% for women (MOHQL, 2015). According to the World Health Organization (WHO), majority of NCDs emanate from four specific behaviours (harmful use of alcohol, tobacco use, physical inactivity, and unhealthy diet) that lead to four key metabolic/physiological changes (raised cholesterol, raised blood pressure, overweight/obesity and raised blood glucose). In Mauritius, total pure alcohol consumption per person aged 15 years and older was 3.6 in 2016. Age-standardized prevalence of current tobacco smoking among persons aged 15 years and older in


2015 was 21.2%. The age-standardized mean population salt intake among Mauritians aged 18 years and older was 14 g per day in 2010; which was almost three times the WHO recommended daily salt intake of 5 g per person. In 2016, 29.8% of adults aged 18 years and above were insufficiently physically active. Modification of those behavioural risk factors requires a strong multi-sectoral action under leadership of the health sector.

Despite all preventive measures being implemented in the country, there are still new HIV infections across all ages. Adolescents and young adults are particularly vulnerable to HIV. Adoption of safe behavior through behavioral change is a challenge.

- 2. In the past two years, the country has witnessed various challenges with the COVID-19 pandemic. These include the procurement of medical supplies, medical equipment and drugs in a period when the international market and international travel were disrupted. This represents opportunities for the country to strengthen its health innovation ecosystem in the light of evolving scientific data and of the evolution of the COVID-19 pandemic. Notwithstanding the gains achieved to control communicable diseases, the country is not spared from the resurgence of infectious and emerging diseases.
- 3. Lack of exercise and physical activity is a critical issue, with only 23% of the Mauritian adult population meeting the World Health Organization (WHO) recommendations of 150 weekly minutes of physical activity and there is a clear disparity in sport participation in relation to gender, age, socio-economic status and disability. Physical activity is not recognised as a national priority with comparatively low levels of physical education in school and no common and clearly defined goal to unite and galvanize our sport and physical activity stakeholders.
- 4. Lack of awareness on healthy eating habits and availability and costs of 'healthy' food is a major issue.

8.4.2 Obstacles/ Weaknesses to Research and Innovation

- I. Lack of funding, resources, specialised skills (e.g., super specialists in medical sector) to conduct research and innovation
- 2. Institutional stumble blocks, e.g., unattractive salary scale for super specialists, communication gaps between public sector, private sector and academia, slow administrative procedures.
 - I. Need for strengthening of legal and regulatory framework in certain areas
 - 2. Lack of collaboration/coordination between institutions (data sharing; joint research)



8.5 Opportunities

8.5.1 Innovation in the Wellness Industry

The global wellness industry, including spiritual self-care, has grown to \$4 trillion (Global Wellness Institute, 2020). The wellness market has expanded by 6.4% since 2017 from \$3.7 trillion to a value of \$4.2 trillion. This growth has been twice as fast as the growth of the global economy.

Wellness is a holistic approach to the wellbeing of an individual mentally, physically and spiritually. People are prone to be unfavourably affected by lifestyle factors than the average global health diseases. Wellness tourism deals with health, wellbeing, leisure, happiness and quality of life.

The global wellness economy was valued at \$4.9 trillion in 2019 and then fell to \$4.4 trillion in 2020, due to the widespread impacts of the COVID-19 pandemic.

The global wellness trends as per the Global Wellness Summit report are as follows:

- Personal Care & Beauty (\$955 billion)
- Healthy Eating, Nutrition, & Weight Loss (\$946 billion)
- Physical Activity (\$738 billion)
- Wellness Tourism (\$436 billion)
- Traditional & Complementary Medicine (\$413 billion)
- Public Health, Prevention & Personalized Medicine (\$375 billion)
- Wellness Real Estate (\$275 billion)
- Mental Wellness (\$131 billion)
- Spas (\$68 billion)
- Workplace Wellness (\$49 billion)
- Thermal/ Mineral Springs (\$39 billion)

8.5.2 Research, Technology and Innovation behind the Wellness Industry (Global Wellness Summit Report, 2020)

Technology and innovation play an important role in the wellness sector. A few examples of how technology is used are as follows.

I. Sleep Market (\$432 million)

 Smartwatches (for quality sleep), SMART Mattress, Nap Pods, Sleep Robots, Time Shifter to help travellers eliminate jet lags, Research on Circadian Medicine to repair or supercharge our cell clocks.

2. Aging (Silver Economy)

 Products adapted to aging include cosmetics, sleek designs of diaper for incontinence, telemedicine for online community, reality games for cognitive functions, time diagnostic kits for easy health monitoring/robotic assistants

3. Mental Health

- Chatbots, Apps and digital support groups/robots
- Mental Health Apps
- Behavioural health software market



- Virtual therapy apps
- Mental Wellness wearables (headsets/bracelets) in early stages of clinical trials
- Mindful/Meditation Apps
- **4. Energy Medicine** (Traditional Healing such as Ayurveda, Chinese Medicine/Shamanic Healing; flow on energy points)
 - Biophotonetics: light technologies to transform human health
 - Pulse electromagnetic field therapy
 - Optogenetics

8.5.3 Health Care Wearables and AI

Advances in sensors and AI are helping millions detect and manage chronic health conditions and avoid serious illness using devices small enough to be worn on a wrist or penny-sized patch. Deloitte Global predicts that 320 million consumer health and wellness wearable devices will be shipped worldwide in 2022; by 2024, that figure will likely reach nearly 440 million units as new offerings hit the market and more health care providers become comfortable using them.

These numbers include both smartwatches, which are marketed to and purchased by consumers, and medical-grade wearables, typically called "smart patches," which are often prescribed by health care professionals but are increasingly available off the shelf.

The pandemic has only accelerated this health-minded trend: More than 10% of U.S. consumers who own smartwatches are now using them to detect COVID-19 symptoms. In fact, 15% of U.S. consumers who own a smartwatch purchased it after the onset of COVID-19 (Deloitte, 2021).

There are limits to what current smartwatch sensor technology can do without attaching to -or getting under -a person's skin. This is where smart patches come in. Typically designed for a single indication, such as diabetes management, patient monitoring, or drug delivery, smart patches are generally small and unobtrusive, affixing directly to a person's skin. They often employ a broader range of technologies than smartwatches do. For example, smart patches that measure heart rate variability often use electrocardiogram technology that tracks the heart's electrical activity directly and more accurately than smartwatches can.

Digital technologies, Robotics, and Artificial Intelligence are increasingly being used in the wellness industry to provide services in the easiest and most efficient way. 3D Printing of specific medications is also a new area that is increasingly being used.

8.6 Strategic Orientations

The Working Group derived four main research and innovation strategic orientations based on the local situational analysis and international trends.

Strategic Orientation 1: Promoting Innovative Technology/ Practices Expected Outcomes:

Implementation and expansion of digital health technologies



- Adoption of other innovative technologies and practices to support the health and wellness sector
- Cost saving on electricity/ petrol bill of Ministry of Health and Wellness
- Improved delivery of services in public hospital
- Better provision of care, research, support including preventive measures for NCDs
- Promotion of multi-disciplinary conversation between hospitals/ specialties
- Promoting intersectional approach between major national hospitals/ private clinics and medical NGOs

FIGURE 71 - HEALTH AND WELLNESS STRATEGIC ORIENTATION 1: PROMOTING INNOVATIVE TECHNOLOGY/PRACTICES

<u>Thematic I</u>

Green Energy for health sector

<u>Thematic 2</u>

Telehealth/ MobiHealth

• Call Centre for Online Consultation

Thematic 3

E-Health

• National Database for NCDs

<u>Thematic 4</u>

Innovative medical approaches/ services

- Complex care plan for patients
- Allied health services with the patient at the centre effective communication channels among doctors/specialists to coordinate treatment of patient.
- Communication between medical and paramedical experts treating the patient
- E-Medical data file
- Legal and technology trends are making medical services to patients more accessible to medical care in a variety of areas. This will help decrease errors and increase quality of medical health care services.

<u>Thematic 5</u>

Use of digital technology in Health and Wellness

- App to promote access to sports facilities;
- Personalised nutrition app;
- Fitness and wellness app with alarm;
- Plant-based protein app; and
- Healthy nutrition beverage app.
- App for calculation of calories in Mauritian Diet



Strategic Orientation 2: Harnessing the Potential Contribution of New Fields of Health and Wellness to Economic Growth

Expected Outcomes:

- Implementation of research and innovation to promote new fields, such as traditional/ ayurvedic medicine, sports economy, silver economy, healthcare tourism, medical education
- Direct and indirect income from foreign student's fees, hostel, parents' visits
- Hotel occupancy rate during down seasons can go up
- Mauritius to improve working relations with various African states through various scholarship to deserving African candidates – build a bridge for improved knowledge transfer and FDI
- Air travel associated income
- Mauritius can be the top wellness tourist destination against NCDs through Ayurveda preventive/ curative medicine
- Evidence-based Ayurveda against NCDs can be fine-tuned to Mauritian context and applied. Newer studies can be launched at the six Ayurveda clinic.
- Improved service delivery by the Ayurveda physicians and therapists



FIGURE 72 - HEALTH AND WELLNESS STRATEGIC ORIENTATION 2: HARNESSING THE POTENTIAL CONTRIBUTION OF NEW FIELDS OF HEALTH AND WELLNESS TO ECONOMIC GROWTH

<u>Thematic 1:</u> Higher Medical Education

• Medical education as a prerequisite for medical tourism

Thematic 2 Ayurvedic Medicine

- A pharmaceutical plant utilizing the herbs indigenous to Mauritius to cater for Ayurveda patients
- Inclusion of Ayurvedic diet and lifestyle at school level PHE curricula to offload the NCD burden in future generations, along with raised awareness drives for the masses towards salt and sugar consumption at household levels.
- Observation studies on specific illnesses/ diseases in different ayurveda clinics
- Design & delivery of postgraduate certificate in Panchakarma, with the CILL, UoM to train the Ayurveda physicians (from public and private sectors) to better serve the population through optimal utilization of manpower/ infrastructural resources to emerge as a global leader in wellness tourism

Thematic 3

Promotion of a Nutraceutical Industry

• Need of a local pharmacopeia for local plant resources

<u>Thematic 4</u>

Promoting a Sports and Wellness Industry in Mauritius

- Enhancing sports innovation ecosystem
- Need to focus on local strength and local hospitality
- Smoking cessation services

Thematic 5:

International Benchmarking

- Medical tourism and other processes
- Quality Systems to be integrated and financial incentives to encourage investment



<u>Thematic 6:</u>

Focus on Traditional Medicine

- Strengthen Mauritian traditional medicine
- National laboratory to be set up for testing for safety and efficacy of traditional medicines, including nutraceutical and ayurvedic in the context of clinical trials
- Conservation of endemic flora and fauna

Strategic Orientation 3: Innovating for a Healthier Population

Expected Outcomes:

- Addressing communicable and non-communicable diseases
- Addressing mental health
- Ways and means to reduce substance abuse
- Decent living environment and aging with dignity and respect
- Participative incentive of patients in their treatment
- Health literacy
- Proper adherence to treatment
- Impeding/ delayed chronic complications
- Increased conversation between actors in formulating individualized treatment plan
 - o Enhanced health outcomes of the senior citizens
 - o Better management of seniors' (geriatric) issues
 - o Impacting the diet behaviour of youth app by using the athlete as a role model

FIGURE 73 - HEALTH AND WELLNESS STRATEGIC ORIENTATION 3: INNOVATING FOR A HEALTHIER POPULATION

<u>Thematic I</u>

Improved diets for different strata of population (e.g., athletes, students, public)

- Mobile apps
- Sensitization campaign
- Innovative Performance Nutrition in sports Athlete as a role model

Thematic 2

Sensitization campaigns on healthy diets and lifestyle

• Promote an ecosystem conducive to healthy food - Nutritional studies



Thematic 3

Legislative framework for nutritional labelling

<u>Thematic 4</u>

Improving the lifestyle/health status of the elderly

• Prototype of residential home for the elderly

Thematic 5

Addressing Non-Alcoholic Fat Liver Disease (NAFLD)/ Non-Alcoholic Steato Hepatitis (NASH)

Thematic 6

Addressing NCDs and infectious diseases

- Research on obesity
- Effect of climate change on human health

Strategic Orientation 4: Innovative Governance Mechanism to Improve Delivery of Institutions

Expected Outcomes:

- Institutional framework for teaching hospital
- Integration of public hospitals into health care tourism
- The postgraduate training of doctors needs an appropriate clinical and regulatory framework
- Better and professional environment for clinical trials, putting Mauritius at level field with international standards. This will enable recognition by leading worldwide pharmas and biotechs
- Move from research to commercialisation, and generate revenues from more than 20 years of accumulated research data and knowledge on endemic medicinal plants
- Attract overseas investors such as food, pharmaceutical and cosmetic companies, who are constantly looking for novel and unique bio-active ingredients to develop blockbuster health products including fortified and functional food products
- Bring new opportunities for small planters, farmers, and owners of sugar cane fields for cultivation of endemic medicinal plants at large scale
- Unlock the potential of the local biodiversity and position the country on the international biotech scene, with the competitive edge of having unique genetic resources that exist nowhere else on the planet
- Penetrate the fast-growing global nutraceutical market that has grown from a value of USD 140 Billion in 2010 to USD 382 Billion in 2020 and expected to reach USD 486 Billion by 2025



FIGURE 74 - HEALTH AND WELLNESS STRATEGIC ORIENTATION 4: INNOVATIVE GOVERNANCE MECHANISM TO IMPROVE DELIVERY OF INSTITUTIONS

<u>Thematic I</u>

Improving on existing framework to promote innovation in health-related institutions

- Implementation of clinical and regulatory framework for teaching hospital in Mauritius
- Regulatory framework required to share medical records with patients electronically, free of charge
- Revamping of the Pharmacy Act

<u>Thematic 2</u>

Upgrading of the ecosystem for clinical research including training and awareness

Thematic 3

Facilitating commercialization of research

• Developing framework for implementation of the Nagoya Protocol

<u>Thematic 4</u>

Exercise prescription/ referral to fight non-communicable diseases

Thematic 5:

Set up a mechanism to facilitate data sharing between institutions



8.7 Short Term Actions

Action Plan 1: Promoting Innovative Technology/ Practices

Implementation/ Collaboration agency(ies):

- Ministry of Health and Wellness
- Private clinics
- Ministry of Youth Empowerment, Sports and Recreation
- Mauritius Multisport Infrastructure Ltd
- University of Mauritius
- Central Information Systems Division (CISD)

Enabling factors

- Funding
- Private-public-academia collaborations
- Good internet nationwide penetration
- Smartphone
- Participative stakeholders and regular reviewing conference

Implementation strategy/ plan

- Feasibility studies
- Sensitization and awareness campaigns
- Surveys

Indicative activities

- Development of mobile apps to promote and facilitate access to personalized nutrition, to provide healthy choices in terms of plant-based proteins, healthy nutrition beverage, calories calculation of Mauritian diet
- Development of mobile apps to promote access to sports facilities, personalized fitness and wellness schedules with alarm
- Development of the TeleHealth/ MobiHealth platform for online consultation
- Storing and updating of all NCDs registers in a national database
- Conceptualization of allied health services with patient at the centre by establishing effective communication channels among doctors and specialists to coordinate treatment of patients
- Adoption of E-medical data file for patients

Hurdles

- Lack of collaboration with respective agencies
- Time taken to complete tasks within given time span



- Need aggressive marketing
- Purposed trained medical staff

Potential risks and Mitigation Measures

- Reluctance of the public to adopt the new sports and healthy diet culture
- Reluctance on the part of relevant authorities to adopt emerging technologies

Mitigation

Appropriate marketing tool and trained staff

Estimated Investment (Indicative Figures)

Rs 1.5 M

Action Plan 2: Harnessing the Potential Contribution of New Fields of Health and

Wellness to Economic Growth

Implementation/ Collaboration agency(ies):

- State Law Office
- Mauritius of Agro Industry and Food Security
- Business Mauritius
- Private sector
- Ministry of Health and Wellness
- University of Mauritius
- Ethics committee
- Clinical Research Regulatory Council (CRRC)
- Food and Agriculture Research and Extension Institute (FAREI)
- Mauritius Multisport Infrastructure Ltd

Enabling factors

- Consultations
- Focus group discussions
- Report writing
- Collaboration with local medical university



Implementation strategy/ plan

- Feasibility studies
- Surveys

Indicative activities

- Conceptualization plan for implementation of Ayurvedic medicine and traditional medicine
- Identification of Mauritian plants for Ayurvedic medicine
- Identification of plants to develop a Mauritian pharmacopeia for the nutraceuticals industry
- Upgrading the ecosystem for clinical research including training and awareness
- Design and delivery of certificate and postgraduate certificate in Panchakarma to train Ayurveda physicians and therapists (from public and private sectors) to better serve the population through optimal utilization of manpower/ infrastructural resources
- Promoting a wellness industry in Mauritius by training the local strength and local hospitality
- Initiating a sports innovation ecosystem

Hurdles

- Funding
- Partnership with authorities
- Resistance to change
- Concerns about clinical trials

Potential risks and Mitigation Measures

Acceptance by regulatory agencies in early involvement

Estimated Investment (Indicative Figures) Rs 2 M

Action Plan 3: Innovating for a Healthier Population

Implementation/ Collaboration agency(ies):

• Ministry of Health and Wellness



- Private clinics
- Ministry of Youth Empowerment, Sports and Recreation
- Mauritius Multisports Infrastructure Ltd (MMIL)
- University of Mauritius
- NGOs

Enabling factors

- Public-private-academia collaboration
- Collaboration from HPC Federation/coaches/athletes Sport Scientist Sport Nutritionist – Mauritius University
- Agreement from implementing agencies

Implementation strategy/ plan

- Testing on a pilot basis
- Demonstration experiments
- Case study/ surveys/ focus group discussion
- Feasibility study

Indicative activities

- Feasibility study for introducing Innovative Performance Nutrition for athletes
- Feasibility study for inclusion of exercise prescription to fight NCDs
- Sensitization campaigns for promoting healthy diets and lifestyle
- Increasing awareness and health literacy in the Mauritian public to address communicable and non-communicable diseases, mental health and to reduce substance abuse
- Introduction of the complex care plan

Hurdles

- Reluctance of the public to adopt the sports and healthy diet culture
- Lack of compliance from athletes who may not want to change their (bad) habits
- Resistance to implement complex care plan
- Non-agreement from MOHW



Potential risks and Mitigation Measures

- New habits take a while to have a real visible effect
- The nutrition plate that would be proposed will represent $\frac{1}{4}$ of the total calorie consumption for the day. We do not have any control on what is going to be taken for the other $\frac{3}{4}$
- Gastrointestinal issues and allergies to certain type of foods

Estimated Investment (Indicative Figures)

Rs 1.5 M

Action Plan 4: Innovative Governance Mechanism to Improve Delivery of

Institutions

Implementation/ Collaboration agency(ies):

- Ministry of Health and Wellness
- Private sectors
- Ministry of Agro Industry and Food Security
- Food and Agriculture Research and Extension Institute (FAREI)
- Ethics committee
- Pharmacovigilance committee
- University of Mauritius Faculty of Agriculture
- Ministry of Civil Service
- Medical Council of Mauritius

Enabling factors

- Funding to undertake research
- Public-private-academia collaboration
- Knowledge transfer/ sharing

Implementation strategy/ plan

- Discussion forums among the above stakeholders
- Focus group discussion
- Steering committee



Indicative activities

- Development of a clinical and regulatory framework for setting up of a teaching hospital in Mauritius
- Improving the regulatory framework required to share medical records with patients electronically, free of charge
- Revamping of the Pharmacy Act
- Study for the development of framework on Nagoya Protocol
- Research and identification of plants for cultivation of large scale
- Updating the legislative framework for nutritional labelling
- Upgrading the ecosystem for clinical research including training and awareness

Hurdles

- Funding
- Partnership with authorities

Potential risks and Mitigation Measures

• Loss of time and money if project is not implemented by relevant authorities

Mitigation measure: Partnership with relevant implementing agencies on specific objectives

• Change in government

Mitigation 2: Written agreements amongst stakeholders

Estimated Investment (Indicative Figures) Rs | M



8.8 Medium Term Actions

Action Plan 1: Promoting Innovative Technology/ Practices

Implementation/ Collaboration agency(ies):

- Ministry of Health and Wellness
- Private clinics
- Ministry of Youth Empowerment, Sports and Recreation
- Mauritius Multisports Infrastructure Ltd
- University of Mauritius

Enabling factors

- Funding
- Private-public-academia collaborations

Implementation strategy/plan

- Feasibility studies
- Sensitization and awareness campaigns
- Surveys
- Pilot/ case study

Indicative activities

- Adoption of innovative medical approaches and services
- Implementation of allied health services with patient at the centre by establishing effective communication channels among doctors and specialists to coordinate treatment of patients.
- Establishing communication channels between medical and paramedical experts treating the patient

Hurdles:

- Lack of funding
- Lack of collaboration with respective agencies
- Time taken to complete tasks within given time span

Potential risks and Mitigation Measures:

• Reluctance on the part of relevant authorities to adopt emerging technologies

Mitigation 1: need appropriate marketing Tool and trained staff

• Lack of compliance from specialists treating patient

Mitigation: Written agreements amongst stakeholders



Estimated Investment (Indicative Figures)

Rs 1.5 M

Action Plan 2: Harnessing the Potential Contribution of New Fields of Health and Wellness to Economic Growth

Implementation/ Collaboration agency(ies):

- State Law Office
- Mauritius of Agro Industry and Food Security
- Business Mauritius
- Private sector
- Ministry of Health and Wellness
- University of Mauritius
- Food and Agriculture Research and Extension Institute (FAREI)
- Mauritius Multisport Infrastructure Ltd

Enabling factors

- Consultations
- Focus group discussions
- Report writing

Implementation strategy/ plan

- Feasibility studies
- Surveys

Indicative activities

- Conceptualization on Wellness Industry, e.g., Smoking cessation services, strengthening the local strength and local hospitality
- Cultivation of endemic, traditional medicinal plants on a large scale by small planters, farmers and owners of sugar cane fields
- Unleash the commercial aspect of more than 20 years of accumulated research data and knowledge on endemic medicinal plant
- Higher medical education as a prerequisite for medical tourism
- Setting up of a center for sports innovation

Hurdles

- Funding
- Lack of know-how on cultivation
- Resistance of farmers to adopt new techniques



• Lack of Mauritian super specialists

Potential risks and Mitigation Measures

• Natural calamities affecting cultivation of endemic plants

Mitigation measure: Planting in phases, warehouse stocking, preservation techniques.

• Importing infectious diseases from other countries

Mitigation measure: Quarantine regulations should be enforced

Estimated Investment (Indicative Figures)

Rs 3 M

Action Plan 3: Innovating for a Healthier Population

Implementation/ Collaboration agency(ies):

- Ministry of Health and Wellness
- Private clinics
- Ministry of Youth Empowerment, Sports and Recreation
- Mauritius Multisports Infrastructure Ltd
- University of Mauritius
- NGOs
- Ministry of Gender Equality and Family Welfare
- Ministry of Social Security
- Ministry of Education and Human Resources

Enabling factors

- Public-private-academia collaboration
- National campaign
- Training of General Practitioners (GPs)

Implementation strategy/ plan

- Testing on a pilot basis
- Demonstration experiments
- Case study/ surveys/ focus group discussion
- Feasibility study

Indicative activities



- Inclusion of Ayurvedic diet and lifestyle at school level PHE curricula to offload the NCD burden in the future generations, along with raised awareness drives for the masses towards salt-sugar auditing at household levels
- Setting up a mechanism to facilitate data sharing between institutions
- Improving the lifestyle/ health status of the elderly by proposing prototype of residential home for the elderly
- Observation studies on specific illnesses/ diseases in different Ayurveda clinics
- Addressing NCDs and infectious diseases e.g., obesity, effect of climate change on human health, Non-Alcoholic Fat Liver Disease (NAFLD)/ Non-Alcoholic Steato Hepatitis (NASH)

Hurdles

- Resistance to new approaches
- Reluctance of the public to adopt the sports and healthy diet culture
- Lack of collaboration between different stakeholders
- Reluctance to adopt ayurvedic treatment by the public

Potential risks and Mitigation Measures

• Limited participation: involve GPs and specialists

Mitigation measure: Awareness programs, workshops, seminars

• Awareness campaigns to the population

Estimated Investment (Indicative Figures)

Rs 2 M

Action Plan 4: Innovative Governance Mechanism to Improve Delivery of Institutions

Implementation/ Collaboration agency(ies):

- Ministry of Health and Wellness
- Private sectors
- Ministry of Agro Industry and Food Security
- Food and Agriculture Research and Extension Institute (FAREI)
- Ethics committee
- Pharmacological committee
- University of Mauritius Faculty of Agriculture



Enabling factors

- Funding to undertake research
- Public-private-academia collaboration
- Knowledge transfer/ sharing

Implementation strategy/ plan

- Testing on a pilot basis
- Demonstration experiments
- Case study/ surveys/ focus group discussion

Indicative activities

- Developing a plan for the silver economy
- Attract overseas investors in the food, pharmaceutical and cosmetic sector
- Unleashing the potential of a nutraceutical industry in Mauritius
- Conceptualization of a Pharmaceutical Plant utilizing herbs innate to Mauritius to cater for Ayurveda patients and nutraceutical industry
- Conceptualization of a National Laboratory/ programme to be set up for testing for safety and efficacy of traditional medicines including nutraceuticals and ayurvedic in the context of clinical trials
- Conceptualization of the medical/ wellness sector with hospitals providing services of super specialists
- Implementation of international benchmarking in the medical tourism

Hurdles

- Time taken to complete projects within targeted deadlines
- Lack of collaboration between different stakeholders
- Lack of know-how

Potential risks and Mitigation Measures

• Lack of local expertise

Mitigation measure: Capacity building for experts

Estimated Investment (Indicative Figures)

Rs 5 M



8.9 Long Term Actions

Action Plan 1: Promoting Innovative Technology/ Practices

Implementation/ Collaboration agency(ies):

- Ministry of Health and Wellness
- Private clinics
- Ministry of Youth Empowerment, Sports and Recreation
- Mauritius Multisports Infrastructure Ltd
- University of Mauritius

Enabling factors

- Consultations
- Focus group discussions
- Report writing
- Included in budget speech 2021-2022

Implementation strategy/plan

• CEB green energy Program Funding for Government Institution

Indicative activities

• Adopting the Green (renewable) energy for cost saving on electricity/ petrol bill of Ministry of Health and Wellness

Hurdles

• Project is not in MOHW priority list

Potential risks and Mitigation Measures

• Low energy supply to essential services

Mitigation: Energy back-up for essential services

Estimated Investment (Indicative Figures)

Rs I M



Action Plan 2: Harnessing the Potential Contribution of New Fields of Health and Wellness to Economic Growth

Implementation/ Collaboration agency(ies):

- State Law Office
- Mauritius of Agro Industry and Food Security
- Business Mauritius
- Private sector
- Ministry of Health and Wellness
- University of Mauritius
- Ministry of Social Security
- Food and Agriculture Research and Extension Institute (FAREI)
- Mauritius Multisport Infrastructure Ltd

Enabling factors

- Consultations
- Focus group discussions
- Report writing
- Committed government caring for and respecting the elder
- Bruno Cheong Hospital and Poudre d'Or Hospital can be renovated and adapted for this purpose
- Insurance premium needs to be established for this purpose

Implementation strategy/ plan

- Consultations
- Focus group discussions
- Report writing
- Collaboration with local medical university
- Feasibility studies
- Surveys

Indicative activities

- Enhanced Residential care for the elderly
- Establishing a pharmaceutical plant utilizing herbs which are innate to Mauritius to cater for Ayurveda patients and nutraceutical industry
- Setting up of the National Laboratory/ programme for testing for safety and efficacy of traditional medicines, nutraceuticals and ayurvedic in the context of clinical trials
- Integrating sports incubators in sports innovation ecosytem



Hurdles

- Time taken to complete projects within targeted deadlines
- Lack of collaboration between different stakeholders
- Lack of know-how

Potential risks and Mitigation Measures

• Natural calamities affecting cultivation of endemic plants and processing of Ayurvedic medicine and nutraceuticals

Mitigation measure: Planting in phases, warehouse stocking, preservation techniques

• Importing infectious diseases from other countries

Mitigation measure: Quarantine regulations should be enforced

Estimated Investment (Indicative Figures)

Rs 3 M

Action Plan 3: Innovating for a Healthier Population

Implementation/ Collaboration agency(ies):

- Ministry of Health and Wellness
- Private clinics
- Ministry of Youth Empowerment, Sports and Recreation
- Mauritius Multisports Infrastructure Ltd
- University of Mauritius
- NGOs

Enabling factors

- Public-private-academia collaboration
- National campaign
- Training of General Practitioners (GPs)

Implementation strategy/ plan

- Testing on a pilot basis
- Demonstration experiments
- Case study/ surveys/ focus group discussion
- Feasibility study

Indicative activities

• Implementation on Wellness Industry



• Improving the lifestyle/ health status of the elderly by proposing prototype of residential home for the elderly

Hurdles

- Funding
- Lack of know-how
- Lack of Mauritian super specialists

Potential risks and Mitigation Measures

• Importing infectious diseases from other countries

Mitigation measure: Quarantine regulations should be enforced.

Estimated Investment (Indicative Figures)

Rs I M

Action Plan 4: Innovative Governance Mechanism to Improve Delivery of Institutions

Implementation/ Collaboration agency(ies):

- Ministry of Health and Wellness
- Private sectors
- Ministry of Agro Industry and Food Security
- Food and Agriculture Research and Extension Institute (FAREI)
- Ethics committee
- Pharmacological committee
- University of Mauritius Faculty of Agriculture

Enabling factors

- Funding to undertake research
- Public-private-academia collaboration
- Knowledge transfer/ sharing

Implementation strategy/ plan

- Testing on a pilot basis
- Demonstration experiments
- Case study/ surveys/ focus group discussion



Indicative activities

- Upgrading the regulatory and legislative frameworks to attract pharmaceutical companies from overseas
- Developing the silver economy
- Set up of pharmaceutical plant and commercialization of products
- Setting up and recruitment for National Laboratory/ programme
- Developing the medical/ wellness sector together with medical education

Potential risks and Mitigation Measures

• Lack of local expertise

Mitigation measure: Capacity building for experts

Estimated Investment (Indicative Figures)

Rs 3 M



Strategic Orientation 1: Prov Innovative Technology/Pra	Health and wellness to economic growth	Weile Strategic Orientation 3: Innovating for a healthier population	Strategic Or Governance delive
 Development of mobile apps to promote and facilitate access to personalized nutrition Develop mobile apps to promo access to sports facilities and personalized fitness Development of the TeleHealth/MobiHealth platfor online consultation Storing and updating of all NCC registers in a national database Conceptualize an allied health with patient at the centre Adoption of E-medical data file patients 	 Conceptualization of a plan for implementation of Ayurvedic Medicine and traditional medicine Identification of Mauritian plants for Ayurvedic Medicine Identification of plants to develop a Mauritian pharmacopeia for the Nutraceuticals industry Upgrading the ecosystem for clinical research including training and awareness Design & Delivery of certificate and postgraduation certificate in Panchakarma Promote a wellness industry by training the local strength and local hospitality 	 Feasibility study for introducing the Innovative Performance Nutrition for athletes Feasibility study for inclusion of Exercise prescription to fight NCDs Sensitization campaigns for promoting healthy diets and lifestyle Increase awareness and promote health literacy to address communicable and non- communicable diseases Introduction of the complex care plan 	 Develop a clinit for setting up o Improve the reg sharing of e-me Revamping of tl Study for the de Nagoya Protoco Research and io cultivation on I Updating the le nutritional labe Upgrading the e including trainit
 Adoption of innovative medical approaches and services Implementation of an allied he services with patient at the cert Establishing the communication channels between medical and paramedical experts 	 Conceptualisation on Wellness Industry, for e.g. Smoking cessation services Cultivation of endemic, traditional medicinal plants on a large scale by small planters Commercialise accumulated research data and knowledge on endemic medicinal plant. Higher medical education as a prerequisite for Medical tourism 	 Physical and Health Education (PHE) curriculato offload the NCD burden Raised awareness towards Salt-Sugar auditing Setting up a mechanism to facilitate data sharing between institutions Improve the elderly's lifestyle by proposing prototype of residential home for the latter Observation studies on specific illnesses/diseases in different ayurveda clinics. Addressing NCDs and infectious diseases 	 Developing a pl Attract oversea pharmaceutica Unleashing the industry in Mau Establish an end Plant for Ayurve Set up a Nation Safety and Effic Provision of sup Medical/wellne Implementation in the medical to
• Adopt Green energy for savings on electricity/petro bill of Min. of Health & Wellness	 Enhanced Residential care for the Elderly Establish an endemic herbs Pharmaceutical Plant for Ayurveda/nutraceutical Industry Set up a National Laboratory/programme for Safety and Efficacy of traditional medicines 	 Implementation on Wellness Industry Improve the elderly's lifestyle by proposing prototype of residential home for the latter 	 Upgrade regulat foreign pharma Developing the Set up of Pharm commercializat Setting up and r Laboratory/proj Developing the together with m



FIGURE 75 - HEALTH AND WELLNESS ROADMAP

ientation 4: Innovative Mechanism to improve ry of institutions

- al and regulatory framework a teaching hospital
- latory framework for free
- lical records with patients
- Pharmacy Act
- elopment of framework on
- entification of plants for
- argescale
- islative framework for
- ing
- cosystem for clinical research g and awareness

an for the silver economy

- s investors in the food,
- l and cosmetic sector potential of a nutraceutical
- ritius
- demic herbs Pharmaceutical da/nutraceutical Industry
- al Laboratory/programme for acy of traditional medicines erspecialists services in
- sssector
- of international benchmarking
- ourism
- ory frameworks to attract
- ceutical companies
- silver economy aceutical Plant and
- on of products
- ecruitment for National
- ramme

- Medical/wellnesssector
- dical education

8.11 Conclusions

This report has the aim to set the foundations for the development of a national roadmap, promoting research and innovation in the health and wellness sectors in Mauritius. The health and wellness innovation foresees a competitive, efficient and inclusive health and wellness innovation ecosystem that allows nurturing and stimulating creativity for a healthier and wealthier Mauritian population.

The forum including key stakeholders/ experts in the field, on the current state and way forward to promote and implement research and innovation in the health and wellness sectors were fruitful. These discussions led to the identification of various apertures to bridge the gaps and challenges in the sector. With the aim to improve national health and ensure economic growth through various strategies, health care and wellness tourism emerged as potential game changers which could be ranked as the second economic pillar of Mauritius.

Salient points that emerged from the discussion of the working groups were the adoption of international benchmarking to join the international market and the need of science communication, not restricted to the science community but also encompassing the society, policy makers and industries. The action plans proposed in this report are expected to boost the economy together with bringing a more efficient innovative ecosystem.

This report will help Mauritius to innovate in the health and wellness sector and achieve goals towards the SDGs, together aligned with the government vision to become a high income and innovative country.



SOCIAL AND GRASSROOTS INNOVATION

"Innovation is the unrelenting drive to break the status quo and develop anew where few have dare to go." - Steven Jeffes

9.0 Social and Grassroots Innovation

9.1 Introduction

This report of the Social and Grassroots (S&G) Innovation Working Group, prepared in the context of the organisation of Les Assises de la Recherche et de l'Innovation 2022, is an attempt to capture the state of the art of S&G Innovation in contemporary Mauritius, the gaps and challenges identified by key stakeholders in this area as well as pointers towards strategic orientations to promote, develop and support initiatives to harness their multiple social, economic and environmental benefits. It builds on a series of consultations with a diverse group of local stakeholders, ranging from academia; social workers, philanthropists and NGOs working closely with grassroots across different causes and/or vulnerable segments; social innovation practitioners; social entrepreneurs and business incubators; Government officials and the CSR arms of the Corporate Sector. Complementing this data-set rich with multiperspectival insights, the research team has also delved into a desk research of policy frameworks and support initiatives internationally in order to guide discussions and identify best practices which could be adapted locally.

9.1.1 Scope of Social and Grassroots Innovation Working Group

The limitations of top-down prescriptions to address enduring socio-economic or environmental vulnerabilities faced by local communities or specific social groups are now well established in development practice. Under the 'Social and Grassroots Innovation' rubric, the focus is about fostering a bottom-up, inclusive and participatory approach to (1) raise awareness and foster learning processes (2) promote the emerge of an enabling environment and (3) encourage the adoption of socially innovative solutions to enduring social problems faced by people in their ordinary lives for positive and sustainable transformations and where possible celebrate and encourage the upscaling of these innovations.

Acknowledging that both 'Social Innovation' and 'Grassroots Innovation' are polysemantic concepts, it is important to delineate at the outset how these concepts are employed in this report. Social innovations are new ideas that meet social needs, create social relationships and form new collaborations. These innovations can be products, services or models addressing unmet needs effectively. The benefits of social innovation, wherever it arises, accrue to society as a whole rather than individuals, although in some cases socially innovative projects can also produce profits and investment returns.

The benefits of grassroots innovations for sustainable development derive principally from their creation of a space for the development of new ideas and practices, for experimenting with new systems of provision, and for enabling people to express their 'alternative' green and socially progressive values, and from the tangible achievement of environmental and social sustainability improvements, albeit on a small scale.

The scope of this important thematic area is therefore to promote and develop Social and Grassroots innovation by recognizing the potential to turn societal challenges into opportunities and develop sustainable solutions for people in the Republic of Mauritius across different institutional settings, across NGOs/CBOs, corporate and public sectors, and to



enhance bottom-up responsible inventiveness towards integration of social, economic and environmental objectives.

9.1.2 Aim and Objectives of Working Group

The aim of the Working Group was to lay the foundations for the development of a national masterplan/ roadmap to promote social and grassroots innovation in order to equip the social economy with an enabling environment, capabilities and resources to generate economic, social and ecological returns.

The objectives are more specifically as follows:

- Examine the current state of social and grassroots innovation locally
- Provide insights of international social and grassroots innovation trends
- Identify the gaps, challenges and needs of the social and grassroots sectors
- Identify specific sub-areas where social innovation could be promoted more aggressively
- Identify strategies and emerging approaches which may be applied to the sub-areas
- Recommend incentives, schemes and policies to help in the progress of the sub-areas in an integrated way that drives economic growth

9.1.3 Social and Grassroots Innovation Guiding Principles

The main guiding principles of Social and Grassroots Innovation are as follows:

Cross-Sectoral:

Social and Grassroots Innovations are not the province of any single sector exclusively. Instead, they cut across and occur in all sectors, move among sectors and also occur at the interfaces between the different sectors.

Open and collaborative:

The social and grassroots sectors are inclusive and bottom up, including grassroots at local level but they also engage a wide range of actors. Collaboration rather than competition is the basic attitude. To ensure this, the many actors in the system, who may have different perspectives and needs, are still working towards the common goal, and the activities are still mutually reinforcing each other, constant alignment is needed between actors and activities.

Mutualism:

Mutualism is the notion that individual and collective well-being is obtainable only by mutual dependence.



Better use of assets and resources

S&G Innovations often recognise, exploit and coordinate assets and resources, which would otherwise be wasted, under-used or not used at all. In some cases, these assets and resources can be latent (i.e., skills that communities have at their disposal), intangible (finance) and/or physical (i.e., buildings and physical spaces).

Develop assets and capabilities

Many S&G Innovations explicitly aim to develop the capabilities of beneficiaries enabling them to meet their needs over the longer term, highlighting human agency and advocating participation.

Creates new roles and relationships

Social innovations can also be identified by the type of relationships they create and also by new roles for users and beneficiaries. For instance, boundaries between producers and consumers seem to be less defined and individuals are not seen only as passive recipients of services anymore.

9.1.4 National Target of the Social and Grassroots Sectors

Social innovation does not refer to any particular sector of the economy but to innovation in the creation of social outputs, regardless of where they emanate. As such, social innovation can take place in all four sectors or as combination of them:

- I. the non-profit sector
- 2. the public sector (both in terms of policy and service models)
- 3. the private sector and
- 4. the informal sector and grassroots movements

All these social partners have the potential to adopt social innovation in order to make society a better place by assisting the national goals of inclusive and rights-based development for all Mauritian citizens.

The budget speech for 2021-2022 aims to have a poverty-free country fulfilling the basic needs of the population by providing housing, education and women entrepreneurship and much focus on improving social resilience (Budget Speech 2021-2022, 2021). Moreover, the government stated that core strategies like recovery, revival and resilience will drive actions, and shape economic, social and environmental policies. Budget 2021-2022 has also laid emphasis on improving the quality of life of inhabitants through economic and social developments, while revamping economic recovery due to pandemics. In Vision 2030 strategy, the government stated the vision to transform the lives of inhabitants, as well as contributing to all-inclusive socio-economic growth for Mauritius by promoting innovation as one of its focal pillars of development (Mauritius Vision 2030, 2017). Moreover, addressing unemployment, eradicating poverty, further opening up the country and encouraging innovation are the main pillars of the Vision 2030 program. Also, the Digital Mauritius 2030



Strategic Plan mentioned that a framework has been adopted to realize the vision of achieving economic and social transformational change and to pave the way for a secured Digital Mauritius (Digital Mauritius 2030 Strategic Plan, 2020). In the Government Programme 2020-2024, it was stated that the government has a clear vision for Mauritius which is a country that values its population as its main asset, through empowerment, enhanced social inclusiveness and equality of opportunity (Government Programme 2020-2024, 2020). In light of the above, the national target of social and grassroots innovation could be to encourage the younger generation to use new methods to eradicate poverty, improve social resilience and improve the quality of life of inhabitants through social development. The adoption of innovative technologies across all spheres of activities will not only uplift those who are socially, culturally and financially disadvantaged, but will also benefit the population as a whole.

9.2 Sectoral Working Group

9.2.1 Methods of Organization

The principles guiding the process of consultations included collaboration, synergy, sharing of ideas and participation, all englobed under the National Innovation Initiative. While the Government on its part undertakes efforts to create a culture of innovation, it is imperative that capacity development happens simultaneously for the nation to harness the full potential of such policies.

To identify stakeholders pertinent to social and grassroots innovation, a set of requests through e-mails were sent to various organizations in the social and grassroots sectors in Mauritius. As a result, 16 positive responses were obtained from different organizations and these 16 persons constituted the working group members and were consulted as part of Les Assises de la Recherche et de l'Innovation 2022. Two working groups were set up mostly because of field-specific and each group consisted of 8 members. The main role of the working group was to chart the salient issues/ features of the sector and initiate discussions with regards to drafting a roadmap for research and innovation. Consequently, these 16 members formed part of the main actors (speakers, panelists, moderator) for Les Assises de la Recherche et de l'Innovation 2022. For practical reasons, consultations could not be extended to the entire civil society.

The sectoral working group on Social and Grassroots Innovation constituted of key stakeholders from the social and grassroots innovation.

9.2.2 Meetings/ One-to-One Interviews

Meetings were held with the two working group members in order to address the following tasks:

- i. To take stock of underlying issues of the Social and Grassroots Innovation
- ii. To comprehend the goals, aspirations or growth target for the social and grassroots sectors



- iii. To understand the needs of the social and grassroots sectors in terms of research and innovation
- iv. To recommend incentives and policy mechanisms to effectively engage development of the social and grassroots sectors in Mauritius
- v. To curate the big questions and discussion point to be focused upon during Les Assises de la Recherche et de l'Innovation
- vi. To organize and facilitate the thematic discussion during Les Assises
- vii. To oversee the writing of the thematic roadmap for research and innovation

The two working groups met at the Council on these occasions:

Sn	Date	Meeting No./ Group No.
I	Friday 18 th February 2022	First meeting with Group I
2	Monday 21 st February 2022	First meeting with Group 2
3	Friday 4 th March 2022	First meeting with UNDP
4	Wednesday 16 th March 2022	Second meeting with Group I+ UNDP
5	Friday 18 th March 2022	Second meeting with Group 2 + UNDP
6	Wednesday 6 th April 2022	Second meeting with UNDP
7	Thursday 14 th April 2022	Third meeting with Groups I and 2

FIGURE 76 - SOCIAL AND GRASSROOTS WORKING GROUP MEETINGS

In addition, six one-to-one interviews were conducted for practical strategic reasons as follows:

Sn	Date	Person/ Organisation
1	Wednesday 23 rd March 2022	Mrs A Jeanne, S.O.S Femmes
2	Thursday 24 th March 2022	Mr R Dilmahomed, GRF
3	Friday 25 th March 2022	Mrs J Beesoon and Ms K Diop, A.P.E.I.M
4	Friday I st April 2022	Mrs S Ganachaud, Trampoline Ltee
5	Wednesday 6 th April 2022	Mr Tony Lee, Ecosis Ltd
6	Friday 8 th April 2022	Mrs Djemillah Mourade-Peerbux, Wavemakers
		Social Innovation Skills Lab

During the first meeting with Groups I and 2 held on 18 February 2022 and 21 February 2022 respectively, members were given a brief introduction on Les Assises de la Recherche et de l'Innovation 2022. Particular tasks of the two working groups, comprising the vulgarization of social and grassroots innovation in Mauritius, recognition of the value/ merits of these dimensions of innovation and specific sub-areas where social innovation could be promoted more aggressively, were discussed. Subsequently, discussion on key questions (main gaps/ challenges with respect to social and grassroots innovation, aspirations/ vision for the sector)



was held. A few members were also requested to work on the key questions with the head of their organizations to come up with additional views and inputs on the key questions in the second meeting.

During the first meeting with UNDP held on 4th March 2022, members were given a brief introduction on Les Assises de la Recherche et de l'Innovation 2022 and the setting up of the two working group meetings. This one-to-one meeting with UNDP was held in order to understand what UNDP is doing pertaining to social innovation. Interestingly, at UNDP, innovation is related to SDGs. Successively, discussion on key questions (gaps/ challenges, aspirations/ vision, new policies/ laws/ actions/ support mechanisms) was held. Speakers and moderator for the thematic discussion during Les Assises were suggested but not finalized. Members from UNDP suggested to be included in the second meeting with Groups 1 and 2. In the second meeting with Groups I and 2 held on 16th March 2022 and 18th March 2022 respectively, after the summary of the first meeting in connection with the previous key questions, proposed actions and recommendations were discussed. Thereafter, discussion on key questions (new policies and strategic directions, new laws and regulations or amendment of existing legislation, actions (innovative ideas, solutions to gaps identified, best practices, projects, etc.), new schemes/ support mechanisms) was held to effectively engage development of the social and grassroots sectors in Mauritius. It was decided to circulate a working draft of the report to members for perusal before Les Assises so that the paramount questions and discussion point could be considered and focused upon during the event. In parallel, inputs on key questions were also requested from S.O.S Femmes, GRF, APEIM, Trampoline Ltee, Ecosis Ltd and Wavemakers Social Innovation Skills Lab by conducting oneto-one interviews.

9.3 Situational Analysis

The notion of innovation has in recent years been expanded to also encompass 'Social Innovation'. Given the widely acknowledged potential of this approach in addressing, in a pragmatic manner, enduring social challenges, the Council aims to promote and harness the full potential of social innovation and drive socially innovative programmes and practices. Numerous national governments and large organizations like the OECD, the European Commission and UNESCO have adopted the term and even have specialized departments and units to drive, promote, foster and coordinate platforms for coordinating good practices in social innovations with potential users. Social innovation is set to grow in importance not only concerning issues such as social integration, equal opportunities and dealing with environmental issues but also with regard to preserving and expanding the innovative capacity of companies and societies. As rightfully mentioned in the budget speech 2021-2022 of the Prime Minister, we aim at becoming poverty-free country fulfilling the basic needs of the population by providing housing, education, and women empowerment and much focus on improving our social resilience and to encourage the young generation to use new methods to address these issues (Budget Speech 2021-2022, 2021). In view of the above, social innovation on the grassroots level and frugal innovation could enhance and develop to achieve sustainable goals. Enabling local communities and individuals to convert their ideas into



products and services—by blending modern science and technology, design, and risk capital—constitutes the heart of grassroots innovation.

The COVID-19 pandemic presents what is undoubtedly one of the greatest challenges ever faced by international development and humanitarian organisations. There have already been major consequences for the world's poor and vulnerable, in terms of the direct impacts of the public health crisis on health and mortality, and indirect impacts on social, economic and political systems (OECD Policy Responses to Coronavirus (COVID-19), 2020; Barclays, 2021). Innovation has attracted a lot of attention in the perfect storm scenario of the ongoing pandemic as a means of dealing with these challenges and a host of other related issues. In high- and low-resource settings alike, and from global through to local levels, effective responses have emphasised trial-and-error experimental approaches and the use of evidence and science to generate novel ideas. Given the novel and unknown nature of the virus and its resulting impacts, innovation has played an important role in informing appropriate responses to the pandemic from medical, public health and socio-economic perspectives, and also for effective recovery measures (World Health Organization, 2020). One global example was developing appropriate policies and interventions for dealing with social and economic effects, as well as ensuring a secure and sustainable longer-term recovery. In Mauritius, the Government has set up a COVID-19 Solidarity Fund to provide support to the population and the community at large who are being affected by the COVID-19 pandemic (Business Mauritius, 2022).

9.3.1 Definition of Social Innovation

The concept of social innovation has seen a rapid uptake in research and policy in the last decade. Many definitions are used, which all converge on taking the social as object of innovation and potential source of solutions to address complex societal challenges.

Organisation for Economic Co-operation and Development (OECD): In 2000, the OECD LEED Forum on Social Innovations was created in Washington DC together with eleven organisations from six countries (France, Italy, Spain, Canada, USA, Mexico). The Forum notably adapted a working definition of social innovation and presented a first set of socially innovative initiatives. Since its launch in 2000, a number of activities have been organised in various OECD member and non-member countries under the framework of the Forum on Social Innovations (OECD, 2000).

Social innovation refers to the design and implementation of new solutions that imply conceptual, process, product, or organisational change, which ultimately aim to improve the welfare and wellbeing of individuals and communities. Many initiatives undertaken by the social economy and by the civil society have proven to be innovative in dealing with socio-economic and environmental problems, while contributing to economic development. To fully tap the potential of social innovation, an enabling policy framework is needed to support public, non-profit and private actors to co-construct and implement socially innovative solutions and thereby contribute to address socio-economic issues, build stronger territorial resilience and better respond to future shocks.

European Commission: Social innovations are new ideas that meet social needs, create social relationships and form new collaborations. These innovations can be products, services



or models addressing unmet needs more effectively. The European Commission's objective is to encourage market uptake of innovative solutions and stimulate employment.

United Nations Educational, Scientific and Cultural Organisations (UNESCO): Social transformations through social inclusion and social innovation are at the crossroad of all of UNESCO's activities, with a particular focus on those who are vulnerable and disadvantaged and excluded. UNESCO's Management of Social Transformations (MOST) Programme and its Intergovernmental Council (IGC) are unique drivers for advancing holistic capacity-building initiatives on social transformations and for building bridges between social scientific knowledge, public policies and society, and ensuing implementation. Social Innovation is defined by UNESCO as new social practices that aim at meeting social needs in a different way, and using different devises and channels (UNESCO, 2020).

Stanford Graduate School of Business: Stanford GSB was the first North American business school to establish a centre dedicated to engaging students in the pursuit of social and environmental change and made many contributions to the understanding of the evolving field of social innovation. Social innovation is the process of developing and deploying effective solutions to challenging and often systemic social and environmental issues in support of social progress. Social innovation is not the prerogative or privilege of any organizational form or legal structure. Solutions often require the active collaboration of constituents across government, business, and the non-profit world (Stanford Graduate School of Business, 2022)

Despite the interest and the increasing consideration of the term, there is a growing need for shared or common definitions of social innovation. Along this line, MRIC follows the mandate of OECD, and the committee members have adopted their definition for better clarity and uniform usage around the country.

9.3.2 Definition of Grassroots Innovation

United Nations High Commissioner for Refugees (UNHCR): Grassroots organizations are primarily made up of civilians advocating a cause to spur change at local, national, or international levels. One example is an innovative project called Justice for Vulnerable Groups launched in Malawi to address GBV rates and provide training to properly identify and assist victims of GBV, especially children. The project was monitored by the non-profit Plan International (Malawi country office) and primarily implemented by the Malawian Police Service. Seed funding came from UNICEF and included stakeholders like the local government and civil society to address cultural issues and norms, as well as create community ownership of the innovation (UNHCR, 2022).

The traditional approach to help disadvantaged people is a top-down one, in which government, NGOs, or businesses create solutions and provide them to the poor. Many large corporations, for example, have convinced themselves that they can serve the poor by producing and delivering goods and services at an affordable price—the bottom-of-the-pyramid approach. These businesses, governments, and aid organizations seldom consider acquiring ideas or innovative products and services designed at the grassroots by the people they are trying to assist. The question of reciprocating what those people have shared with them seldom arises. Despite the billions of dollars spent on developmental aid, we still do not


find many databases, either online or offline, of innovative solutions developed by disadvantaged people themselves (Standford Social Innovation Review, 2016). We should not discount completely the merit of providing certain goods and services to the people at the bottom of the economic pyramid, but the fact remains that poor people are not at the bottom of the knowledge, ethical, or innovation pyramids.

9.3.3 Social Innovation in Mauritius

Mauritius is striving to become a high-income innovation-driven nation where innovation becomes the key driver of socio-economic development. At the same time, the country has the potential to lead the African Continent into a new wave of growth and can become a gateway for global business to enter Africa. In recent times, the critical role of the publicprivate partnership in investing in innovation and the importance of enterprises in creating scientific and technological human resources for innovation has been beneficial for progress. It also recognizes that innovation is people-centred and acknowledges the importance of social innovation in ensuring the stability of the economy. The National Innovation Framework was conceptualized in 2018 as a means to catapulting the Mauritian economy to the next phase of growth (National Innovation Framework 2018-2030, 2018). It is now widely recognised that research and innovation do not only have economic impact but also social impact. Along this line, Les Assises de la Recherche et de l'Innovation- Social and Grassroots Innovation, envisages to fill a gap in terms of a new set of approaches to address social problems and come up with pragmatic solutions for vulnerable social groups whose needs are not being adequately addressed by existing social policies. A defining feature of social innovation is that the Return on Investment is not measured in terms of money but rather in terms of social good particularly for vulnerable segments of the population (Foroudi et al., 2021).

Fostering and adopting a culture of social innovation holds many promises in terms of how many longstanding topical social issues which Mauritius has to contend with, can be addressed for the greater good of Mauritian society as a whole thereby meeting the goals of a more inclusive, fairer, healthier and sustainable society. Some priority grand challenges which can readily lend themselves to social innovation programmes include addressing Non-Communicable Diseases, substance abuse, poverty, adolescent reproductive health, ageing population, national heritage conservation, education, gender-based violence, among others.

Mauritius Research and Innovation Council:

At institutional, industry and individual levels, it is worth mentioning that there are research and innovation funding schemes that are being managed by the MRIC. Inspired by international models, these schemes allow any stakeholder, whether from the public, private sector or any individual having an innovative idea to test or validate the idea. Innovative features of these schemes include the collaboration of different stakeholders and matching grants from the applicants. Launched in 2017, the Social Innovation and Research Grant Scheme (SIRGS), a funding scheme in line with the National Innovation Initiative being spearheaded by the Ministry of Technology, Communication and Innovation (MoTCI), can be seen as an innovative one to tackle an existing gap in social innovation in the local context. The Council, therefore, invites NGOs and/or public funded bodies in collaboration with academic/ research



institutions/ private sector companies to submit proposals which combine action-research and a social innovation potential with tangible outcomes in social development research areas including but not limited to social integration of vulnerable groups, equal opportunities and environmental issues. The MRIC anticipates to award a grant of up to Rs I M per project for a project duration not exceeding 24 months. The projects under this scheme need to have a strong research element embedded within to clearly define, describe, monitor and evaluate an intervention in an identified social problem and how in turn this intervention brings a novel and practical solution to the area under investigation. The list of funded SIRGS projects is as below.

Project Title	Company/ Institution	Status
Digital Inclusion as one of the enablers of Active Ageing	University of Mauritius in collaboration with Lions Club of Flacq	Completed
Sustainability and long-term environmental conservation through 'ERA crafts'	Ecosystem Restoration Alliance Indian Ocean	Completed
Research on long-term holistic accompaniment of families living in poverty in the Republic of Mauritius	University of Mauritius in collaboration with Lions Club of Flacq	Completed
BeeswithStories':Beekeeping for the promotionofbiodiversityconservationandinsupportofvulnerablegroups	T.i.A Bee Products Ltd in collaboration with Ferney Ltd	Ongoing
Practical Training in Product Development Methodology to boost innovation in artisanal manufacturing	My Pop-Up Store Co Ltd	Ongoing
DevelopmentandImplementationofVirtualTours for MauritianMuseumsto promote national heritage	Mauritius Institute of Education in collaboration with Mauritius Museums Council	Ongoing
Smart Diabetes Education	Université des Mascareignes in collaboration with APSA, Université de la Reunion,	Ongoing

FIGURE 78 - SOCIAL AND GRASSROOTS LIST OF FUNDED SIRGS PROJECTS



	Centre Hospitalier Universitaire Felix Guyon	
OERQI- An Open Learning Platform for Capacity- Building in Youth Work-Based on the Micro-Credentials Concept.	University of Mauritius in collaboration with Crystal Delta Pty. Ltd	Ongoing
The Callithea Project: Developing Training and Employment Outcomes for Young Adults with Intellectual Disabilities Using the Social Enterprise Framework.	Association de Parents d'Enfants Inadaptés de l'Ile Maurice (A.P.E.I.M) in collaboration with Inclusion Mauritius, Vatel Mauritius	Ongoing

Source: Mauritius Research and Innovation Council, 2021

On 30th November 2017, the MRIC in collaboration with Red Dot brought together diverse professionals from the public, private and NGO sectors for a one-day Workshop on Social Innovation (Red Dot, 2021). In the iconic Red Dot approach to experiential learning, participants engaged in a series of fun and interactive activities, learning about creative confidence, the mindsets required for social innovation, as well as a condensed cycle of the design thinking process. Participants also teamed up in groups, to build personas, frame problem statements and worked on tackling complex problems, such as poverty, youth unemployment, gender-based violence, as well as public health. Participants called upon each other to share experience and wisdom, and built on each other's insights to approach problems in a spirit of empathy. The goal was to shift from a more "policy-centred" solutions, to explore the surprising solutions that would emerge when we take a more "human-centred approach".

Innovation initiatives at the United Nations Development Programme (UNDP)

The United Nations in Mauritius initiated the establishment of Technology Innovation Labs (UNTIL) to drive the development agenda, through innovation and technology, and to solve some of humanities' most pressing needs. The objectives of these labs were to function as a start-up platform for a collaborative attempt to problem solving initiatives among the UN entities, private sector, academia and civil society. This would serve as the platform for linking with innovators and mentors from across the globe as well as to facilitate global exchange of ideas and resources, offering advisory support and guidance that will facilitate solutions through workshops, immersion-learning, and incubated projects. On 12th October 2018, the Government of Mauritius, through its Council of Ministers endorsement, agreed to set up the UNTIL in the island. Following which, UNDP Mauritius submitted a proposal for additional resources to fund the preparatory work for this innovative solution in accelerating the development agenda and to establish initial activities to support the Government of Mauritius'



vision for the innovation labs (UNDP, 2022). The proposal envisaged to create enabling environment for innovation in Mauritius, to bring different actors to discuss and exchange views and ideas and to engage in upstream policy dialogue for Innovation. UNDP supports and supplements national efforts aimed at reducing poverty in all its forms, accelerating the transition to sustainable development and making sure national institutions and communities are able to withstand crises and shocks. The Grassroots Innovation Database (GRID), built by the UNDP Mauritius and Seychelles Accelerator Lab, will include the Seychellois, Mauritian and Rodriguan innovators and the grassroots solutions they have worked on over the years. Through this initiative, innovators from our islands will be brought to the forefront and their solutions up scaled to the national and regional levels. The Accelerator Lab in Mauritius comprises of Ms Ayooshee Dookhee, Head of Solutions Mapping, Mrs Melany Poorun-Sooprayen, Head of Exploration and Mr Avinash Meetoo, Head of Experimentation. The objectives set by the new team are to help the Republic of Mauritius, Rodrigues and the Republic of Seychelles achieve the 17 UN sustainable development goals by leveraging on grassroots innovations and emerging trends, and by running experiments with multiple actors. The vision behind is to promote prosperity for all but not at the expense of the planet and of our collective future. However, protecting the planet and people presents unique challenges. In the same vein, a working group was set up with expert stakeholders related to the sectors to develop a roadmap.

Red Dot

Red Dot is an innovation consultancy company headquartered in Mauritius. They partner with ambitious leaders to solve complex board-level challenges and scope opportunities to launch new platform businesses, using rare insight and entrepreneurial skill, which changes the rules of an industry, and grows the pie for all stakeholders. They support companies through the start-up phases using high-growth technology entrepreneurship, bringing their own networks for fundraising and venture finance, adopting artificial intelligence, developing and testing prototypes as well as offering end-to-end technology implementation (Red Dot, 2021).

Trampoline- Social Enterprise Accelerator

The Currimjee Group has been an active participant in Mauritius' evolution from a monocrop economy to the resilient and diversified one we see today. To celebrate its 125th anniversary, the Group has set up a fund of MUR 125 M to contribute to a sustainable entrepreneurship and innovative ecosystem which will be beneficial the Mauritian society at large. Trampoline, a not-for-profit company with the ambition to create and support opportunities in the social-entrepreneurship space, is the first initiative from this fund (Trampoline, 2021). Their Impact Accelerator Programme is an intensive nine-month initiative that will provide social entrepreneurs with access to consulting services, mentorship programmes, extensive networks, training and funds. Through the Currimjee Group's extensive networks, Trampoline provides industry-specific expertise through business



mentors from a range of organizations, rigorous analytical support and prepares social enterprises to access capital and customers.

9.3.4 Insights of International Social and Grassroots Innovation

Social Sector

In most countries and regions that have promoted social innovation so far, policy focused on creating a supportive environment for the social economy, social enterprises and/or social entrepreneurship. In this sense, the tools of social innovation policy have mirrored those of innovation and entrepreneurship policy more widely. Policy for social innovation has been largely concerned with the following themes: funding and investment, building skills and capacity amongst innovators and social ventures, regulation and legislative frameworks, public procurement and commissioning to create a market for social innovation, awareness raising, championing and connecting, and using public assets to foster social innovation. **Table 2** shows the different initiatives undertaken by selected countries to develop their social sectors.

To uphold sustainable, smart and inclusive growth, social innovation is necessary to address poverty, create employment, develop capabilities and participation, and promote changes in production and consumption habits. A list of major examples undertaken by some countries to develop their social sectors is located in **Annex A**.

Countries	Initiatives undertaken	Policy innovatio	for n then	social nes
UKª	Providing funding for capacity building in particular areas, such as the UK government's Investment and Contract Readiness Fund for social enterprises.	Building capacity innovators ventures	skills ar and	and nongst social
Scotland ^a	Promoting social entrepreneurship training and education (e.g., Scottish Government's Just Enterprise training programme for social entrepreneurs)	Building capacity innovators ventures	skills ar and	and nongst social
South Korea ^{a,c}	Supporting intermediaries, such as incubators and network organisations, like the Seoul Creative Lab. The city government of Seoul is spearheading South Korea's development of social innovation with initiatives such as the Seoul Innovation Planning Division and the Residents' Participatory Budgeting System.	Building capacity innovators ventures	skills ar and	and nongst social

FIGURE 79 - SOCIAL AND GRASSROOTS INITIATIVES UNDERTAKEN BY COUNTRIES TO DEVELOP THEIR SOCIAL SECTORS



Ireland ^a	Direct provision of grants or loan schemes open to	Funding and investment
	social innovators or socially innovative organisations.	
	The Irish Government-backed Social Innovation Fund	
	provides investment and support programmes tailored	
	to early or later stage social innovations.	
UK ^a	Measures to stimulate growth of a social investment	Funding and investment
	market, such as the UK's establishment of Big Society	
	Capital as a 'wholesale' social investor (it provide funds	
	to other investment intermediaries) and introduction of	
	Social Investment Tax Relief. Experimentation with new	
	forms of financing instruments, such as social impact	
	bonds and community shares and other forms of	
	crowdfunding (the UK government has recently	
	launched a matched crowdfunding scheme for arts and	
	heritage projects, in association with Nesta and	
	Crowdfunder).	
Canada ^c	Canada has demonstrated a solid commitment to	Financing
	funding social innovation in recent years at both the	
	national and provincial level, through initiatives such as	
	the Community and College Social Innovation Fund and	
	Ontario's Social Enterprise Demonstration Fund. It has	
	also long pioneered innovations in financing, such as	
	Nova Scotia's Community Economic Development	
	Investment Funds, which allow investors a tax credit on	
	investments into local communities, launched in 1999.	
France ^a	The "Société Coopérative D'intéret Collectif" and	Regulation and legislative
	more recent Loi Economie sociale et solidaire (ESS	frameworks
	2014) have brought about greater flexibility in the kinds	
	of commercial frameworks that are available for social	
	or solidarity-based businesses.	
UK ^{a,c}	The UK Financial Conduct Authority's 'regulatory	Regulation and legislative
	sandbox', which provides a 'safe space' for innovators	frameworks
	to test out the impacts of new models without	
	immediately incurring the usual regulatory	
	requirements. Successive UK governments have	
	legislated to support social innovation projects and	
	businesses, while policies such as the 2010-15 "Big	
	Society" initiative have provided funding and	
	institutional backing for numerous innovations, not least	
	social impact bonds	
UK ^a	Commitments to bring socially oriented suppliers into	Market access/Social
	public sector supply chains, such as the UK parliament's	Entrepreneurship
	commitment to 'Buy Social'.	



Barcelona ^a	National and city-level challenge-based procurement	Market access/Social
	models, like the Barcelona Open Challenge.	Entrepreneurship
South	South Korea supports social enterprise and provides	Market access/ Social
Korea ^c	funds and subsidies for such endeavours. The city of	Entrepreneurship
	Seoul is spearheading social innovation with several	
	initiatives such as open data and open communication:	
	the city discloses 90% of public data, including draft	
	projects by city officials, in real-time, and incorporates	
	citizens' suggestions for improvements	
Spain ^d	Support for incubators and hubs within cities or regions	Market access/ Social
	to concentrate and amplify capacity and activity.	Entrepreneurship
	DenokInn, the Basque Centre for Innovation,	
	Entrepreneurship, and New Business development in	
	Spain is creating a business park for social enterprises	
	and co-operatives. The park included start-ups, regional	
	and governmental organisations, and charitable	
	foundations. Research and development needs was met	
	by the creation of a school for social innovation.	
Colombia ^a	Policymakers can help to improve the legitimacy and	Awareness raising,
	visibility of social innovation through initiatives that map	championing and
	and measure activity, and attempt to measure its impact	connecting
	and contribution. Colombia adopted competitions and	
	awards, such as Colombia's global "Ain't No Need We	
	Can't Solve – Challenge 2014"	
Netherlands	The Social Innovation Community Summer School,	Awareness raising,
а	hosted as part of Tilburg University's European Social	championing and
	Innovation Week 2016.	connecting
Singapore ^d	In Singapore, Biopolis, a two-million square foot	Education, training and
01	research centre brings together scientific leaders and	awareness campaigns
	post-doctoral students and in the Basque Country, the	
	world's first experiment in creating a 'social silicon	
	valley' is currently underway	
UKª	Presenting complex policy challenges as open	Policy challenges and
	innovation opportunities - e.g., challenge prizes like	support
	Innovate UK's Innovation Challenges	
USª	Inviting "citizen experts" input through citizen science	Policy challenges and
	platforms e.g., the US government's Citizenscience.gov	support
Czechia ^b	Fostering inclusive integration through public services.	Governance and public
	The project aims to make public services accessible to	service infrastructure
	all by introducing a new role in social services – the	
	intercultural assistant. These assistants, employed by	
	the municipality, are responsible for removing barriers	
	the municipality, are responsible for removing barriers	



be	tween migrants and public service officers. They
pro	ovide personalised support and counselling to
mi	grants and can company them to meetings with
dif	ferent public services such as hospitals or schools.

^a Source: Social Innovation Community, 2017

^b Source: Publication Office of the European Union, 2020

^c Source: Social Innovation Exchange, 2020

^d Source: Study on Social Innovation, 2010

Grassroots Sector

The benefits of grassroots innovations for sustainable development are derived principally from their creation of a space for the development of new ideas and practices, for experimenting with new systems of provision, and for enabling people to express their 'alternative' green and socially progressive values, and from the tangible achievement of environmental and social sustainability improvements, albeit on a small scale. Conversely, the main challenges faced by grassroots innovations are related to the struggle to maintain a viable sustainable socio-technical space within a wider unsustainable regime. This translates into issues around securing funding, which in turn affects possibilities for institutionalization and consolidating learning, managing organizational change, making effective links and networks with other societal actors, and diffusing oppositional ideas into wider society. A list of examples undertaken by a few countries to develop their grassroots sectors is **Annex B**.

Countries	Initiatives undertaken for grassroots innovation	Policies for grassroots innovation themes
Belgium ^{a,b}	Belgium: NewB Card The Goodpay is a biodegradable card made from corn which allows to evaluate whether the behaviour is good for the environment. This payment method will not enable people to become overdrawn and offers them the possibility of paying for purchases anonymously. With each purchase, 5 cents are given to a good cause, at the company's expense. The NewB Card is amongst the cheapest prepaid cards in Belgium. It is even free if it is used regularly.	 Sustainability Collaboration Sustainable development goals Regulatory reforms Capacity building Policy

FIGURE 80 - SOCIAL AND GRASSROOTS INITIATIVES UNDERTAKEN BY COUNTRIES TO DEVELOP GRASSROOTS SECTORS



Canada ^{a,c}	Canada: Crystal Green Energy The Canadian start-up <u>Crystal Green Energy has</u> <u>devised an ultra-efficient solar panel</u> in Sudbury, in the province of Ontario. The machine can adapt itself to the sun's movement throughout the day to maximize its performance, particularly in areas where there is less sunshine.	 Policy and regulatory environment Sustainable development goals Governance & public service infrastructure Sustainability
Mexico ^{a,d}	Mexico: Eco Domum Eco Domum collects plastic waste to develop large panels. They use this material as a base to develop walls and roofs of around 40m ² . These inexpensive homes are then offered to low-income families, for the modest sum of 5000 pesos (around £250).	 Policy Regulatory reforms Awareness & mobilization Capacity building Sustainability
Thailand ^{a,e}	Thailand: Phi Suea Phi Suea is the first housing complex to be solar- hydrogen self-sufficient. This project was launched in Chiang Mai, in the north of Thailand, on 29 th January 2016. This project is registered in a line of incredible development of ecological housing. Phi Suea claims to be independent from any type of weather phenomena and is self-sufficient 24 hours a day.	 Social entrepreneurship Financing Policy and regulatory environment Evidence and knowledge sharing Collaboration Ownership Sustainable development goals Sustainability Awareness & mobilization
Bali ^{a,f}	Bali: Bye Bye Plastic Bags Two sisters aged 10 and 12, Isabel and Melati Wijsen, are responsible for the project Bye Bye Plastic Bags. Last year, they made a short video calling for a law banning the production and sale of plastic bags. "1000m ³ of plastic bags are produced every day in Bali", they argue. The island's indescribable landscapes are being ruined by poor waste management and an overproduction of plastic	 Social entrepreneurship Financing Sustainable development goals Sustainability Education, training and awareness campaigns



	containers. Their engagement in this project has been supported by the Australian and Canadian ambassadors.	• Policy and regulatory environment
Netherlands ^{a,g}	The Netherlands: Fruitleather This textile material was thought up by design students at the Willem de Kooing Academy in Rotterdam and is made from food waste. A material very similar to leather called 'Fruitleather', or "leather of fruit" which is very resistant. Bags, shoes, or decorations can be made from this process.	 Novelty Fostering Awareness & mobilization Market access Financing Regulatory reforms Policy
United States ^{a,h}	United States: Brooklyn Microgrid An American start-up, Trans Active Grid, have developed a system of 'microgrids'. It consists of a network powered by locally produced energy. The system uses solar panels installed on the roofs in Brooklyn, the most densely populated borough of New York.	 Policy and regulatory environment Sustainable development goals Sustainability
India ^{i,j}	Department of Science and Technology (DST) has been taken several new initiatives to promoting innovation, supporting cutting-edge research, attracting the youth towards science, improving ease of doing science and fostering international collaborations. The department has aligned its activities with the National Agenda of the Government towards Make in India, Startup India, Digital India, Swachh Bharat, Swasth Bharat, etc and has moved ahead with several achievements.	 Funding Strengthening the linkages between stakeholders Promotion of science Risk taking ability Intellectual property Addressing the innovation value chain Participation in global Research and Development infrastructure



Singapore ^k	Singapore's innovation policy is the tripartite 'Home' strategy, which refers to 'Home for Business', 'Home for Innovation', and 'Home for Talent' as part of the innovation strategy. Home for Business provides an overall framework for the talent and innovation strategies. The Home for Innovation entrepreneurial ecosystem is being created in Singapore. The Home for Talent strategy adopts Singapore's innovation strategy to respond to broad macro trends happening in global markets.	•	Public knowledge infrastructure Inducements for private companies to cluster Knowledge flows and network links among key actors in the cluster A regulatory framework and business environment
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^a Source: Le Journal International, 2017

- ^b Source: ICDO_CCIM WG sustainable public procurement, 2014
- ^c Source: Government of Canada, 2019
- ^d Source: Sustainable Governance Indicators, 2021
- ^e Source: Enabling Policy Framework for The Nexus, 2021
- ^f Source: Environmental and social sustainability policy, 2020
- ^g Source: Food waste and donation policies in France and the Netherlands, 2015
- ^h Source: U.S Department of State, 2003
- ¹Source: India Science, Technology & Innovation, 2022
- Source: Technology Innovation Management Review, 2014
- k Source: Innovation Policy in Singapore, 2018

9.4 Gaps and Challenges of Sector

In this section, the main gaps and challenges identified by the stakeholders are highlighted. In many ways, the recurring issues which emerge from the consultations, imply that there are common challenges which hamper progress in engaging in social and grassroots innovation and there is a call for action in order to address these gaps.

9.4.1 Knowledge and Practice Gaps – The Need to Further Popularize and Vulgarize the Notions of S&G Innovation to Promote their Adoption

• A common finding which emerged during the engagement with stakeholders was that whilst there was a general recognition and appreciation of the value and potential of Social and Grassroots Innovation to contribute to inclusive and sustainable



development, nonetheless there was a general concern that these notions are yet to find currency in the local jargon.

 In fact, concern was expressed in the technical working groups and corroborated in one-to-one interviews with high profile NGOs and social innovation practitioners that the majority of NGOs and grassroots organisations may have been exposed to the theoretical benefits of adopting S&G innovation, but in practice there are but a handful of NGOs which are sufficiently aware of and indeed adopt socially innovative approaches in their activities.

9.4.2 Gaps in Innovation Culture: Aversion to Change and Risk-taking

• A culture of innovation generally, more particularly a flexible mindset which is not averse to change, risk-taking and experimentation are by and large considered to be lacking.

9.4.3 Systemic Constraints – Mindset/ Bureaucracy

- Compliance v/s performance Civil servants from Ministries with a social vocation are paradoxically not innovation-friendly as they have rigid procedures to follow and which at times are not compatible with day-to-day practical requirements of grassroots clients (the lack of support to refugees in the wake of Batsirai cyclone and heavy rainfalls after the cyclone warning was removed was used as an example to illustrate the strict procedural approach which is generally adopted).
- Siloed approach and lack of collaboration among stakeholders

9.4.4 Capacity/ Resources Gaps and Challenges

- Severe constraints and limitations in civil society participation in general capabilities, resources, interest, capacity
- NGOs are not trained enough to innovate and apply their creative thinking.
- NGOs have limited research capabilities, lack resources and sometimes, lack the skill to innovate their services.
- Social work, which is an important interface with vulnerable segments, is not adequately valued in Mauritius.
- Most NGOs are operating with staff who do not necessarily possess any qualifications in social work- difficulties in conducting administrative tasks and applying for schemes.
- Even though many courses are being offered at tertiary level in social work, less youth are willing to work as fieldworkers for NGOs and reach out to grassroots.
- Confusion between social projects and socially innovative projects.
- Focus of applicants tends to be more on research rather than innovation dimensions.
- Limitations in assessing social innovation and the impact of these projects.
- Poor networking, poor communication and limited capacity within the sector.



- Negative competition for resources also undermines the reputation of the sector and the effectiveness of NGO activities at community level. As a result, there is a great deal of suspicion among NGOs, secrecy and lack of transparency.
- NGO politics: one fighting another, one with resources but no community presence, another with community presence but no resources.

9.4.5 Incentives Gaps and Challenges

- Long term sustainability and upscaling of social projects are lacking.
- Corporates or social entrepreneurs are often operating at a loss and injecting their own funds to fulfil social and ecological missions. This is a deterrent for broadening the social innovation space.
- Recognition and facilitation are lacking.

9.4.6 Financing Gaps and Challenges

- Access to financial support for social missions are lacking- Social financing; social business angels
- Funding grants from institutions such as the MRIC, EU, National Social Inclusion Fund are deemed as complex and more assistance is required to enable a broader application base.

9.4.7 Policy/ Regulatory Gaps and Challenges

• An overarching and explicit National Social Innovation Policy as there are in certain advanced countries with the vision, authority and resources to galvanise key stakeholders to engage in Social and Grassroots Innovation is lacking.

9.4.8 Disconnects between Decision-makers and Ground Realities – Need for Live Action and Participatory Research to Bridge these Disconnects

 CSR arms and foundations of large corporates which have extensive reach of localbased grassroots communities warn that there are often disconnects between policy makers and grassroots realities and more particularly between arguably theoretical Western approaches and adaptability to our local realities. Our local specificities may mean that what works elsewhere may not necessarily work in the local context and argue that the adoption of prescriptive approaches or tried and tested formulae from other settings to address common problem areas – e.g., eradication of poverty, waste disposal, integration of marginalized groups etc may not meet with the same outcomes.



9.4.9 Information, Communication and Technology Gaps

• Internet and email as fundamental for all organisations. Lack of online resources or a website that enables the creation of networks locally and internationally. A website makes it easier for sharing of results and data.

9.4.10Collaboration/Partnerships

- Mechanism to facilitate and support multi-disciplinary approaches to be put in place
- Public/ private (industry and SMEs)/ academia partnerships should be strengthened
- International partnerships to be encouraged
- Need for stronger links between research and policy making

9.4.11Support Mechanism/ Institutional Support

- Legal and regulatory framework should be enhanced to facilitate innovation including intellectual property rights (IPR) issues
- Ways and means to promote an innovation culture and teamwork
- Innovation in SMEs should be given particular attention, especially in terms of institutional support and structured guidance e.g., through business incubators

9.4.12A Fragmented Ecosystem

- The major challenges that social and grassroots innovation face from their start-up is establishing a committee which consist of different individuals with various skills and backgrounds. After the inception, the next challenge is to become a resource base and become more resilient by working with people of various disciplines. A common finding which emerged during the engagement with stakeholders is that there is a fragmented ecosystem and there is a great need to adopt a multisector approach to magnify the complexity of the ecosystem.
- Collaboration between multiple stakeholders such as the private, public, and nonprofit sectors is paramount in scaling social and grassroots innovations. The technical working groups agreed that each sector has its own set of knowledge, resources, and networks, however, the shared awareness and significant coordination are rockbottom. Most of the organisations are operating on a scattered manner, resulting in major hindrances to develop innovative strategies to obtain formal support. They further argued that current motivations do not vitalize collaboration and very few agencies have the capacity to knit together efforts, resources, and activities from the various sectors to drive social and grassroots innovations on a higher scale.



SWOT Analysis of the S&G Innovation in Mauritius

FIGURE 81 - SOCIAL AND GRASSROOTS SWOT ANALYSIS

	0	
Strengths Weaknesses	Opportunities	Threats
 Inclusive growth Increased wellbeing and human development Educational accessibility Environmental sustainability Compatible with the circular economy Relationship building Positive mindset of stakeholders in the social and grassroots sectors Existing incentives to innovate Interest of NGOs and private sector Deliver solutions that respond to the local situation based on communities' knowledge, interests and values. Innovations from local groups or individual inventors. Local empowerment and community engagement. Collecting, documenting, and disseminating innovations and practices at the grassroots level by bringing together individuals and 	 Skills development "L'Approche Communautaire"- community-based projects have been shown be to be very successful around the island An increase in the level of trust and collaboration amongst stakeholders Improvements to the decision-making processes within authorities Emergence of new social norms, values, and practices that institutionalize innovative behavior and thinking Provide feedback routinely and communicate how the situation is evolving on the ground Get to know the people, culture, and environment to take the innovation and better implement it on the ground International and local partnerships to access innovative technologies platform and expertise 	 Resistance to change Rigid and cumbersome procedures to gain resources to undertake research Competition for resources from other economic sectors Lack of follow-through Keeping up with fast-paced changes Too focused on the bottom line, therefore innovation often never gets off the ground Unclear goals Complexity of law Lack of resources to sustain projects

with regional and international S&G innovation practitioners

cross-country collaboration



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9.5 Vision for the Sector

The vision of the working groups on social and grassroots innovation is to develop and promote social innovation by recognizing the potential to turn societal challenges into opportunities and develop sustainable solutions for people in the Republic of Mauritius across different institutional settings, across NGOs/ CBOs, and public sectors. This is in line with the Government Programme 2020-2024 and vision for the social and grassroots sectors discussed by different stakeholders from the two working groups.

The vision statements from different stakeholders are as follows:

- Shared understanding of S&G innovation
- Enabling environment/ ecosystem
- Encouragement of social entrepreneurship
- Capacity building/ skills development civil society as a pillar of social innovation
- Open data and research

9.5.1 Strategic Orientation 1: Shared Understanding of S&G Innovation

Targets:

- I. Fill a market gap
- 2. Create sustainable solutions for social change
- 3. Collaborative for societal impact

Economic and Social Benefits (Expected impact):

- Public-private partnerships
- Corporate social responsibility
- Earned income ventures
- Competitive sourcing

Expected Outcomes:

- Reduced poverty
- Better education
- Improved government finances

FIGURE 82 - SOCIAL AND GRASSROOTS STRATEGIC ORIENTATION 1: SHARED UNDERSTANDING OF S&G INNOVATION

Relevant Actionable/ strategy/ support

Project I

Coordinate a national social and grassroots innovation awareness campaign to raise awareness and mobilise grassroots to take stock of the benefits of S&G innovation.

Project 2



Develop local innovation initiatives such as Social and Grassroots Innovation fairs for improving community relationships, develop routes for local talent to access opportunities, and enhance the potential for innovation activities to support and strengthen local grassroots community.

Project 3

Establish a social innovation evidence development and knowledge sharing initiative to enable the scouting of S&G initiatives locally, regionally and internationally.

Project 4

Formulate policies for promoting development programmes and sustainability of projects through the involvement of the community members in the decision-making process.

9.5.2 Strategic Orientation 2: Enabling Environment/ Ecosystem with Emphasis on Collaboration (Public-Private- Academia-Civil Society)

Targets:

- I. Capability building
- 2. Improve the processes
- 3. Developing operational standards
- 4. Community-building
- 5. Represent the group in policy-making institutions

Economic and Social Benefits (Expected impact):

- Participate in cost reduction opportunities
- Mobilize under-utilized capacity
- Reduced operating costs
- Improved cash flows
- Shared tangible and intangible resources to improve return on investment (ROI)
- Solve complex problems

Expected Outcome:

- Goal achievement
- Nature of interaction among partners



FIGURE 83 - SOCIAL AND GRASSROOTS STRATEGIC ORIENTATION 2: ENABLING ENVIRONMENT/ ECOSYSTEM WITH EMPHASIS ON COLLABORATION

Relevant Actionable/ strategy/ support

Project I

Develop a legal framework for social enterprises in Mauritius for enabling social innovators and entrepreneurs to emerge.

Project 2

Develop a social innovation ecosystem by incubating potential social enterprises and social business incubators through multiplying the number of adherents and by extension, impact more tangibly on society.

Project 3

Provide government with clear and timely guidance on the principles, mechanisms and institutions required to improve the design, enforcement and review of their regulatory framework to the highest standards.

Project 4

Develop regulatory innovation capacity using 'sandboxes' to explore and experiment with new models.

9.5.3 Strategic Orientation 3: Encouragement of Social Entrepreneurship

Targets:

- I. Empower communities
- 2. Enable people to initiate and control their own development
- 3. Change their ideas and beliefs and organize the human, material, financial, and other resources required for socio-economic development

Economic and Social Benefits (Expected impact):

- Increase community, individual, and group capacity to identify and satisfy their needs
- Improve program design
- Improve program quality
- Increase community ownership of the program
- Cost effective way to achieve sustainable results
- Increased property value due to regeneration
- Induced development and construction expenditure

Expected Outcome:

• Design thinking



- Local and regional development
- Social economy
- Social entrepreneurship
- •

FIGURE 84 - SOCIAL AND GRASSROOTS STRATEGIC ORIENTATION 3: ENCOURAGEMENT OF SOCIAL ENTREPRENEURSHIP

Relevant Actionable/ strategy/ support

Project I

Establish a multi-sectoral committee for social innovation comprising of policy-makers, academics, business leaders, NGOs and grassroots leaders and social entrepreneurs and social innovation specialists.

Project 2

Government support of pertinent entrepreneurships (governments acknowledging the importance of this kind of entrepreneurship; hence, plan strategies that will facilitate and benefit social entrepreneurs and their professional activity).

Project 3

Launch entrepreneurship outreach and awareness campaigns at national, regional and local levels in collaboration with all stakeholders, utilize the media and spaces for policy dialogue, speeches, addresses and reports to communicate support for entrepreneurship.

Project 4

Stimulate private sector-led initiatives and strengthen networks among entrepreneurs (support private sector-led campaigns, facilitate business exchange platforms, business portals, fairs, business associations and clubs, and engage diaspora community in local entrepreneurship networks.

9.5.4 Strategic Orientation 4: Capacity Building/ Skills Development with a Particular Attention to Capabilizing Grassroots Communities and Civil Society as Pillars of Social Innovation

Targets:

- I. Ground capacity building in equality
- 2. Support both technical and adaptive capacities
- 3. Strengthen the eco-system
- 4. Co-create solutions with stakeholders

Economic and Social Benefits (Expected impact):

- Supports local employment and enterprise
- Promotes and supports innovation in business and in public services



- Builds social capital- networks, volunteering, community activities, and culture
- Increases knowledge, skills, and leadership held in community
- Replaces 'imports' with local products and externally delivered services with designed activities

Expected Outcome:

- Developmental (first-order change)
- Transitional (second-order change)
- Transformational (third-order change)

FIGURE 85 - SOCIAL AND GRASSROOTS STRATEGIC ORIENTATION 4: CAPACITY BUILDING/ SKILLS DEVELOPMENT WITH A PARTICULAR ATTENTION TO CAPABILIZING GRASSROOTS COMMUNITIES AND CIVIL SOCIETY AS PILLARS OF SOCIAL INNOVATION

Relevant Actionable/ strategy/ support

Project I

Set-up a special innovation fund to the disposal of researchers based on partnerships between various stakeholders and on the merit of socially innovative projects with high impact value.

Project 2

Empower and improve NGOs and grassroots innovators access to innovation and social entrepreneurial skills (design thinking, social business development).

Project 3

Improve social purpose organization's access to federal innovation, business development and skills training programs.

Project 4

Develop grant writing (supporting grant-writing efforts through synthesizing or gathering relevant knowledge), and fundraising support (through design of sustainable strategies, events, and processes).

9.5.5 Strategic Orientation 5: Open Data and Research

Targets:

- I. Economic growth and job creation
- 2. Efficiency and effectiveness of public services
- 3. Transparency, accountability and citizen participation
- 4. Better information-sharing within government

Economic and Social Benefits (Expected impact):

- Enhanced access to research
- Better information-sharing



- More effective advocacy/ lobbying
- Reduced government costs
- More effective and efficient government services
- Self-empowerment
- Increased transparency
- Greater engagement in science and research
- Greater funding impact
- Increased visibility and reuse of funded research

Expected Outcome:

- Public engagement
- Responsible research and innovation
- Trans-disciplinary research

FIGURE 86 - SOCIAL AND GRASSROOTS STRATEGIC ORIENTATION 5: OPEN DATA AND RESEARCH

Relevant Actionable/ strategy/ support

Project I

Devise a regular grant writing course with emphasis on specifying and elucidating the social innovation dimension in the 'theory of change' especially for NGOs.

Project 2

Extend the services of MRIC to hand-holding from pre-application inception stage through to connecting grantees to end-users and facilitate networking.

Project 3

Re-introduce the Solicited and Unsolicited Research and Innovation Grant Schemes at the MRIC for encouraging applied social research for direct linkages with socially innovative outcomes.

Project 4

Develop research partnerships between community organizers and researchers to improve scoping, framing and impact of research and develop their roles as civic institutions.



9.6 General/ Cross-cutting Recommendations

Several recommendations have been put forward during the engagement process to put social and grassroots innovation to work in the country. Given the multi-sectoral, multi-disciplinary and multi-perspectival reach of social and grassroots innovation, the recommendations for the proposed strategy are designed to support an ecosystems approach where all stakeholders more particularly grassroots having a role to play in improving outcomes in our communities and solving our common challenges. This strategy is intended to work across all social issue areas (poverty, unemployment, circular economy, disability, social exclusion) and sectors, including with all levels of Government.

Awareness and mobilisation for a shared understanding of S&G Innovation

Coordination of a national social and grassroots innovation awareness campaign to raise awareness and mobilise grassroots to take stock of the benefits of S&G innovation.

Regular national competitions and awards focusing on themes of national interest of topical relevance can have the dual role of incentivising uptake of S&G while generating widespread interest in this area.

Nation-wide innovation initiatives, such as social and grassroots innovation fairs, could improve community relationships, develop routes for local talent to access opportunities, and enhance the potential for innovation activities to support and strengthen local grassroots community.

Displaying promotional videos of social and grassroots innovations at crowded places like metro stations, workplaces, malls, and major local bus stops. This will attract the focus of the commuting local passengers and make them aware about the various social and grassroots innovations of Mauritius.

Evidence and knowledge sharing

Establishment of a social innovation evidence development and knowledge sharing initiative. This will enable the scouting of S&G initiatives locally, regionally and internationally as well as the sharing of data. Open data and research are widely known to be crucial to inform social innovation.

MRIC schemes, hand-holding support and facilitation of uptake and upscaling

There have been numerous representations among different quarters during the consultation process that MRIC diverse schemes could include social innovation and social impact as evaluation criteria to promote this field.

Given the large number of expressions of interest for SIRGS as opposed to the actual number of applications, as well as the unfavourable ratio of successful v/s unsuccessful applicants, it is also recommended to devise regular grant writing course with emphasis on specifying and elucidating the social innovation dimension in the 'theory of change'. In fact, NGOs are often confronted with shortage of staff with the technical ability to write and submit grant applications in prescribed formats.



In order to ensure that innovative projects funded by the Council are sustained beyond the grant and have due social impacts, it has also been recommended that the services of the Council be extended to hand-holding from pre-application inception stage through to connecting grantees to end-users and facilitate networking.

It has also been recommended to re-introduce the Solicited and Unsolicited Research and Innovation Grant Schemes to encourage applied social research where there are direct linkages with socially innovative outcomes.

Research and Innovation Facilitation and Coordination between Social Innovation Practitioners, Researchers and Grassroots

MRIC and researchers could develop research partnerships between community organisers and researchers to improve scoping, framing and impact of research and develop their roles as civic institutions.

Establish a permanent multi-sectoral committee for Social Innovation

There is a need for the setting up of a multi-sectoral committee for Social Innovation chaired by the MRIC and comprised of policy-makers, academics, business leaders, NGOs and grassroots leaders and social entrepreneurs and social innovation specialists which would help anchor commitment and long-term policy action towards S&G Innovation.

This permanent committee can also contribute to creating synergies and multi-sectoral collaborative agreements.

Funding and capital

The issue of funding and capital for the development of projects which are socially or causedriven rather than profit driven is an issue which impedes on this sector to take-off. Recommendations have been made to the effect that a special social innovation fund be put to the disposal of potential applicants on the merit of socially innovative submissions with high impact value.

Moreover, in order to meet the requirements of grassroots projects, due consideration be given to shifting rigorous reporting of activities to flexible pursuit of outcomes.

Invest in leaders and organizations that are struggling to overcome the stagnation chasm.

Funding seasoned entrepreneurs to collaborate with Grassroots Innovators. To increase the success rate of Grassroots Innovators, we would provide grants to seasoned entrepreneurs who could then choose the Grassroots Innovators that they want to collaborate with. The collaboration would bring the best entrepreneurial brain to try their hands in making the grassroots innovations reach its potential.

Policy and Regulatory Environment

Closely related to the above point, the need has been impressed by the working group to address the legal and regulatory issues impeding NGOs and non-profits from engaging in social innovation and social enterprise.



While many able social innovators and entrepreneurs are interested to serve the community, it is often detrimental to their own time and funds and along these lines, there is another important recommendation to review the legal framework for social enterprises in order to enable them to emerge.

There are many aspects to develop a legal framework that underpins social innovation, from tax relief to procurement rules that oblige public bodies to consider how services to be procured can improve the economic, social and environmental well-being of communities (such as the UK's Social Value Act, 2012). At present, Mauritius does not have a legal framework for social enterprises, sometimes known as "mission-led" (rather than profit-led) businesses.

A twin track approach is required. On the one side, we require research and policy that come up with the establishment of multiple social and grassroots innovations projects which generate sustainable practices. On the other, all stakeholders should adopt a reciprocal learning approach to social and grassroots innovations, that is, action research. We need to learn from the wealth of information that other agencies possess and work on it to promote sustainable innovations.

Social business incubation, skills labs and capacity building in social and grassroots innovation

Further recommendations to develop the social innovation ecosystem would be to incubate potential social enterprises and more social business incubators, such as Trampoline, would be able to multiply the number of adherents and by extension, impact more tangibly on society.

Capacity-building, empowering and improving NGOs and grassroots innovators access to innovation and social entrepreneurial skills, such as design thinking, social business development, relevant soft and technical skills required in their problem area.

In addition, the development of an entrepreneurial mindset particularly at the grassroots level is lacking. Risk-taking is a critical concept that should be imbibed in our younger generation since it enables and develops innovative thinking which can lead to differentiation of products and services.

- Local networking for mutual learning and sharing
- Harmonizing approaches to development
- Local/regional NGO networks for research, resource sharing, management and capacity development

Educate, support, and support individuals who can functionally bridge the fragmented ecosystem.



9.7 Roadmap

Social and Grassroots

Strategic Orientation 1: Shared Understanding of S&G Innovation

Short Term

Long Term

- · organise awareness campaigns on the benefits of S&G innovation.
- · Developing local initiatives to support and strengthen local grassroots community.
- · Establish a Social Innovation Evidence Development and KnowledgeSharingInitiative.
- · formulate policies to promote crowdsourced sustainable development programmes

Strategic Orientation 3: Encouragement of Social Entrepreneurship

- · Establishing a multi-sectoral committee for social innovation
- Government support of pertinent entrepreneurships
- · Launch entrepreneurship awareness campaigns at national, regional and local levels
- · Stimulate private sector-led initiatives and strengthen networks among entrepreneurs

Strategic Orientation 5: Open data and Research Investigating the skills gap between social science graduates and industry expectations. Develop social conscience & responsible citizens(innovative international best practices) · Re-introducing the Solicited and Unsolicited Research and Innovation Grant Schemes

- · Developing research partnerships between community organisers and researchers.
- Developing a repository for social initiatives.

Strategic Orientation 2: Enabling Environment/Ecosystem with emphasis on collaboration (Public-Private-Academia-Civil Society) · Develop a legal framework to enable social innovators and entrepreneurs to emerge. Medium Term

- Developing a Social Innovation Ecosystem by incubating potential social enterprises
- Provide government with guidance for regulatory framework of highest standards. · Develop regulatory innovation capacity 'sandboxes' to experiment with new models.
- Establish research support programs to increase transparency and accountability

Strategic Orientation 4: Capacity Building/ Skills Development with a particular attention to capabilising grassroots communities and Civil Society as pillars of social innovation

- · Set-up a Special Innovation Fund to the disposal of researchers at the grassroots level.
- · Empower NGOs and grassroots with innovation and social entrepreneurial skills
- · Develop grant writing, fundraising support and facilitate networking.





9.8 Conclusions

Social and Grassroots Innovation in Mauritius is best described as in a nascent stage. What is clear is that social innovation is already a force for positive change in many developed and developing markets alike; that it is being incorporated into more administrations, analysed by more institutions, and pursued by more entrepreneurs and investors. Future studies, and future innovators, will therefore have more data to draw on, and social innovation will move further from a concept towards a science that is applied and tested.

This contribution of the Working Group on the state-of-the-art in S&G Innovation, the gaps and challenges which exist, the vision for this complex sector and the recommendations for addressing these gaps and enable its adoption to harness its potential, will contribute to positive transformations in Mauritian society.



Annex A

Social Innovation

In today's hyper connected world, one country's societal problems can become ours. Nations are facing slow economic growth, financial instability, political turmoil, hunger, poverty and disease. These are all social issues that have to be addressed, and such big problems generate big business opportunities. In fact, more than 80% of economic growth comes from innovation and application of new knowledge. A truly prosperous society in our days consists of both economic prosperity and social prosperity. Prosperous societies have an innovative approach to current social issues because complex problems need new solutions. Social innovation brings a new mindset that leaves behind the narrow way of thinking about social enterprises and for-profit businesses as two mutually exclusive areas. It should be acknowledged that social innovation is potentially adding an extra dimension to innovation, sustaining economic and social growth. Embracing social innovation is not just about doing good for the society but also about doing good business. **Table A.1** shows previous major examples undertaken by selected countries to develop their social sectors.

Countries	International Social Innovation
Singapore ^a	Singapore was considered as the most vulnerable to future water stress 'based on
	an index measuring competition for and depletion of surface water, such as lakes
	and rivers' and saw a potential threat as an opportunity to step into the frontline to
	secure its water future. As a result, the country has become a hub for mutually
	beneficial technology collaborations and exchanges to support its own water
	security. Currently, the country is a world leader in water research with sustainable
	domestic supply. The city-state is a pioneer in water technology with solutions
	capable of creating long-lasting change.
India ^b	Agnisumukh manufactures commercial kitchen equipment driven by innovative,
	energy-efficient radiant heat gas burners. These ultra-efficient cooking stoves save
	30% on gas, improve cooking and help beat indoor air pollution in commercial
	kitchens. Their vision is to transform lives by providing clean, green, energy-efficient
	heating solutions across gas fuels.
Malaysia ^c	Malaysian enterprise Green Hope has found a way to create biodegradable bags
	from cassava trees. This innovation is exciting because there is the usage of the
	starch in the roots of cassava trees to create the bags. So production won't disrupt
	food chains.
Iceland and	Equal paid paternity and maternity leave to tackle the gender wage gap. By law, men
Finland ^c	and women in Iceland and Finland enjoy equal family leave. And some organizations

FIGURE 88 - EXAMPLES UNDERTAKEN BY SELECTED COUNTRIES TO DEVELOP THEIR SOCIAL SECTORS



	are taking it upon themselves to offer generous paid paternity leave, including					
	Facebook, Netflix, Spotify, and Etsy.					
California ^c	The University of California have developed artificial_sunflowers. Known					
	SUNbots, these fake sunflowers are less than 1 millimeter in diameter are made					
	materials that react to heat in order to bend towards sunlight and harvest more					
	power. This tech could make solar power more efficient.					
China ^c	Food waste is a big issue all over the world. But in China, cockroaches are sorti					
	through it. In one cockroach farm in Jinan, China, a billion cockroaches chew					
	through 45 tonnes of the stuff each day. They're also used as a ground-up food					
	source for livestock.					
France ^c	Last year, France banned the destruction of unsold consumer goods – a wasteful					
	practice that saw up to \$900 million in products destroyed each year. By 2023,					
	brands will have to donate, reuse, or recycle everything they make.					
United	UK company Dendra Systems has found a way to plant trees 150 times faster with					
Kingdom ^c	the help of drones. The drones quickly and accurately shoot biodegradable pods					
	into the ground. Dendra Systems hopes to plant 500 billion trees.					
Hong Kong ^c	Hong Kong University have found a way to repurpose the heat produced by					
	computers, ovens, and aircon exhausts. They've developed a cheap, adjustable					
	energy recycling cell that can convert this excess heat into electricity for repeat use.					
London ^c	London start up Abornea's Bio Solar Leaf panels grow edible algae to produce food					
	ingredients while reducing CO_2 levels. This technology can be used as a means to					
	minimize CO_2 around cities as the panels take up minimal space. The algae grown					
	on a single solar panel absorbs as much CO_2 as 100 trees per day.					

^a Source: Social Innovation Academy, 2020

^b Source: Social Innovation Academy, 2019

^c Source: Board of Innovation, 2022



Annex B

Grassroots Innovation

Figure 87 shows previous major examples undertaken by selected countries to develop their grassroots sectors.

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Countries	International Grassroots Innovation				
France ^d	Energy autonomy in Le Mené: A French case of grassroots innovation. This				
	initiative was innovative not only in terms of the scope of the mechanisms				
	implemented, but also in terms of the social organization behind the development				
	of the projects and the capacity to use energy production as a social resource.				
Japan ^e	Grant Assistance for Grassroots Projects (GGP). This scheme supports projects				
	proposed by various bodies such as NGOs and local government authorities.				
	Particular attention is given to projects in the following areas such as primary health				
	care, primary education, poverty relief, public welfare, and environment.				
Colombia ^f	Colombia's Peace fand Grassroots Peacebuilding. The grassroots approach				
	considers peacebuilding a bottom-up process that focuses on integrating the				
	community level, rather than trying to 'achieve' peace at level of the elites. When				
	the Colombian Peace Agreement was signed in 2016, two grassroots initiatives in				
	Colombia were taken under the loop				
South	In South America the appropriate technology movement emerged in a context of				
America ^g	social upheaval between the challenge of political repression and the influence of				
	new forms of activism and participation. It brought the development of own local				
	networks, technologies and the transformation of appropriate technology ideas in				
	a more suitable way for the needs of the region, as well as pioneering activities that				
	would outlast the movement in areas such as agroecology.				
India ^g	The people's science movement emanated from discussions between civil society				
	organizations, technologists, and scientists that focused on the potential for				
	enhancing traditional techniques through scientific application. It was emerged for				
	inclusive local development.				
United	In UK the movement for socially useful production emerged due to economic				
Kingdom ^g	decline and loss of manufacturing jobs in industrial sectors. This movement aroused				
	out a combination of diverse movements such as grassroots trades unionism,				
	peace, community activism, radical science, and to a lesser extent,				
	environmentalism, and feminism.				
Brazil ^g	The STN put community development activities at the centre of developing new,				
	inclusive capabilities in science and technology development. The STN had as its				
	main aim fostering a more democratic process of innovation for development by				
	turning isolated initiatives into broader public policies and application, with				

FIGURE 89 - EXAMPLES UNDERTAKEN BY SELECTED COUNTRIES TO DEVELOP THEIR GRASSROOTS SECTORS



	attention to income generation and social inclusion for the poorest among the			
	population.			
India ^g	The Honey Bee Network views grassroots innovation as invention and innovation			
	coming from the grassroots, often among people with little formal training and			
	reliant on local, traditional or indigenous knowledge. The network's main activity			
	is the scouting and documentation of innovations and traditional knowledge based			
	on different actions.			
Brazil,	Youth innovation and entrepreneurship was the focus of the Brazil, Russia, India,			
Russia, India,	China, South Africa (BRICS) Young Scientist Forum taking place in Durban. The			
China, and	concept involves leveraging what someone has and using minimal resources, while			
South	adding value. The programme supports innovators with technology packages,			
Africa ^g	access to technical, academic and incubation expertise, value addition and			
	intellectual property protection, as well as with marketing their innovations.			
California ^{g,h}	Hackerspaces, fablabs and makerspaces are community- based digital fabrication			
	workshops providing innovative spaces where people come together to learn			
	about and use versatile digital design and manufacturing technologies.			

^d Source: Yalcin-Riollet et al., 2014

^e Source: Ministry of Foreign Affairs of Japan, 2022

^f Source: PCDN, 2018

⁸ Source: Steps Centre, 2016 ^h Source: OpenMind BBVA, 2015



IT, EMERGING AND ENABLING INNOVATION

Be an innovator, not an imitator." - Audrey Carballo

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10.0 IT, Emerging and Enabling Innovation

10.1 Executive Summary

A participatory approach to define a new strategy leveraging on IT and Emerging Innovation for the betterment of the lives and livelihoods of the people of the Republic of Mauritius

Since the last couple of years, IT, Emerging and Enabling Innovation became key drivers of innovation and have greatly improved the lives and livelihoods of many people. Mauritius is no exception to this trend. The COVID-19 pandemic has triggered a small digital revolution in the Republic of Mauritius. The country was closed to the world and many new services, driven by IT, enabled the economy to remain operational. Concepts, such as online ordering, e-payment, e-money transfer, e-grocery, which were once a myth in Mauritius, became common practice and is now impregnated in the Mauritian routine. Most of these digital changes were driven by Mauritian technicians.

Change is a constant in the IT and enabling emerging industries. Every day, there are new technologies being developed and new opportunities for progress created. While the rest of the world is progressing at a phenomenal speed in the IT sector, it is primordial for the Republic of Mauritius to continue its ongoing effort and strive to adapt and develop new skills, knowledge, infrastructure and regulations with regards to the emerging and enabling technologies to be able to stay afloat in the post COVID-19 world.

Les Assises de la Recherche et de l'Innovation 2022 seeks to define a new roadmap to facilitate the adoption, adaptation, usage and creation of new technologies led by Mauritians for Mauritius. The order seems to be very tall in face of the numerous challenges currently present in the IT and enabling emerging industries ecosystem in Mauritius. However, there is a glimmer of hope that Mauritius can steer itself out of the crisis if we leverage on the policies and IT infrastructure already in place in Mauritius, the literacy rate and the resilience of Mauritians in face of the coronavirus crisis.

For us to pursue on this path and tackle the coronavirus crisis on our own, we should adopt an 'innovative mindset and emerging sector driven strategy'. The rules of the game have been drastically changed by COVID-19 and opportunities for success are real and available - many at affordable cost. The challenge is to put more effort on providing a response to COVID-19 imposed change than to continue reacting to this sudden catastrophe. To create the right mindset and involvement of stakeholders in the private sector, public sector, academia and the society, we need to promote this culture of 'together we can'.

This report provides the reflections of a group of diverse high-level stakeholders from Ministries, private sector, academia and society in Mauritius. It defines a series of short, medium and long-term projects and strategies to implement to give Mauritius a new thrust in the post COVID-19 era.



10.2 Introduction

The present report provides the gist of the reflections of the captains of the IT industry and emerging innovation sector in Mauritius. The panel of discussions regrouped a highly technical and professional team comprising the public sector, private sector, NGOs and academia to identify gaps and challenges currently being faced and solutions in the coming 3 to 5 years ahead to push IT, Emerging and Enabling Innovation in contributing to the Mauritian economy. Focus is also set on short-, medium- and long-term actions which are impactful and implementable and which, altogether, contribute to pulling the Republic of Mauritius out of the COVID-19 imposed crisis.

10.2.1 Aim and Objectives

The aim of the thematic group on IT, Emerging and Enabling Innovation of the ARI 2022 is to set the foundations of a national masterplan for technology, research, and innovation for the Republic of Mauritius.

10.2.2 Guiding Principles

The following key factors were taken into consideration while addressing the above objectives:

- A paradigm shift towards adoption of specialised concepts, such as artificial intelligence, big data and industry 4.0 across all sectors
- Promotion of an innovation culture and pioneer a learning culture across all demographics
- Starting on a small scale and laying the required foundations for the next five years
- Developing a growth mindset to become pro-active.
- A critical evaluation to gain an in depth understanding of our strengths and weaknesses
- Capacity building contributing to the development of Mauritius workforce
- Education, training, and awareness campaigns on the importance and use of IT and Emerging technologies

10.2.3 Outline of International Innovation Trends related to IT, Emerging and Enabling Innovation

In our modern world, AI is rapidly expanding, and a new subset of AI is machine learning, which refers to the concept that computer programs can automatically learn from and adapt to new data without being assisted by humans. Using that concept, AI is being tested and used in the healthcare sector, financial industry and in self-driving cars. The AI market is expected to grow to a \$190 billion industry by 2025. The next big emerging technologies are VR and AR. These technologies have enormous potential far beyond the gaming industry, such as in training, entertainment, education, marketing and rehabilitation after an injury. The global VR and AR market is expected to grow to \$210 billion by 2022.



In addition to this, the usage of cloud computing is still dominant but no longer an emerging technology, unlike edge and quantum computing. Edge computing can be used to bypass latency caused by cloud computing and get data quicker to a data centre for processing. Therefore, by adopting this methodology, edge computing can be used to process time-sensitive data in remote locations with limited or no connectivity to a centralised location. On the other hand, quantum computing is a form of computing that takes advantage of quantum phenomena like superposition and quantum entanglement. This amazing technology is extremely helpful, for instance, in preventing the spread of the coronavirus, and to develop potential vaccines, owing to its ability to easily query, monitor, analyse and act on data. In addition to that, the cyber security and cryptocurrency industries are experiencing a boost as a result of blockchain technology. The ability of blockchain technology to only be able to add data, and not take away from or change the chain, makes it very secure. In addition, blockchains are consensus-driven, so no one entity can take control of the data and with blockchain, there is no need for a trusted third party to oversee or validate transactions. Furthermore, the introduction of 5G is expected to revolutionize our lives, by enabling

services that rely on advanced technologies like VR and AR, alongside cloud-based gaming. Moreover, this will allow the concept of IoT to expand, by enabling devices, home appliances, cars and much more to be connected and exchange data over the internet. 5G networks will cover 40% of the world by 2024, handling 25% of all mobile traffic data making it an emerging technology. Forecasts suggest that by 2030 around 50 billion of these IoT devices will be in use around the world, creating a massive web of interconnected devices spanning everything from smartphones to kitchen appliances. The global spending on the IoT is forecast to reach 1.1 trillion U.S. dollars in 2022.

The following tables shows selected countries making the most out of the digital age according to the NRI.

Countries	Strategy
Finland	Thanks to its outstanding digital infrastructure, which the Global Information Technology Report (GITR) says is the best in the world. With more than 90% of its population using the internet, and with high levels of innovation, Finland is reaping the rewards of investing heavily in ICT in the mid- 1990s, which it did in response to a financial crisis.
Singapore	Offers an ICT infrastructure that is relentlessly being improved, and the best online services and highest-quality education systems in the world. This city state has become a knowledge-intensive economy and ICT powerhouse.
Sweden	A world-class yet affordable digital infrastructure and stable pro-business environment, despite high tax rates. These strengths have led to outstanding use of ICTs by individuals, businesses and government, as well as one of the highest innovation performances in the world, making Sweden a truly knowledge-based society.
The Netherlands	This service-based economy has quickly and skillfully recognized the importance of ICTs in boosting innovation and competitiveness. Information technology permeates all sections of society in the Netherlands, with nearly everyone able to access a computer and home internet connection, and a large number of government services available online.

FIGURE 90 - SELECTED COUNTRIES MAKING THE MOST OUT OF THE DIGITAL AGE



Norway	95% are internet users and more than 90% have access to a personal computer and internet connection at home. In addition, the country benefits from a stable pro-business and pro-innovation environment and a government that is aware of the importance of connectivity for the economic and social development of a geographically vast nation with a widely dispersed population.				
Switzerland	An excellent, if expensive, ICT infrastructure and a strong education system that provides the necessary skills to create a knowledge-based, technology-rich economy. These assets, coupled with a stable political and regulatory environment and excellent conditions for innovation and entrepreneurship, have resulted in outstanding digital uptake and use by businesses.				
United States	Due to improvements in many areas of the index, including the country's already strong business and innovation environment and ICT infrastructure, notably in terms of wider access to international internet bandwidth. Overall, the country has seen a robust uptake of digital technology by all major stakeholders, whether businesses, governments or individuals.				
Hong Kong	This has been driven by improvements in conditions for innovation and entrepreneurship, better skills training and increased use by both business and government. Hong Kong enjoys a well-developed infrastructure, and this has had a positive economic and social impact.				
United Kingdom	The UK was early in recognizing the importance of ICTs, especially to innovation and competitiveness, and as a result has become highly digitized, with a thriving e-commerce environment. This, coupled with a pro-business approach, has had wide-ranging economic and social benefits.				
South Korea	A country that has based its economic success largely on the ICT industry, Korea's government ranks first in the world in terms of online services. The country's focus on developing its technological capacity as part of its economic development strategy has also improved its reputation for innovation.				

Contemplating the NRI, we can observe that the top 10 performers more or less never change and the reason behind is their consistency in most pillars (technology, people, governance, impact), especially the technology sector. Their sheer will to set themselves apart by adopting and investing in emerging technologies, such as AI, 5G and IoT, amongst others, is quite astonishing.

The following table shows the top 10 economies in NRI 2020.

FIGURE 91 - TOP 10 ECONOMIES IN NRI 2020

Country	NRI Rank	NRI Score	Technology
Sweden	1	82.75	2
Denmark	2	82.19	5
Singapore	3	81.39	10
Netherlands	4	81.37	3
Switzerland	5	80.41	1
Finland	6	80.16	9
Norway	7	79.39	11
United States	8	78.91	4
Germany	9	77.48	7
United Kingdom	10	76.27	8

Mauritius is ranked 61^{st} in NRI 2020 and 56^{th} in the technology pillar, making it the top performer in Africa with a score of 49.83.

The above figure represents the new trends regarding the penetration of IT and Emerging Sector in the post-COVID world. It is more and more evident that technology is integrated in all aspects of the economy around the world.



The COVID-19 pandemic has set new norms and reduced many of the digital divides. It is envisaged that if Mauritius could implement a proper plan, many sectors could be easily digitised. The section below presents a summary of the reports focusing on ICT sector in Mauritius.

10.2.4 Status of ICT in Mauritius

Mauritius has progressed remarkably in the ICT sector during the last decade and has positioned itself as one of the countries with the best IT infrastructure in the African continent. This, coupled with the high literacy rate, political stability and ideal location for Eastern countries augurs very well for further progress in the ICT and emerging technologies sector.

Nowadays, Mauritius is a recognized regional ICT hub and the ICT sector is now the third pillar of the economy as it represents open-source policy, Digital Mauritius strategy and Al strategy, amongst others. With some 850 ICT-BPO based enterprises, the industry represents a key driver of the Mauritian economy with a GDP contribution of 7.4% for 2021 and employing around 30,000 people, thereby transforming the country into one of the richest technology ecosystems in Africa that thrive on innovation and collaboration with global players such as Accenture, Ceridian, Convergys, Huawei, Orange Business Services and Allianz across sectors.

Due to its strategic location, Mauritius is today considered as the start-up hotspot in the region as it has implemented numerous measures to optimize conditions for technology. Developments in the digital space currently offer the country the possibility of embracing new opportunities to grow the economy in fields, such as cloud services, cybersecurity, digital health technologies, ed-tech, ecommerce, IoT, AI, VR and AR. Also, Mauritius has embarked upon Industry 4.0 and the new graduates have competencies in emerging technologies, such as AI and the block-chain as the MRIC offers at least 6 innovation and commercialization schemes with the aim to boost creativity, innovation and research in Mauritius with the funding ranging from Rs I M to Rs I0 M. On top of that, the ICT industry in Mauritius has evolved towards export-oriented services. The African market is accessible to companies operating in Mauritius because of our membership in SADC and COMESA.

Trade in ICT goods between 2019 and 2020 was as follows:

- imports went down by 22.8 % from Rs 11,524 million to Rs 8,892 million
- exports, which include re-exports, decreased by 35.3% from Rs 1,074 million to Rs 695 million.

Trade in ICT services between 2019 and 2020 was as follows:

- imports increased by 21.7% from Rs 3,830 million to Rs 4,662 million
- exports decreased by 1.3% from Rs 4,970 million to Rs 4,907 million.

Between 2019 and 2020, the share of ICT goods and services increased:

- from 5.7% to 6.5% over total imports
- from 3.1% to 4.4% over total exports.


The contribution of ICT to Gross Value Added (GVA) at current basic prices was 7.0% in 2020, higher than in 2019 (5.8%). The real growth rate (after removing price effects) went up from 4.7% to 4.9%. In 2020, around 53% of the value of the sector was generated by telecommunications, 14% by wholesale and retail trade and 33% by the remaining activities such as manufacturing, call centres, software development and website development.

Furthermore, the internet infrastructure in Mauritius is world-class with full fibre for home coverage as Mauritius is the first country in Africa to offer 100 Mbit/s internet bandwidth to home users. According to the continuous multi-purpose household survey, between 2018-2020, the ICT access by households improved considerably. The proportion of households with smartphones currently ranges from 71.3% to 81.4% while 69.7% to 72.6% of households have internet access. Internet penetration is 133.9% and mobile penetration is 155.25% as of 06/2021.

In addition, Mauritius is connected to the world with three undersea cables (SAFE, LION/LION2 and METISS) and a third cable will be operational soon. A fourth optical cable, namely the T3, connecting Mauritius to South Africa with an offshore connection to Reunion Island and Madagascar, will be implemented by 2022-2023. The MARS cable (Mauritius-Rodrigues Sub-Marine Cable) connects Rodrigues to the rest of the world. Faster internet connection, better internet penetration and enhanced security of the banking systems are significant advantages the fibre brings to local business and already prepares Mauritius to face the new post-COVID-19 era.

Moreover, there is an unfailing commitment of the Mauritian Government to transform Mauritius into a cyber island. For instance, the National Computer Board initiated the Cyber Caravan project, with the aim to raise the level of computer literacy and render internet access more accessible to everyone within the community.

The details of the project are shown in Figure 90.

Technology	350 Wi-Fi hotspots Cyber Caravan – mobile training lab Open-source course content – Code studio.org	Training	Coding for youth, ICT literacy training for women
Year program started	2017	Cost to users	US\$ 20 for 3 modules of training (compared to US \$130 by private sector) US\$ 95 online certification
Geography	Island	Total cost of program	Not disclosed
User profile	State college students, the general national public, and women between the ages of 16 and 35 for targeted programing	Associated organizations	Mauritius Telecom, Mauritius Telecom Foundation, Microsoft, Various government ministries

FIGURE 92 - PROJECT DETAILS OF THE CYBER CARAVAN PROJECT



10.2.5 ICT Sector - A Major Boost for Mauritius to Tackle Post COVID-19 World

It is now clear that emerging technologies have become a critical factor for successful economic resurgence post COVID-19 crisis. Interestingly, the COVID-19 pandemic has reset all parameters. What was once taken for granted is no more a reality, while new paradigms have mushroomed allowing every country a chance to emerge out of the crisis if the latest IT technologies are adopted and adapted to the country's own socioeconomic situation.

Hence, in the post-COVID-19 era, Mauritius has its chances to break into the global market if a proper strategic plan is implemented focussing on generating an unprecedented, futuristic, and flexible ecosystem driven by IT and emerging technologies. These trends can be further enhanced by leveraging on the indigenous Mauritian culture and bringing together key actors of the public and private sectors, academia and the society to operate more efficiently. Our cultural heritage, our geographical location and our people are key factors for success in this new era.

Solid strategies enhancing key pillars, such as up-to-date ICT infrastructure, talent management, cybersecurity, digital government and enhanced adoption of innovation, and emerging technologies must be implemented to achieve the above-mentioned paradigm shift gearing Mauritius towards accelerated innovation.

This report provides an overview of the discussions and views of the captains of the ICT industry in Mauritius, academia, key public sector representatives and the society representatives on the aforementioned strategies and proposes an outline of the key steps to be implemented.

10.3 Sectoral Working Group - IT and Emerging Industries

10.3.1 Meetings

Four brainstorming sessions were held with captains of industry, key representatives from the public sector, researchers from academia and representatives of the society. The stakeholders sought to define a new roadmap focusing on how the MRIC will leverage on its strengths and collaborators to facilitate the adoption, adaptation, usage and creation of new technologies led by Mauritians for Mauritius.

Using the inputs from all the stakeholders during the brainstorming sessions, a report was drafted providing insights for the roadmap on IT, Emerging and Enabling Innovation while enunciating the short-, medium- and long-term actions. The main findings of the report were thoroughly discussed and validated during Les Assises de la Recherche et de l'Innovation 2022 on the 28th April 2022.



10.3.2 Key Outcomes and Recommendations for the IT, Emerging and Enabling Innovation – Strategic Orientations

There was a consensus that there is a glimmer of hope that Mauritius can steer itself out of the crisis if we leverage on the policies and IT infrastructure already in place in Mauritius, the literacy rate and the resilience of Mauritians in face of the COVID-19 crisis.

There is a consensus amongst the experts and captains of the IT Industry in Mauritius that for us to get out of the crisis, we should adopt an 'innovative mind set and emerging sector driven strategy'. The rules of the game have been drastically changed by COVID-19 and opportunities for success are real and available, many at affordable cost. The challenge is to put our efforts and heads together to re-engineer a new mindset involving stakeholders in the private sector, public sector, academia, and the society and create this new wave of 'together we can'. The working model that was recommended is to proceed via a series of short-, medium-, and long-term projects and strategies to implement to give Mauritius a new thrust in the post-COVID-19 era.

10.3.3 Gaps and Challenges

The technical committee highlighted that for Mauritians to innovate, the mindset needs to evolve from a young age. Despite a high literacy rate and access to the internet, the disparity between skills and knowledge has left unfathomable cracks in our way alongside numerous issues which are yet to be quantified. These include brain-drain, an ageing population, health, limited export opportunities and a fierce competition in tourism to mention a few.

Firstly, a clear difference between learning and education must be entrenched with the aim to focus more upon skills and capacity building to normalise an aptitude for learning. As a matter of fact, the education strategy in Mauritius is no longer in perfect harmony with the mindset of the new generation with regards to the IT sector as constraints on age, number of seats, time and the structure of the programme at tertiary level amongst others do not allow the transcendence of pedagogical values and norms into the career world. The existing educational culture in Mauritius was already becoming unconventional, but the pandemic further aggravated the situation and created an ecosystem where autonomous learning is prioritised.

For instance, there might be a group of students who are incredibly passionate about coding, web design, application development, digital marketing, artificial intelligence or designing noncentralised platforms, i.e., blockchain & DeFi (Ether, NFTs, Bitcoin) and not necessarily computer science as a whole, as a result of which, these students resort to self-learning due to the availability and accessibility of courses online; they would rather have the choice to learn at their own pace than to follow a strict curriculum. Currently, the philosophy adopted by these group of people might be considered as a threat to traditional universities, but looking at it from a positive perspective, this might push them to review their curriculum, innovate their ways of teaching and campaign to raise awareness of the accessibility and the boundless nature of the IT sector in the foreseeable future.

Moreover, what we will achieve in the next five years has most probably already been accomplished by developed countries. Hence, a lack of follow up on emerging technologies



worldwide, for example in data science, machine learning and cybersecurity, is a huge concern and will undoubtedly enlarge the present gap unless we act upon it now. It was highlighted that Mauritius must not fall prey to overestimating our progress. Instead, we should be continuously and consistently reviewing our efforts and attempt to innovate our surroundings. In addition to this, the lack of Search Engine Optimization skills has negatively impacted the tourism industry. The new generation is highly influenced by social media and advertisements with pertinent content while planning for their vacation destinations, thereby denoting that the obsolete marketing tactics of the tourism industry need to evolve into a technology business. VR technologies can be utilised to enable a virtual experience of hotel rooms and sightseeing since social media advertisements alone might fall short to reach the targeted audience.

In a nutshell, the government must act as an enabler to promote a new innovation culture and raise awareness of the public about the life-changing scenarios that mastering those skills could bring in conjunction with assuring that businesses evolve in parallel with the IT sector with the goal to prevent them from dawdling into oblivion. However, some questions on resources, adaptability and willingness remain to be answered and maybe many answers that we now have remain to be modified. Having said that, it is better to try and fail rather than fail to try and the faster we fail, the faster we can learn and the better it is for the IT sector.

10.3.4 General Principles

To address the above gaps and challenges, the committee recommended the following general principles:

- Adopt a problem-solving mindset rather than IT mindset and achieve a digital literacy population
- To review education strategy in Mauritius as STEM is difficult to grab
- To collaborate with public and private sectors while including people from grassroots level regarding decisions (To know what is the real problem)
- To focus on digitalisation
- Mauritius should go global and offer services worldwide
- Use of technology to avoid impact of Mauritius geographical location
- To raise awareness on digital tools
- To strengthen local market
- Promote an innovation culture in Mauritius
- Prioritise data science
- Use of technology in parking system and agriculture (e.g. Al in hydroponics)
- Use satellite data to tackle UN SDGs for socio-economic benefits
- With the New Space Era, space technology could become a pillar of the economy such as providing ground station as a service and business/start-ups around space activities



10.4 Strategic Orientations

Further to discussions and validation during the ARI 2022, three main strategic orientations were recommended to gear Mauritius on the right path to embark into the current worldwide trend to adopt and adapt IT and emerging technologies in all aspects of the socio-economic development. These strategies are namely:

- i. Creating awareness and fostering empowerment in the ICT sector.
- ii. Instigating and sustaining the maker culture in the country.
- Engaging into collaborative innovation involving key public and private sector stakeholders, academia and the society to enhance R&D and Innovation in IT and Emerging technologies.

10.4.1 Strategic Orientation 1: Awareness and Empowerment

Target:

- Boost IT & Emerging Technologies among the Mauritian population
- Demystify information and communication technology
- Raise awareness among the existing workforces

Economic and Social Benefits (Expected impact):

- Increase in qualified workforce
- Acquiring industry-related IT skills could change the standard of living of many citizens
- A more conscious and technologically adept society

Expected Outcomes:

- Improved IT literacy of the population
- Increased number of autonomous learners
- Emergence of a digital society

FIGURE 93 – IT, EMERGING & ENABLING INNOVATION STRATEGIC ORIENTATION 1: AWARENESS AND EMPOWERMENT

Project I

Create a social media account/ website which posts informative videos, for instance, live tutorials, regarding IT and emerging technologies on a regular basis. Additionally, the videos could be made in creole to attract a wider Mauritian audience and English and French subtitles could be added afterwards so as not to deprive the expatriates of this opportunity.

Project 2

Public awareness by making use of marketing techniques (advertisements, papers, national TV pubs & billboards) to inform citizens about digital developments and further increase their relevant knowledge alongside an adoption of emerging technologies.



Project 3

Organize seminars and workshops on coding, website, and app development amongst others in primary and secondary schools for free with the purpose of diversifying the skills of the modern generation by developing a more efficient problem-solving technique which is transferable to various other fields.

Project 4

Accelerate collaboration between government, private sectors and telecom operators on a common interest in creating a technologically adept economy and society. By providing a digital upgrade in offices and workplaces, this will promote emerging technologies and engage more people to participate (make people more IT literate).

10.4.2 Strategic Orientation 2: Instigating the Maker Culture in the Country

Target:

- Creating innovative mindsets
- Creating a futuristic and adaptable working environment
- Changing the conventional methods of academia
- Tackle the brain drain issue

Economic and Social Benefits (Expected impact):

- Developing local ideas and expertise
- A greater proportion of youngsters willing to take disruptive action
- Normalizing the concept of failing at first to eventually succeed

Expected Outcomes:

- Encourage the adoption of technology
- Formation of a more competitive industry
- The rise of a group of people who can keep up pace with emerging technologies and are not reluctant to evolve

FIGURE 94 – IT, EMERGING AND ENABLING INNOVATION STRATEGIC ORIENTATION 2: INSTIGATING THE MAKER CULTURE IN THE COUNTRY

Project I

Create an online platform/ idea bank dedicated to providing the public with all the necessary resources, such as free online courses or the link to tutorials (MIT and Harvard offer many free coding related courses on YouTube, free Python courses are available on various websites). Conjointly, small projects and tasks will be assigned to active members and regulated and assessed by the platform, thereby helping them shape their skills to be more industry specific.



Project 2

Organize competitions both at the primary and secondary levels in order to nurture an innovation culture from a young age. Interactive group competitions will engage students to participate and ignite their passions for IT & emerging technologies. Competitions, such as deployment of a simple weather balloon, construction of a model rocket, designing circuits or using Arduino to learn how to activate motors and use sensors, for example.

Project 3

Encourage public and private companies to introduce emerging technologies in their everyday work routine in order to increase productivity and data sharing. For example, the tourism industry can incentivize hotels to incorporate virtual tours of their rooms on their websites for a better booking experience for clients. Construction companies can include holographic presentations of their new projects to help the different stakeholders and the public to better visualize. Moreover, the use of blockchain can be beneficial to improve cybersecurity in the finance sector and provide a decentralization platform, such as Ethereum, which can be used as smart contracts.

Project 4

The use of emerging technologies is undoubtedly a more efficient approach to tackling recurrent issues. However, Mauritians who have an unconventional academic background, for example, in finance theory and computational finance, do not see Mauritius as a hub related to their domain of expertise, thus leading to an irrevocable brain-drain. With the government acting as enablers to pioneer Artificial Intelligence in the financial sector in the country, our citizens/students abroad will see it as an opportunity to use their abilities to design algorithms for predictive modelling, optimization and realize financial systems with the goal to give companies a better decision-making tool, build a healthier financial society and prepare ourselves better than ever before in case another pandemic or crisis hits the country.

10.4.3 Strategic Orientation 3: Collaboration among Public and Private Sectors, Academia, and Society to Enhance R&D in IT and Emerging Technologies

Target:

- Modernization of industries
- Transforming enterprises into a digital world
- Help businesses reduce costs while increasing innovation
- Teach and enable companies how to provide their services on a global scale
- Regroup the main stakeholders to carry out research and development

Economic and Social Benefits (Expected impact):

- Improving the status of the IT sector in Mauritius
- Healthier economy
- Better modelling of unprecedented events



Expected Outcomes:

- Concretizing projects for the welfare of the Mauritian population
- Acquiring the right digital foundation for research and development
- Rise in technology-friendly businesses

FIGURE 95 - IT, EMERGING AND ENABLING INNOVATION STRATEGIC ORIENTATION 3: COLLABORATION AMONG PUBLIC AND PRIVATE SECTORS, ACADEMIA, AND SOCIETY TO ENHANCE R&D IN IT AND EMERGING TECHNOLOGIES

Project l

With all the requisites in place, our healthcare system could work in parallel with public and private sectors (Natec medical for instance) to introduce and enhance 3D printing in healthcare equipment production to meet the demand for censorious equipment. Thus, new and good quality prototypes can be created and brought to the market very rapidly (e.g. 3D printed prostheses for amputees).

Project 2

The more we contemplate certain jobs that do not add value to industries, the more efficient automation and robotics seems. With reduced costs, upgraded functionality and a wide range of applications, the implementation of robotics in top performing sectors would further boost their production level and overall equipment efficiency without affecting their key performance indicator whilst being in perfect harmony with lean production, a concept which is adopted by most manufacturers.

Project 3

Nowadays, manufacturing needs to keep up with customer expectations for high-quality, reliable products at an affordable cost. Computer vision, a subset of artificial intelligence, allows computers to take in information from digital images and then make decisions based on that information. Computer vision allows computers connected to robots to carry out repetitive tasks more efficiently and with more attention to detail. The textile industry can make good use of this new technology in order to increase productivity and quality at an affordable price.

Project 4

Ultimately, to regulate the instrumentation and control of sensors and devices, the Internet of Things (IoT) technology could be effectively used for industrial applications. Smart power grids, smart digital supply chains and connected logistics are some of the common uses to mention a few. Moreover, it could help to create new business models and revenue streams while allowing businesses to simultaneously enhance all the existing processes. On that wise, a robust collaboration with Oracle India could pave the way for the fourth wave of industrialization in Mauritius.



10.5 Short Term Action Plan

The COVID-19 has left Mauritius on the brink of economic recession. Budget to implement new projects seems to be quite unrealistic. However, there are many projects which can be implemented immediately without requiring a consequent budget. We consider some proposals below and should these start to bring positive and impactful outcomes we can think of implementing the medium- and longer-term actions.

10.5.1 Action Plan 1- Free Online Digital Tools at One Click

Implementing Agencies

- Ministry of Education, Tertiary Education, Science and Technology
- Mauritius Research and Innovation Council
- University of Mauritius
- Mauritius Institute of Education
- National Computer Board
- Emtel
- MBC

Enabling factors

- Public-private partnerships
- Regulatory framework
- Promotion strategies
- Social media
- Capacity building, training and knowledge transfer

Hurdles

- No response from public during data collection
- Inadequate local expertise
- Funding
- Inadequate human resource

Potential Risks and Mitigation Measures

FIGURE 96 - IT, EMERGING AND ENABLING INNOVATION SHORT TERM ACTION PLAN 1- FREE ONLINE DIGITAL TOOLS AT ONE CLICK: RISKS AND MITIGATION MEASURES

Potential Risks	Mitigation Measures
Inactivity of website use	Advertising strategies
No dedication from users to learn free courses	Motivational quotes to be displayed and awareness campaigns to be done via radio/ facebook to encourage students



Implementation strategy/ plan

- Academic experts' consultation
- National consultation
- Call for proposals
- Feasibility studies
- Public-private partnerships

Activities

- Development of "E-Education Scheme/Boosting IT Skills scheme" at MRIC
- Set up a steering committee to direct and monitor the project milestones
- Creation of an online platform where free IT related online courses will be available
- IT related courses to be displayed online: python, graphic designing, SPSS, etc.
- Call for proposals
- Pilot tests and surveys
- Collection of data (free courses links to be attached online)
- Implementation of project via defined milestones and strategies
- Development of a website to display the idea bank
- To advertise the website via social media
- Awareness campaigns

Estimated Investment

FIGURE 97 - IT, EMERGING AND ENABLING INNOVATION SHORT TERM ACTION PLAN 1- FREE ONLINE DIGITAL TOOLS AT ONE CLICK: ESTIMATED INVESTMENT

Actions/	2022-2023	2023-2024	2024-2025
Programme			
Short term			
Surveys/ Data	Rs 200,000	Rs 250,000	Rs 300,000
Collection			
Website Creation	Rs 250,000	Rs 250,000	Rs 250,000
Advertisement	Rs 300,000	Rs 300,000	Rs 300,000
Training Workshops	Rs 250,000	Rs 250,000	Rs 250,000

10.5.2 Action Plan 2 - Promoting Innovation Culture

Implementing agencies

- Mauritius Research and Innovation Council
- National Productivity and Competitiveness Council
- Mauritius Institute of Education
- Ministry of Education, Tertiary Education, Science and Technology



Enablers

- Public- Private partnerships
- Regulatory framework
- Promotion strategies
- Social media
- Capacity building, training and knowledge transfer
- Boosting IT skills scheme

Hurdles

- Inadequate funding
- Inadequate expert advice
- Inadequate policy implementation
- Reluctance to adopt emerging technologies
- Inadequate local expertise
- Initial cost barrier

Potential Risks and Mitigation measures

FIGURE 98 - IT, EMERGING AND ENABLING INNOVATION SHORT TERM ACTION PLAN 2 - PROMOTING INNOVATION CULTURE RISKS AND MITIGATION MEASURES

Potential Risks	Mitigation measures	
Unwillingness to participate	Sensitization campaigns	
Conflict with academic performance or	Time management guides (The	
dedication	pomodoro Technique)	

Implementation strategy/ plan

- National consultation
- Feasibility studies
- Experts' consultation
- Public-private partnerships
- Pilot testing
- Awareness campaigns
- Advertisement or promotion strategies

Activities

- To organize an innovation challenge or competition targeting students at 3 academic level: Primary School (6 years old – 12 years old), Secondary school (13 years old -18 years old) and Tertiary Institutes (18 years old – 25 years old). The aim of participation is to develop an innovative project or idea where one uses IT and emerging technologies to solve national priority concerns.
- Organizing focus groups and steering committee to monitor the competition progress
- Call for proposals



- Defined competition milestones, guidelines, and rewards
- Administrative screening and procedures
- Awareness and sensitization campaigns
- Promotion Strategies; advertisements on radio, TV, posters, and social media

Estimated Investment

FIGURE 99 - IT, EMERGING AND ENABLING INNOVATION SHORT TERM ACTION PLAN 2 - PROMOTING INNOVATION CULTURE: ESTIMATED INVESTMENT

Actions/Programme	2022-2023	2023-2024
Short term		
Awareness Campaigns	Rs 250,000	Rs 250,000
Advertisement	Rs 250,000	Rs 300,000
Focus Group Discussions and	Rs 100,000	Rs 100,000
Monitoring		
Rewards/winning prize	Rs 750,000	Rs 750,000



10.6 Medium term Action Plan

10.6.1 Action Plan 1- Capacity Building & IT Skills development

Implementing agencies

- Mauritius Research and Innovation Council
- Mauritius Institute of Education
- Ministry of Education, Tertiary Education, Science and Technology
- University of Mauritius
- Polytechnic Mauritius
- National Computer Board

Enabling factors

- Public-private collaboration
- Regulatory framework
- Promotion strategies
- Social media
- Capacity building, training and knowledge transfer
- "Boosting IT Skills Scheme"

Hurdles

- Inadequate funding
- Inadequate expert advice
- Inadequate policy implementation
- Reluctance to adopt emerging technologies
- Inadequate local expertise
- Initial cost barrier

Potential Risks and Mitigation Measures

FIGURE 100 - IT, EMERGING AND ENABLING INNOVATION MEDIUM TERM ACTION PLAN 1- CAPACITY BUILDING & IT Skills development Risks and Mitigation Measures

Potential Risks	Mitigation Measures
Unwillingness to participate or no	Sensitization campaigns
dedication	
Conflict with academic performance or	Time management guides (The pomodoro
dedication	Technique)
Difficulty to allocate tertiary students	To seek expert advice from academic institutions
for internships at different organizations	



Implementation strategy/ plan

- National consultation
- Feasibility studies
- Experts' consultation
- Public-private partnerships
- Pilot testing
- Awareness campaigns
- Advertisement or promotion strategies

Activities

- Set up of focus group discussions and steering committee to guide and monitor the proposal
- Internships allocation for tertiary students
- Implementation of workshops, seminars, and fieldworks at Secondary Schools (2 hours per week)
- IT Skills Development mentoring and consultation
- Monitor progress and impact
- Certifications to be provided

Estimated Investment

FIGURE 101 - IT, EMERGING AND ENABLING INNOVATION MEDIUM TERM ACTION PLAN 1- CAPACITY BUILDING & IT SKILLS DEVELOPMENT ESTIMATED INVESTMENT

Actions/ Programme	2022-2023	2023-2024	2024-2025		
Medium term	Medium term				
Experts' consultation and	Rs 750000	Rs 750000	Rs 750000		
mentoring					
Workshops and seminars	Rs 100 000	Rs 100 000	Rs 100 000		
Internships and fieldworks	Rs 50000	Rs 50000	Rs 50000		
Advertisement and	Rs 250000	Rs 250000	Rs 250000		
awareness campaigns					

10.6.2 Action Plan 2 - Awareness Campaigns to Adopt the Use of Emerging Technologies in our Lifestyle

Implementing agencies

- Mauritius Research and Innovation Council
- Mauritius Institute of Education
- Ministry of Education, Tertiary Education, Science and Technology
- University of Mauritius
- Polytechnic Mauritius



- National Computer Board
- MBC
- Emtel

Enablers

- Public-private partnerships
- Regulatory framework
- Promotion strategies
- Social media
- Capacity building, training and knowledge transfer

Hurdles

- Inadequate funding
- Inadequate expert advice
- Inadequate policy implementation
- Reluctance to adopt emerging technologies
- Inadequate local expertise
- Initial cost barrier

Implementation strategy/ plan

- National consultation
- Feasibility studies
- Experts' consultation
- Public-private partnerships
- Pilot testing
- Awareness campaigns
- Advertisement or promotion strategies

Activities

- Focus group discussions and steering committee to monitor the awareness campaigns
- To design posters to be shared online via social media and displayed on billboards throughout the island
- To create short videos (2 mins) to be broadcasted on MBC channels, creating awareness on readily available IT tools and emerging technologies.
- To monitor progress and impact
- To advertise successfully implemented MRIC Projects related to Artificial intelligence and Internet of Thing (IoT)



Estimated Investment

FIGURE 102 - IT, EMERGING AND ENABLING INNOVATION MEDIUM TERM ACTION PLAN 2 - AWARENESS CAMPAIGNS TO ADOPT THE USE OF EMERGING TECHNOLOGIES IN OUR LIFESTYLE ESTIMATED INVESTMENT

Actions/Programme	2022-2023	2023-2024	2024-2025		
Medium term	Medium term				
Technical Committee	Rs 50000	Rs 50000	Rs 50000		
Graphic designing and	Rs 80 000	Rs 80 000	Rs 80 000		
video creator					
Advertisement via	Rs 200 000	Rs 100 000	Rs 100 000		
billboards, radio and MBC					
Awareness campaigns	Rs 200 000	Rs 200 000	Rs 200 000		



10.7 Long Term Action Plan

10.7.1 Action Plan 1- Connecting Public, Private Sectors, Academia, and Society through Research and Development in IT and Emerging Technologies

Implementing agencies

- Mauritius Research and Innovation Council
- Mauritius Institute of Education
- Ministry of Education, Tertiary Education, Science and Technology
- University of Mauritius

Enabling factors

- Public-private partnerships
- Regulatory framework
- Promotion strategies
- Capacity building, training and knowledge transfer

Hurdles

- Inadequate funding
- Inadequate expert advice
- Inadequate policy implementation
- Reluctance to adopt emerging technologies
- Inadequate local expertise
- Initial cost barrier

Implementation strategy/plan

- National consultation
- Feasibility studies
- Experts' consultation
- Data collection
- Data sharing
- Public-private partnerships
- Pilot testing

Activities

- Set up a steering committee to direct and monitor the strategic plan/ proposal
- Creating a bridge between research works done by tertiary students and strategic national actions implemented by public sectors
- To create an online platform, serving as a database to enhance collaboration between academic, private, and public sectors



- To create different specific platforms related to different fields such as health, technology, marine studies etc. to enhance data sharing and collaboration
- Use of research works done, or data collected by students in developing national projects.

Estimated Investment

FIGURE 103 - IT, EMERGING AND ENABLING INNOVATION LONG TERM ACTION PLAN 1- CONNECTING PUBLIC, PRIVATE SECTORS, ACADEMIA, AND SOCIETY THROUGH RESEARCH AND DEVELOPMENT IN IT AND EMERGING TECHNOLOGIES ESTIMATED INVESTMENT

Actions/Programme	2022-2023	2023-2025	2025-2030		
Long term	Long term				
Data collection	Rs 250000	Rs 500000	Rs 950000		
Research	Rs 250000	Rs 500000	Rs 950000		
Database/online platform	Rs 250000	Rs 500000	Rs 950000		
creation					
Data sharing (software	Rs 250000	Rs 500000	Rs 950000		
Licenses)					
Reports	Rs 250000	Rs 500000	Rs 950000		



10.8 Conclusions

The consultative meetings and validation at the ARI of the key aspects on how IT and emerging technologies can help Mauritius leapfrog into the new COVID world have been eye opening. It was seen that COVID-19 forced a small digital revolution in Mauritius and the trend is gaining pace. On the other hand, the excellent infrastructure that Mauritius has, the political stability, the general willingness of the Mauritian people to work together are key factors that show a glimmer of light that IT and emerging technologies adoption will become a reality in Mauritius sooner than later.

The key strategy is reengineering our way of working together towards achieving a common goal, that of pushing our country forward in its fight to emerge out of the current economic strains. By working towards a win-win mindset, encouraging a collaborative innovation mindset, raising awareness on the formidable potential of IT and emerging technologies, empowering and inspiring our population to adopt and adapt IT tools in their day-to-day lives, we can pull the Republic of Mauritius in this current difficult situation.

This report lay emphasis on the feedback from the technical committee but is not restricted to above-mentioned gaps and challenges.



Long Term Connecting public, private sectors, academia, and society through Research and Development in IT and Emerging technologies. Research and Development **Sensitisation and Awareness Campaigns**

Capacity Building and Skill Development

Medium Term

Diversifying the skills of the modern generation by developing a more efficient problem-solving technique which is transferable to various other fields.

Free Online Digital Tools at one click

Short Term

Create an online platform/Idea bank dedicated to providing the public with all the necessary resources such as free online courses or the link to tutorials (MIT and Harvard offer many free coding related courses on YouTube, free Python courses are available on various websites

Medium Term

Public awareness to inform citizens about digital developments and further increase their relevant knowledge alongside an adoption of emerging technologies.

Short Term

Promoting Innovation Culture

IT, Emerging and Enabling Innovation



Organize competitions both at the primary and secondary levels in order to nurture an innovation culture from a young age. Interactive group competitions will engage students to participate and ignite their passions for IT & emerging technologies



If you wish to lift mountains tomorrow, you must start by lifting stones today - African Proverb



11.0 Rodrigues

11.1 Introduction

Rodrigues is an autonomous outer island within the Republic of Mauritius. It is situated around 560 kilometers east of Mauritius island in the Indian Ocean. In 2020, it had a population of about 43,997 inhabitants. Rodrigues traditionally consists of an economy mostly based on subsistence agricultural, fishing and tourist sectors. Given the competencies of Rodrigues in production of honey, cultivation of lemon, octopus farming, livestock (goat, sheep, chicken, pork and beef), it has the potential to produce organic food, having a 'green label'. Priority research areas are water, agriculture, fishing and organic food industry.

The island of Rodrigues has real potential in terms of green and blue growth. It has key strategic sectors that can generate green and blue jobs and can contribute to the reduction of poverty. Strategic programs targeting poor communities, the youths as well as strategic policy options to foster green and blue jobs opportunities are of high importance to the island. This agenda is for Rodrigues both an opportunity and a challenge to become a sustainable Island.

The Government of Mauritius is looking ahead to transform the country into a high-income economy whilst preserving the environment and making a sustainable use of natural resources. Rodrigues is also seeking for its contribution to this country vision by reinventing itself to undergo a transformation into a green and blue economy in order to improve the socio-economic and environmental conditions of the island. However, while having the vision to become a sustainable and ecological island, there are also a number of initiatives aimed at nurturing the emergence of new sectors-including supporting the ICT sector to boost the development in other sectors. ICT can help achieve broader development objectives in addition to job creation in the ICT sector itself. ICT could increase access to market information, reduce transaction costs and enhance Rodrigues chances to participate in the global economy. It will also increase the efficiency and competitiveness of SMEs which are essential for income and job generation, especially with the introduction of internet optical fibre in 2015. In addition, it provides tools for improved and transparent monitoring of environmental regulations and situations, in agriculture, blue economy, water management, the tourism sector, amongst others.

In view of promoting a new and modern economic perspective for Rodrigues, much emphasis is now being laid on research and innovation which will be instrumental in the strategic development of the island. Already the creation of a concrete and solid private sector as well as the inculcation of an entrepreneurial culture is high on the agenda of the Rodrigues Regional Assembly. It is worth mentioning that this vision of the Rodrigues Regional Assembly is very much embedded in the promotion of applied research and innovation; a vision which complements that of the Government of Mauritius to develop a national roadmap for research and innovation under the Ministry of Information Technology, Communication and Innovation. This roadmap aims at developing the right conditions and mechanisms to promote innovation and enhance the impact of innovation on the socio-economic development of the republic. Rodrigues is being paid special attention in this framework given that even if the



island shares some of the opportunities and challenges of Mauritius, it also has its own specificities in terms of culture, climate and socio-economic conditions that require special measures.

Hence, it is essential to develop a roadmap for research and innovation specific to Rodrigues, a roadmap that will complement the roadmap in Mauritius currently under preparation by the MRIC under the aegis of the Ministry of Information technology, Communication and Innovation (MITCI) in consultation with other ministries/ institutions/ organisations.

11.2 Aim, Objectives and Guiding Principles

National Priorities

- Alleviate poverty
- Create employment
- Achieve a Rodrigues Ile Ecologique

Aim

Using research and innovation as key drivers to address priorities in Rodrigues, promote economic growth, and enhance the quality of life of the Rodriguan citizen

Objectives

- a. Increase efficiency of local public and private institutions in using research and innovation to achieve societal and economic development in a sustainable manner.
- b. Increase the competitiveness of SMEs by promoting the use of Research and innovation.
- c. Support technological transformation, capacity-building and innovation.
- d. Improve linkages between the research and industry sectors.
- e. Develop national, regional and international collaborations.
- f. Strengthen the research capability and encourage innovation.
- g. Inculcate and promote the culture of R&I.
- h. Strengthen support to researchers.

Guiding Principles

The formulation of the document is based on the principles of relevancy, sustainability, flexibility, inclusion and participation.



11.3 Situational Analysis

Rodrigues island hosts research activities, that are conducted by a few public bodies and nongovernmental organizations. However, these remain scattered and unorganized. Some of the public bodies, such as SEMPA, FRTU, Rodrigues Branch of the MRIC department of Agriculture, Human Resource Centre, Department of water resources, among others) are mandated to conduct research though they are not necessarily actively doing so. On the other hand, NGOs, such as Shoals Rodrigues, Ter-Mer Rodriguez Association and Mauritian Wildlife Foundation, are mandated and actively doing research in their respective fields of interventions. Since 31st October 2011, Rodrigues island hosts a branch of the MRIC that is a major step towards the development of an organized and rooted research sector. The Rodrigues branch of the MRIC has as objective to promote a robust research/ technology cooperation process in Rodrigues through research/ technology exchange programs and capacity building. Since 2017, the collaboration between the MRIC and Rodrigues Regional Assembly has strengthened by the empowerment of the Rodrigues Branch of the MRIC through:

- I. Grant memorandum for recruitment of two Research Assistants currently being placed under the Rodrigues branch
- 2. Co-design, finance and development of research and innovation initiatives such as (Improving scientific understanding of FADs Fishery in Rodrigues-FTRU/MRIC; Acacia nilotica valorisation: A New perspective improving Management of IAS in Rodrigues, MRIC/MITD/RRA, Solar Dryer Project, MRIC/Commission for Agriculture & Others)
- 3. Collaboration of the MRIC through its Rodrigues Branch on the EU-Funded Regional SeqCOI Project: Co-construction et Réalisation d'Outils de Mesure de la Séquestration du Carbone dans les Sols à la Réunion, Rodrigues et Madagascar lead by the « Institut de Recherche pour le Développement (IRD)

A dedicated grant scheme was developed by the staff of the Rodrigues branch upon the announcement made by the Honourable Minister of Information Technology, Communication and Innovation to inculcate a Research and Innovation Culture in the island. The Rodrigues Research and Innovation Grant Scheme (RRIGS) is dedicated to Rodriguan stakeholders from civil society, private, public sectors. Six research and innovation projects have been approved under the scheme in the fields of Education, Marine Science, Information Technology, Food & Beverage Technology and Manufacturing.



11.4 Process

The vision of the Rodrigues Regional Assembly was captured from the Sustainable Integrated Development Plan for Rodrigues-SIDPR (which is being reviewed), the 5-year Government program (2022-2027) and the RRA Budget speech 2022-2023.

The vision of the RRA is driven by the SDGs. Four thematic areas were identified from the aforementioned vision that align with the aspirations of Rodriguans as well as national and international trends, namely:

- I. Blue Innovation
- 2. Green Innovation
- 3. Health and Wellness/ Tourism Innovation
- 4. Social and Grassroots Innovation

Wider Consultations

Following the Working Group meetings, the proposals were further discussed in specific thematic sessions during the 27th and 28th July 2022 as follows:

Date	Theme	Moderators
Wednesday 27 th July 2022	Blue Innovation	Mr. Thomas Genave
		Departmental Head for
		Fisheries, Agriculture & Others
	Green Innovation	Mr. Jerome Felicite
		Assistant Manager, Commission
		for Agriculture & Others
Thursday 28 th July 2022	Health and Wellness/	Mrs. Rughoobur Bheekhee
	Tourism Innovation	Artee, Hospital Director
		(QEH), Commission for Health
		& Others
	Social & Grassroots	Dr. Annick Tolbize
	Innovation	Manager, RCEA

FIGURE 105 - RODINOV WIDER CONSULTATIONS PER THEMATIC

The wider consultations were held with about 125 participants coming from NGOs and civil society, private enterprises, commissions and public institutions. About 45 participants, including the Rodriguan Diaspora and stakeholders from Mauritius attended the sessions online.

Recommendations coming from the thematic sessions were validated with a wide audience on the 28th July after a high level panel discussion with the following panelists: Dr K Sukon, Chairman, MRIC; Prof T Bahorun, GOSK, PhD, Executive Director, MRIC, Mr. Thomas Genave, Departmental Head for Fisheries, Agriculture & Others; Mr. Jerome Felicite, Assistant manager, Commission for Agriculture & Others; Mrs. Rughoobur Bheekhee Artee, Hospital Director (QEH), Commission for Health & Others; Dr. Annick Tolbize, Manager, RCEA



The high-level panel was moderated by Ms. Marietta Agathe, Coordinator, Gender Links (Rodrigues).

11.5 Strengths and Weaknesses of Research and Innovation in Rodrigues

FIGURE 106 - SWOT ANALYSIS OF RESEARCH AND INNOVATION IN RODRIGUES

Information on research dispersed and not easily accessible - need for centralisation Enhanced coordination would improve the system Infrastructure/logistics problem Capacity Building/ Expertise required
in certain areas SMEs – identification and strengthening of promising sectors Educational issues: need to sensitize students Need for public awareness Research to be directed towards a 'Rodrigues Ecologique' Funding problems Research priorities to be addressed Management Issues at the level of commissions; technicians mandated to undertake research spend time in administrative work. Brain Drain Poor Research and Innovation culture Decentralised research data and findings Limited access to research literature Lack of knowledge on to access funding and other major research activities Lack of data for evidence-based policy making Poor Research and Innovation Culture



Opportunities	Threats
 Possibility to tap into niche markets by having a "Rodrigues Naturellement" Label. Possibility to exploit unique marine and biodiversity resources Forthcoming Technopole and Smart SME Village Possibility to become a Centre of Excellence in Ocean Research Set up of a Research Institute in Rodrigues Promote Rodrigues as a Green Destination Climate and nature based innovative funding Development of education programs to promote innovation 	 Brain Drain Lack of scientific auditing Fast paced scientific and technological progress in the world Vulnerabilities as SIDS Competition from large exporters (India, China) on the export market Knowledge (both traditional and research output) generated in the territory of Rodrigues not fully available and put to the advantage of the stakeholders on the island Climate Change



11.6 Thematic Area: Blue Innovation

11.6.1 Introduction

The island of Rodrigues remains relatively undeveloped and the economy is based mainly on agriculture, livestock and fisheries with over one third of the workforce employed in these sectors in 2010. Catches of octopus and reef fin-fish have declined by approximately 75% over the past 10 years, resulting in reduced earnings and impacting the livelihood of fishermen on Rodrigues. Global climate change related impacts (e.g., sea water temperature increases, ocean acidification, sea level rise and increased unpredictability of storms) will place further stress on the coral reef and the coastal communities that depend on reef-related fisheries.

This high dependency on fishing means that the community in Rodrigues is particularly vulnerable to global climate change. This can be reflected in declining catches due to overfishing, increasing seawater temperatures (coral bleaching), changes in the tides and sedimentation infilling the lagoon as current threats to their fishing activities, whilst changing seasons, a decrease in the availability of water and poor health of livestock also affect agriculture in the village.

11.6.2 Gaps and Challenges

Infrastructure/ logistics problem

- Capacity building/ expertise required in certain areas
- Educational issues: need to sensitize students on marine sciences
- Need for public awareness on the sea
- Poor transformation of seafood
- Lack of training and capacity building for fishermen and young on new technologies (Include fisheries and marine science at secondary level)
- Degradation of lagoon (overexploitation)/ ensure food security/ lack of fish for local consumption



11.6.3 Strategic Orientations

FIGURE 107 - RODINOV BLUE INNOVATION STRATEGIC ORIENTATIONS

Relevant Research and Innovation Priority Area for Blue Innovation

STRATEGIC ORIENTATION 1: Offshore Fishing Development (with special attention on Continental Plateau) and lagoon fishing

- Study on sustainable aquaculture methods
- Exploration of sea mounts and banks around Rodrigues Island
- Development of an offshore fishing development plan for Rodrigues Island
- To conduct a socio-economic evaluation of sustainable exploitation of continental plateau fisheries in Rodrigues
- Assessment of continental plateau fish species of commercial potential importance**
- Establishment and formalization of bilateral collaboration with key organizations, such as MOI, Albion Fisheries and University of Mauritius, to improve research and innovation capabilities of Rodrigues stakeholders
- Establishment of continental plateau fishing ground and sites based on satellite imagery development through the MOI**
- Development of fishing technologies and techniques to enhance off-fishing sector
- Improvement of fishing infrastructures to improve seafood security in Rodrigues Island
- Baseline study on available fish stock in the lagoons and offshore**
- Impact of climate change on marine sciences
- Fishing development plan (lagoon and offshore)** special attention with continental plateau
- Identity sustainable aquaculture activities

STRATEGIC ORIENTATION 2: Sustainable Marine and Coastal Resources Management

- Continuous monitoring of marine and coastal resources
- Development of a lagoon conservation and restoration integrated plan for Rodrigues Island**
- Development of bioprospecting exercises on key marine and coastal species, such as macroalgae, microalgae, sea urchins, sponges among other species
- Development and operationalization of water quality monitoring action for Rodrigues
- To identify new technologies and innovative means to ensure continuous monitoring of water quality for the lagoon of Rodrigues (water quality index)
- Development and operationalization of a marine spatial plan for the lagoon of Rodrigues
- Economic evaluation of marine resources and ecosystem services



- Assessment of the different types of aquaculture practices that can be done in Rodrigues
- Identification of aquaculture sites
- Evaluation and protection of sensitive coastal areas and marine resources
- To investigate the socio-economic and environmental impact of desalination plant in Rodrigues Island
- Set up of a legal and integrated management framework for optimal use of marine resources
- Studying ways and means to store seafood
- Investigating the impact of soil erosion on marine life

STRATEGIC ORIENTATION 3: Ocean-Based Renewable Energy

- Identify the best mix of renewable energies that can help the island to move towards energy self-sufficiency and explore possibilities to attract private investment in this sector
- Use of ocean-based energy to feed the desalination plants around Rodrigues Island
- To take stock of all existing research and documents regarding ocean-based renewable energy in Rodrigues island with special attention to offshore wind and wave/ tidal energy
- To improve collaboration between Rodrigues Island and MARENA
- To develop sensitization and education campaigns on ocean-based renewable energy potential in Rodrigues Island
- To assess human capacity development needs with regards to ocean-based renewable energy for Rodrigues

STRATEGIC ORIENTATION 4: Deep Sea Exploration

- Development and operationalization of a deep-sea exploration and mapping programs for Rodrigues Island
- To develop the current and bathymetric profile of the waters surrounding Rodrigues Island
- Investigation of the potential of manganese nodules exploitation and valuable minerals and metals

STRATEGIC ORIENTATION 5: Maritime Connectivity

- Improvement of maritime connectivity to foster export of seafood products to foreign market
- Assessment of impact of Rodrigues Port Development on Yacht Tourism, Cruise Tourism and Fishing sector of Rodrigues Island
- Possibility of greening the ports of Port Mathurin
- Study the possibility of developing Port Sud Est as a fishing port



STRATEGIC ORIENTATION 6: Improving the Ocean Governance Framework

- Developing a pole of innovation in Ocean Sciences in relation to forthcoming Marine Academy and Research Centre**
- Introduction of marine sciences at an early stage in the primary education system
- Developing an atlas of existing marine and coastal living species in Rodrigues
- Train people at grassroots level to develop capacity and expertise in offshore fishing

STRATEGIC ORIENTATION 7: Sustainable Blue Tourism

- Development of a blue tourism/ecotourism activities portfolio for Rodrigues Island
- To assess the legal and policy framework in view of improving blue tourism in Rodrigues Island
- To assess socio-economic potential of marine protected areas and reserves of Rodrigues Island
- To establish an ecosystem approach for a better environmental management of the coastal and maritime tourism
- Managing the environmental sustainability of blue tourism in the marine protected areas of Rodrigues Island
- Survey of relevant actors (scientific, managers, operators, policy decision makers, community groups)

STRATEGIC ORIENTATION 8: BLUE CARBON

- To assess the blue carbon potential of Rodrigues Island as a means of innovative finance for ecosystem-based management and development projects in Rodrigues Island
- To conduct a socio-economic and environmental evaluation of mangroves and mangrove-like species stands in Rodrigues Island and its islets
- To conduct ongoing monitoring program on seagrass and mangroves in Rodrigues Island
- To establish the carbon sequestration of potential of mangroves and seagrass as nationally determined climate contributions
- To establish the nationally determined climate contribution of macroalgae (seaweed) farming of Rodrigues
- To develop dedicated restorations programs for mangroves and seagrasses in Rodrigues respectively
- To assess the contribution and potential of seagrass and mangroves in limiting siltation of the lagoon of Rodrigues Island
- To develop community-based protection and restoration of mangroves and seagrass at target sites within the lagoon of Rodrigues Island
- To assess the species connectivity between mangroves, coral reef and seagrass stands of Rodrigues Island
- To improve sustainable costal marine and coastal ecosystem management



- To develop climate smart fisheries through participation of local communities
- To assess the innovative finance potential from blue carbon

****Short term priority actions**

Expected Outcomes:

- Energy self-efficiency
- Use of natural resources in a sustainable manner
- Increase value addition of local produce
- Encourage consumption in an intelligent manner
- Efficient use of resources
- Efficient management of materials and sources
- Increase in job opportunities
- Business opportunities
- Software development
- Applied research and innovation on potent local terrestrial/marine biofactors with high prospects for commercial ventures
- New commercial products



BLUE INNOVATION

STRATEGIC ORIENTATION 1: Offshore Fishing Development (with special attention on Continental Plateau) and lagoon fishing

- Study on sustainable aquaculture methods
- · Exploration of sea mounts and banks around Rodrigues Island
- · Development of an offshore fishing development plan for Rodrigues Island
- To conduct a socio-economic evaluation of sustainable exploitation of continental plateau fisheries in Rodrigues
- · Assessment of continental plateau fish species of commercial potential importance**
- · Establishment and formalization of bilateral collaboration with key organizations such as MOI, Albion Fisheries, University of Mauritius to improve research and innovation capabilities of Rodrigues stakeholders
- · Establishment of continental Plateau fishing ground and sites based on satellite imagery development through the MOI**
- · Development of fishing technologies and techniques to enhance off-fishing sector
- · Improvement of fishing infrastructures to improve seafood security in Rodrigues Island
- · Baseline study on available fish stock in the lagoons and offshore**
- Impact of climate change on marine sciences
- Fishing Development Plan (lagoon and offshore) ** special attention with continental plateau
- Identity sustainable Aquaculture activities

STRATEGIC ORIENTATION 2: Sustainable Marine and **Coastal Resources Management**

- Development of bioprospecting exercises on key marine and coastal species such as macroalgae, microalgae, sea urchins, sponges among other species
- Development and operationalization of water quality monitoring action for Rodrigues
- To identify new technologies and innovative means to ensure continuous monitoring of water quality for the lagoon of Rodrigues (Water Quality Index)
- Development and Operationalization of a marine Spatial Plan for the whole of lagoon of Rodrigues
- Economic evaluation of marine resources and ecosystem services.
- Assess the different the type of aquaculture practices that can be done in Rodrigues
- Identification of aquaculture sites/ investigate
- · Evaluation and protection of sensitive coastal areas and marine resources
- · To investigate the socio-economic and environmental impact of desalination plant in Rodrigues Island
- Set up of a legal and integrated management framework for optimal use of marine resources
- · Study on ways and means to store seafood
- Investigate the impact of soil erosion on marine life

STRATEGIC ORIENTATION 7: Sustainable Blue Tourism

- Development of a blue tourism/ecotourism activities portfolio for Rodrigues Island
- To assess the legal and policy framework in view of improving blue tourism in Rodrigues Island
- To assess socio-economic potential of marine protected Areas and reserves of Rodrigues Island
- To establish an ecosystem approach for a better environmental management of the coastal and maritime tourism
- Managing the environmental sustainability of blue tourism in the Marine protected Areas of **Rodrigues Island**
- Survey of relevant actors (scientific, managers, operators, policy decision makers, community groups)

STRATEGIC ORIENTATION 3: Ocean-Based **Renewable Energy**

- Identify the best mix of Renewable Energies that can help the island to move towards energy self-sufficiency and explore possibilities to attract private investment in this sector
- Use of ocean-based energy to feed the desalination plants around Rodrigues Island
- To take stock of all existing research and documents regarding ocean-based renewable energy in Rodrigues Island with special attention to offshore wind and wave/tidal energy
- To improve collaboration between Rodrigues Island and MARENA
- To develop sensitization and education campaigns on ocean-based renewable energy potential in Rodrigues Island To assess human capacity development
- needs with regards to ocean-based renewable energy for Rodrigues

STRATEGIC ORIENTATION 8: BLUE CARBON

- · To assess the blue carbon potential of Rodrigues Island as a means of innovative finance for ecosystem-based management and development projects in Rodrigues Island
- To conduct a socio-economic and environmental evaluation of Mangroves and mangrove-like species stands in Rodrigues Island and its islets
- To conduct ongoing monitoring program on seagrass and mangroves in Rodrigues Island
- · To establish the carbon sequestration of potential of mangroves and seagrass as nationally determined climate contributions
- · To establish the nationally determined climate contribution of macroalgae (seaweed) farming of Rodrigues
- · To develop dedicated restorations programs for mangroves and seagrasses in Rodrigues respectively
- · To assess the contribution and potential of seagrass and mangroves in limiting siltation of the lagoon of Rodrigues Island
- To develop community-based protection and restoration of mangroves and seagrass at target sites within the lagoon of Rodrigues Island To assess the species connectivity between mangroves, coral reef and
- seagrass stands of Rodrigues Island To improve sustainable costal marine and coastal ecosystem
- management · To develop climate smart fisheries through participation of local communities
- · To assess the innovative finance potential from blue carbon

- STRATEGIC ORIENTATION 5: Maritime Connectivity
- Improvement of maritime connectivity to foster export of seafood products to foreign market
- Assessment of impact of Rodrigues Port Development on Yacht Tourism, Cruise Tourism and Fishing sector of Rodrigues Island
- · Possibility of greening of the Ports of Port Mathurin
- Study the possibility of developing Port Sud Est as a fishing port

STRATEGIC ORIENTATION 6: Improving the Ocean Governance Framework

- Developing a pole of innovation in Ocean Sciences in relation to forthcoming Marine Academy and Research Centre**
- Introduction of marine sciences at an early stage in the primary education system
- Developing an atlas of existing marine and coastal living species in Rodrigues
- Train people at grassroots level to develop capacity and expertise in offshore fishing





STRATEGIC ORIENTATION 4: Deep Sea Exploration

 Development and operationalization of a deep-sea exploration and mapping programs for Rodrigues Island To develop the current and bathymetric profile of the waters surrounding Rodrigues Island Investigation of the potential of manganese nodules exploitation and valuable minerals and metals

11.7 Thematic Area: Green Innovation

11.7.1 Introduction

The Island of Rodrigues, which is of volcanic origin, is situated some 650 km to the north-east of mainland Mauritius. With its 108 km, it is 18 times smaller than Mauritius and is recognised to be not only the smallest of the "Mascarenes Islands" but also reputedly the youngest, with rocks being dated at only 1.5 million years old. Oval in shape (18 km long and 6 km wide), Rodrigues is surrounded by coral reef which forms a lagoon of about 200 km² which also encloses 18 islets. The island currently faces serious environmental challenges that require urgent attention of all Rodriguans, and the RRA. Indeed, out of a total land area of some 10,800 ha, only 1,000 ha are in private hands implying that the RRA is completely responsible for the management of the lands. The adoption of a sustainable land resources-, solid waste-, and coastal zone-management system is viewed as critical in order to successfully transform, in the long-run, the current situation of land degradation, soil loss, and impoverished ecosystems into diverse cultural landscapes of outstanding aesthetic, economic and ecological value.

Core issues revolve around the following themes: Overgrazing; unsustainable livestock production system; unsustainable cropping practices; fallow agricultural lands; unsustainable cropping practices; decline in soil fertility; poor enforcement and implementation of antierosive measures; and degraded cattlewalk areas among others. In the same line, one strength of Rodrigues is its unique resources, such as coffee, lemon, chillies and black pig, which should be valorized.

11.7.2 Gaps and Challenges

- Increase in price of raw materials and technologies
- Fast paced scientific and technological progress in the world
- Knowledge (both traditional and research output) generated in the territory of Rodrigues not fully available and put to the advantage of the stakeholders on the island
- Vulnerabilities as a SIDS due to climate change
- Lack of support for young entrepreneurs starting a business in green economy
- No proper management of land and water resources
- Effect of climate change on agriculture and food security
- Little access to new technologies in food and energy production
- Lack of knowledge from the population on green innovation and capacity building on new technologies of food production
- Treatment and management of waste putting emphasis on plastic packaging and green waste
- Little access to supply of innovative equipment for quality food production
- Increasing demand for quality food products
- Increase in food production cost
- Unequal access to safe and healthy food in Rodrigues
- Effect of globalization on consumption in Rodrigues i.e., change consumption habits



- Lack of investment to support the food production sector
- Rodrigues is dependent on the import of food, energy, commodities and raw materials
- Abandoned agricultural land
- Effect of pandemic and external pressures such as wars on food supply

11.7.3 Strategic Orientations

FIGURE 109 - RODINOV GREEN INNOVATION STRATEGIC ORIENTATIONS

Relevant Research and Innovation Priority Area for Green Innovation

STRATEGIC ORIENTATION 1: Enhancing food security

- a. Professional and household farming
- b. Valorization of 'Produit Terroir' including local crops, fruits and seedlings production
- c. Establishment of gene banks to provide locally produced seedling and conserve unique species (such as bee and lemon) to Rodrigues
- d. Bio-Farming i.e., Biocontrol, biological plant promoters, recycling of green waste**
- e. Land and water management for food production
- f. Build resilience towards climate change

STRATEGIC ORIENTATION 2: Agro-processing and Food technologies

- a. Adding value to new local products through certification, market research, norms, and standards**
- b. Storage and conditioning of Agricultural product for local consumption and export.
- c. Optimizing food production i.e. proper processing and distribution channel
- d. Capacity building in new techniques of food production.
- e. Encourage social innovation and entrepreneurship
- f. Access to low-cost technologies that can be implemented in Rodrigues
- g. Production of flour from breadfruit in Rodrigues
- h. Study of irrigation systems adapted for Rodrigues Island

STRATEGIC ORIENTATION 3: Renewable Energies

- a. Identify the best mix of renewable energies that can help the island to move towards energy self-sufficiency and explore possibilities to attract private investment in this sector
- b. Use of renewable energies in the agricultural sector to improve productivity and lower the cost of production
- c. Safe disposal of used renewable energy equipment (e.g., PV cells)

STRATEGIC ORIENTATION 4: Climate change

- a. Adaptation of the agricultural sector to climate change
- b. Development of a resilience strategy of food production in view of climate change**
- c. Develop a Guide Agricole for Rodrigues Island including a 'Calendrier Agricole'



****Short term priority actions**

Expected Outcomes:

- Improved quantity and quality of local food
- Increase production of local healthy food
- Increase value addition of local produce
- Trust in source of food
- Encourage consumption in an intelligent manner
- Efficient use of resources
- Minimised food waste along the value chain
- Preservation of nutritional quality
- Enhancing availability and convenience
- Increase in job opportunities


GREEN INNOVATION

STRATEGIC ORIENTATION 1: Enhancing food security

- Professional and household farming
- Valorization of 'Produit Terroir' including local crops , fruits and seedlings production
- Establishment of gene banks to provide locally produced seedling and conserve unique species (such as bee and lemon) to Rodrigues
- Bio-Farming i.e Biocontrol, biological plant promoters, recycling of green waste**
- Land and water management for food production
- Build resilience towards climate change

PV cells)

STRATEGIC ORIENTATION 3: Renewable Energies

- Identify the best mix of Renewable Energies that can help the island to move towards energy self-sufficiency and explore possibilities to attract private investment in this sector
- Use of renewable energies in the agricultural sector to improve productivity and lower the cost of production
- · Safe disposal of used renewable energy equipment (eg

- STRATEGIC ORIENTATION 2: Agro-processing and Food technologies
- Adding value to new local products through certification, market research, norms, and standards**
- Storage and conditioning of Agricultural product for local consumption and export.
- Optimizing food production i.e proper processing and distribution channel
- Capacity building in new techniques of food production.
- · Encourage social innovation and entrepreneurship
- Access to low-cost technologies that can be implemented in Rodrigues
- · Production of flour from breadfruit in Rodrigues
- Study of irrigation systems adapted for Rodrigues Island

STRATEGIC ORIENTATION 4: Climate change

- Adaptation of the agricultural sector to climate change
- Development of a resilience strategy of food production in view of climate change. **
- Develop a Guide Agricole for Rodrigues Island including a 'Calendrier Agricole'





11.8 Thematic Area: Social and Grassroots Innovation

11.8.1 Introduction

Rodriguans are generally a happy people with strong and stable family ties. They offer an example of family life which is quite authentic and which is a special attraction for tourists. This ties well with a tourism policy of attracting a new breed of older and more mature tourists. Apart from jobs, all Rodriguans and in particular the youth need more facilities for expressing themselves and demonstrating their innate musical and other creative talents. Inadequate attention has been paid in the past to leisure and cultural activities in schools and the various youth and community centres. Over the years, a number of problems have cropped up in the society. The core issues revolve around teenage pregnancy, alcohol/ substance abuse and degradation in the social fabric.

On the entrepreneurship side, it is known that there are a number of small enterprises on the island, still operating at an artisanal scale. In this line, the entrepreneurial culture should be empowered to produce quality products in a social entrepreneurship framework.

11.8.2 Gaps and Challenges

- Tendency to only focus on problems, no systematic process for solution identification or implementation
- Lack of innovation in the entrepreneurship sector (packaging, new product development)
- General tendency not to invest research funds in the social sciences
- High teenage pregnancy rate
- Limited technical skills for innovation
- Poor digitalization and internet access
- Systemic threats that move priorities away from research in social sciences (e.g., the current economic conditions, pandemics and climate issues)
- Poor success rate of cooperatives
- Rodriguan culture poorly documented and represented on social media
- Vulnerabilities as SIDS (high importation rate and climate change)
- Liberalisation of knowledge among individuals not trained/ skilled to consume research or information critically
- Lack of access to markets
- Difficulties of Rodriguan students to undertake research relevant to Rodrigues during their university studies
- Education system to be improved to promote creativity at a young age, to be more relevant to Rodrigues and give special consideration to students with special leaning needs



11.8.3 Strategic Orientations

FIGURE 111 - RODINOV SOCIAL & GRASSROOTS INNOVATION STRATEGIC ORIENTATIONS

STRATEGIC ORIENTATION I: Education and Human Development

- Identifying individual and systemic factors that facilitate or hinder the development of core competencies and 21st century skills (learning and innovation skills; digital literacy skills; career and life skills), including career driven education
- Investigating the extent to which effective use of assessments and evaluation throughout the teaching-learning process improves the quality of education
- Languages in the formal educational system: Increasing the acceptance of the mother tongue and addressing issues of learning in second languages
- Supporting the literacy development of children through adult literacy initiatives and community-centre based literary activities
- Meeting the diverse needs of all learners in inclusive education settings
- What is the current level of post-secondary and career readiness of students of school leaving age?
- Understanding normative human development in Rodrigues: are developmental milestones in the social, emotional, communication, physical, cognitive, and functional domains universal?
- Addressing factors typically associated with deviant developmental trajectories [e.g., teenage pregnancy, juvenile delinquency, mental health issues and risk-taking behaviors (alcohol abuse, drug use and early sexual activity)]**
- A longitudinal cross-sectional study of teenage pregnancy**
- Impacts of awareness and sensitization campaign to reduce taboo and stigmatization on the incidence of teenage pregnancy^{**}
- Socio-economic impact of teenage pregnancy**
- Effectiveness and impact of social aid on the Rodriguan society
- Modality for effectiveness continuous professional and human development
- Providing information and resources to youths on reproductive issues and sexual health, on the incidence of sexual activities, sexually transmitted infections and pregnancies among teenagers**
- Empowering the TVET sector and addressing mismatch between job offers and skills
- Developing a community psychological approach to the understanding of teenage pregnancy in Rodrigues

STRATEGIC ORIENTATION 2: Social Inclusion and Community Development

- Building the resilience of vulnerable groups to adapt to climate change, rise in the price of commodities and the socio-economic impacts of COVID-19.
- Identifying opportunities for gender-mainstreaming and increased accessibility in current public policies and practices.



- Collecting data for basic socio-economic statistics disaggregated by gender, income level, disability status, and education status to better inform policy and practice
- Addressing issues that have a disproportionate impact on females and vulnerable individuals, such as those with disabilities, the unemployed and the elderly, including climate change and rights violations (e.g., domestic or elderly abuse).
- Mapping all NGOs in Rodrigues to develop avenues for collaboration in various sectors^{**}
- Identifying and applying solutions to common socio-economic problems affecting all SIDS communities
- Evaluating the effectiveness of bottom-up, community development approaches to achieve desirable socio-economic outcomes (e.g., inclusion and participation of individuals with disabilities, decreased gender-based violence)
- Investigating the short and long-term impacts of the Rodrigues Youth Parliament on participants/ alumni socio-economic contributions across the political divide

STRATEGIC ORIENTATION 3: Culture and Language

- An anthropological approach to Rodriguan culture, heritage and identity
- Analysis of the mother tongue of Rodrigues island
- Documentation & oral collection of traditions, folklore, and history of the inhabitants of Rodrigues island**
- Cataloging archeological artefacts of Rodrigues island
- Building the capacity of grassroots action groups to foster Rodriguan pride and identity
- Genealogy research to identify the origins of the population of the island/retracing our ancestry
- Investigating changes in the structures of the Rodriguan family and their impacts on various social outcomes including (and not limited to)
 - Oral transmission of cultural knowledge and know-how
 - Rodriguan values
 - Pride/Belonging
 - Identity

STRATEGIC ORIENTATION 4: Social Entrepreneurship

- Cataloguing the skills and competencies of the Rodriguan human resource by sector
- Investigating new methods to develop high end quality products to boost the entrepreneurship sector
- Social entrepreneurship as a means of increasing social participation and improving the socio-economic outlook of members of vulnerable groups (e.g., persons of low socio-economic status, single mothers with limited education, out of school youths, individuals with impairments etc.)
- Strengthening women-led small and medium enterprises to address gender disparity in the economic sector
- Studying and documenting existing social enterprises



- Evaluating the success of cooperatives in Rodrigues and identifying measures for success^{**}
- Studies to better the understanding of failure of local businesses (including cooperatives) in Rodrigues
- Developing of tailor-made education and sensitization approach and programmes to better guide and foster cooperative development in the general population of Rodrigues

****Short term priority actions**

Expected Outcomes:

- Reduced poverty
- Better education
- Improved government finances
- Local and regional development
- Social economy
- Social entrepreneurship
- Developmental (first-order change)
- Transitional (second-order change)
- Transformational (third-order change)
- Public engagement
- Responsible research and innovation
- Trans-disciplinary research



11.8.4 Roadmap





11.9 Thematic Area: Health and Wellness/ Tourism

11.9.1 Introduction

Rodrigues Island presents unique opportunities and strengths which can be made use of to develop a sound health sector. The small island area, a small population, a good network of communication, coupled with strong political commitment of the RRA are all key ingredients which can help to reorient the health approach. The existing healthcare system is basically curative-oriented and, if maintained as such, will get overburdened in the years to come. Rodrigues has its own specificities which can favour the development of an integrated approach to tackle health issues, whereby much more emphasis is to be laid on preventive medicine.

Within the context of the broader objective of integrated, sustainable development of Rodrigues, the core issues identified are associated with (1) over-emphasis on curative medicine, which is not sustainable; (2) performance and infrastructure of the health care system; (3) selected health indicators (MDGs directly relevant to the health sector); (4) threat of propagation of HIV/AIDS, and extent of provision of care to support to People living-with-HIV/AIDS (PLWHA); (5() incidence of non-communicable diseases (NCDs); (6) a high percentage of teenage pregnancy; and (7) alcohol abuse as a persistent phenomenon.

Rodrigues, like many other SIDS, is highly vulnerable to natural disasters, such as cyclones, droughts, flash floods and to the adverse effects of climate change. However, over the years, the Rodriguan population has built up an adaptive capacity while steadily championing a way out through sustainable conservation principles and innovative practices. The vision of Rodriguan authorities to develop the island into a 'green island', coupled with the richness of the Rodriguan culture, in terms traditional knowledge and adoption of sustainable environmental practices, can open up the touristic potential of the island as a 'green destination'.

11.9.2 Gaps and Challenges

- Lack of specialised skills in certain areas, e.g., super specialists in medical sector
- Lack of medical experts and infrastructure on the island
- Salary scale not attractive for super specialists in medical field
- Lack of public awareness on healthy eating
- Communication gaps between the public sector, private sector and academia
- Slow administrative procedures as a stumbling block for innovation
- High rates of NCDs
- Need for strengthening of legal and regulatory framework
- Lack of detail statistical data in the health and tourism sector
- Lack of continuous training of staff in the health sector
- Lack of data sharing/ modern techniques between Mauritius and Rodrigues in the health sector
- Challenges in relation to COVID-19



• Lack of interest from operators to upgrade their skills in the tourism sector to be in line with global standards

11.9.3 Strategic Orientations

FIGURE 113 - RODINOV HEALTH AND WELLNESS/TOURISM STRATEGIC ORIENTATIONS

STRATEGIC ORIENTATION 1: TELEMEDICINE

- a. Implementation of telemedicine health system in Rodrigues
- b. Assessing the resources (equipment, intranet/internet connectivity) for implementing telemedicine system in Rodrigues
- c. Identify health care services needed
- d. Identification of specialist
- e. Agreement between RRA and Ministry of Health/ international health department to implement the telemedicine program
- f. Assessment of the impact of telemedicine on the economy**
- g. Creating awareness on telemedicine

STRATEGIC ORIENTATION 2: SPORT TOURISM

- a. To investigate the tourism carrying capacity of Rodrigues Island in view of realizing the vision of reaching 100,000 tourists in 2027**
- b. Impact of tourism on the Rodrigues economy, society and culture, natural resources, environment, and health
- c. Strengthening of tourist services, e.g., assessment of training needs, available information to tourists, digitalization of services
- d. Identification of new ecotourism products directed towards a green destination
- e. Assess the training needs for the promotion of an ecotourism industry $\!\!\!\!\!\!*\!\!*$
- f. Assessment of the touristic revenue particularly in international events like kite surf and Trail de Rodrigues
- g. Possibility of setting up a travel package for sport events (package may include air ticket, competition fee, hotel, massage, spa, contrast bath, lunch in different restaurant, etc.) and hosting international events
- h. To develop sustainable Sport Tourism in Rodrigues**
- i. Possibility of setting up a special care system for tourism. Proposed idea: Each hotel must have a medical department that will provide quality health care to tourists
- j. Setting up of a department to provide quality health services to tourists
- k. Innovative finance mechanism to identify foreign and private investment in sport tourism
- I. Development of locally made supplements for sport

STRATEGIC ORIENTATION 3: WELLNESS TOURISM

a. A cultural perspective of health and wellness tourism (Develop a cultural approach to attract tourists)



- b. Identify wellness activities and relaxation spots for tourists (soft preventive therapies/ music/ scent therapy) in Rodrigues
- c. Promote sustainable wellness tourism in Rodrigues

STRATEGIC ORIENTATION 4: E-HEALTH

- a. Assessing current E-health system and use it to its full potential
- b. Make E-Health work between all health department that is hospital, Areas health centres and community health centres (interconnection)
- c. Framework to ensure data capture in the system

STRATEGIC ORIENTATION 5: TRADITIONAL MEDECINE

- a. Implementation of research and innovation to promote traditional medicine
- b. Gather information about all studies and knowledge that have been done regarding traditional knowledge**
- c. Identify plants and other natural resources used in traditional medicine**
- d. Identify traditional practices/ medicine that are practiced in Rodrigues
- e. Study the impact of traditional practices/ medicine that are practiced in Rodrigues
- f. Valorization and protection of indigenous knowledge related to traditional medicine

STRATEGIC ORIENTATION 6: ALCOOL AND DRUG ABUSE

- a. Study on non-injectable and injectable drugs that are present in Rodrigues
- b. Assessing and improving rehabilitation and re-insertion program regarding drug and alcohol abuse
- c. Evaluating and improving sensitization programs regarding drug and alcohol abuse (empowering the youth to cope with drug and alcohol)
- d. Studying the social factors that contribute to alcohol and drug abuse in the Rodriguan society

STRATEGIC ORIENTATION 7: NON-COMMUNICABLE DISEASES

- a. Study the link between food consumption and NCDs prevalence, with special focus on healthy eating habits
- b. Assessment of NCDs treatment
- c. Study to understand the causes of cancer
- d. Implementation of a cancer treatment centre in Rodrigues
- e. Implementation of a cancer registry in Rodrigues
- f. Implementation of exercise referral as treatment for some NCDs
- g. Study of the link between genetics and NCDs

STRATEGIC ORIENTATION 8: SEXUALLY REPRODUCTIVE HEALTH

- a. Study on prevalence of sexually transmissible diseases to know the estimated population
- b. Identify the key population that are affected by STDs
- c. Setting up of a sexual reproductive health program



d. Evaluating and improvement of sensitization program regarding NCDs, STDs and teenage pregnancy

STRATEGIC ORIENTATION 9: PUBLIC HEALTH

- a. Baseline study on the carrying capacity of the health sector
- b. Assessing human resource needs and priorities (e.g., redesigning job roles and work schedules to improve the productivity of existing staff)
- c. Assessing health care services
- d. Assessing the energy consumption in hospitals and other public infrastructure

****Short term priority actions**

Expected Outcomes:

- Implementation and expansion of digital health technologies
- Adoption of other innovative technologies and practices to support the health and wellness sector
- Improved delivery of services in public hospital
- Better provision of care, research, support including preventive measures for NCDs
- Promotion of multi-disciplinary conversation between hospitals/ specialties
- Promoting intersectional approach between major national hospitals/ private clinics and medical NGOs
- Implementation of research and innovation to promote new fields, such as traditional/ ayurvedic medicine, sports economy, silver economy, healthcare tourism, medical education
- Improved service delivery by the Ayurveda physicians and therapists
- Addressing communicable and non-communicable diseases
- Addressing mental health
- Ways and means to reduce substance abuse
- Decent living environment and aging with dignity and respect
- Participative incentive of patients in their treatment
- Health literacy
- Proper adherence to treatment
- Impeding/ delayed chronic complications
- Increased conversation between actors in formulating individualized treatment plan
 - o enhanced health outcomes of the senior citizens
 - o better management of seniors' (geriatric) issues
 - o impacting the diet behaviour of youth by using the athlete as a role model



Health and Wellness/Tourism

STRATEGIC ORIENTATION 1: TELEMEDICINE

- Implementation of telemedicine health system in Rodrigues
- Assessing the resources (equipment, intranet/internet connectivity) for implementing telemedicine system in Rodrigues
- · Identify health care services needed
- Identification of specialist
- Agreement between RRA and Ministry of Health/international health department to implement the telemedicine program · Assessing the impact of telemedicine on the
- economy
- · Creating awareness on telemedicine

STRATEGIC ORIENTATION 4: E-HEALTH

- Assessing current E-health system and use it to its full potential
- Make E-Health work between all health department that is hospital, Areas Health Centres and Community Health Centres (interconnection)
- Framework to ensure data capture in the system

STRATEGIC ORIENTATION 7: NON-COMMUNICABLE DISEASES (NCDS)

- Study the link between the food consumption and NCDs prevalence, with special focus on healthy eating habits.
- Assessment/Evaluation of NCDs treatment.
- Study to understand the causes of cancer.
- Implementation of a cancer treatment Centre in Rodrigues.
- Implementation of a cancer registry in Rodrigues
- implementation of Exercise referral as treatment for some NCDs
- Study of the link between genetics and NCDs

STRATEGIC ORIENTATION 2: SPORT TOURISM

- To investigate the tourism Carrying Capacity of the Rodrigues Island in view of realizing the vision of reaching 100, 000 tourists in 2027
- Impact of tourism on the Rodrigues economy, society & culture, natural resources, environment, and health.
- Strengthening of tourist services e.g assessment of training needs, available Information to tourists, digitalization of services
- Identification of new ecotourism products directed towards a green destination
- Assess the training needs for the promotion of an ecotourism industry.
- Assessment of the touristic revenue particularly in international event like kite Surf and Trail de Rodrigues
- Possibility to setting up travel package for sport events (package may include air ticket, competition fee, hotel, massage, spa, contrast bath, lunch in different restaurant, etc...) and hosting international events
- To develop sustainable Sport Tourism in Rodrigues
- Possibility of setting up a special care system for tourism. Proposed idea:
- Each hotel must have a medical department that will provide quality health care to tourism
- Setting up of a department liaise with all tourism sector to provide quality health services to tourist.
- · Innovative finance mechanism to identify foreign and private investment in sport tourism
- Development of locally made supplements for sport

STRATEGIC ORIENTATION 5: TRADITIONAL MEDECINE

- Implementation of research and innovation to promote traditional medicine.
- Gather information about all studies and knowledge that have been done regarding traditional knowledge.
- Identify plants and other natural resources used in traditional medicine
- Identify traditional practices/medicine that are practiced in Rodrigues
- Study the impact of traditional practices/medicine that are practice in Rodrigues.
- Valorisation and protection of Indigenous knowledge related to traditional medicine

STRATEGIC ORIENTATION 8: SEXUALLY REPRODUCTIVE HEALTH

- Study on prevalence Sexually transmissible diseases to know the estimate population.
- Identify the key population that are affected by STDs.
- Setting up of a Sexual Reproductive Health program.
- Evaluating and improve of sensitisation program regarding NCDs, STDs and Teenage pregnancy.

STRATEGIC ORIENTATION 6: ALCOOL AND DRUG ABUSE

- Study on non-injectable and injectable drugs that are present in Rodrigues
- Assessing and improving rehabilitation and reinsertion program regarding drug and alcohol abuse.
- Evaluating and improve sensitization program regarding drug and alcohol abuse (empower the youth to cope with drug and alcohol).
- Study of the social factors that contribute to alcohol and drug abuse on the Rodriguan society

STRATEGIC ORIENTATION 9: PUBLIC HEALTH

- Baseline study on the carrying capacity of health sector
- Assessing human resource needs and priorities (e.g., redesigning job roles and work schedules to improve the productivity of existing staff)
- Assessing health care services
- Assessing the energy consumption in hospital and other public infrastructure

LES ASSISES de la Recherche

TOURISM

- approach to attract tourist)
- Identify wellness activities and relaxation spots for tourists (soft preventive therapies/music/scent
- therapy) in Rodrigues
- in Rodrigues.

STRATEGIC ORIENTATION 3: WELLNESS

 A cultural perspective of health and wellness tourism. (Develop a cultural Promote sustainable Wellness Tourism



Strategic Direction: To enhance investment in Research and Innovation

STRATEGIES

- To promote investment of private sector, both national and international, in Research & Innovation in Rodrigues
- To set up a Rodrigues Research and Innovation Fund in RRA Budget
- To set up funding schemes aiming at promoting the following
 - Promoting Research and Innovation
 - Promoting commercialisation of Research and Innovation, with special focus on grassroots
 - innovation
 - Promoting Capacity Building
- To train researchers to tap into sources of funding, both national and international
- To provide financial supports for postgraduates and doctoral education in strategic/priority fields or sectors
- To develop Incubation programs to foster Entrepreneurial development and Innovation





IMPLEMENTATION

Science is what should be applied, not memorised - Arabic saying

Implementation of Projects/Measures emanating from ARI 2022

Project Title: Implementation and follow up of projects/measures emanating from Les
Assises de la Recherche et de l'Innovation
Project Value: MUR 53,555,000 (For Year I)
General Cost Breakdown:

FIGURE 116 - IMPLEMENTATION AND FOLLOW UP OF PROJECTS/MEASURES EMANATING FROM LES ASSISES DE LA RECHERCHE ET DE L'INNOVATION

Items	2022-2023	2023-2024	2024-2025
Thematic Sectors			
Overall Recommendation implementation	6,050,000	2,610,000	2,610,000
Blue and Green Innovation	13,655,000	21,555,000	36,555,000
Health and Wellness Innovation	6,630,000	8,080,000	10,080,000
Financial Innovation	9,530,000	30,980,000	20,980,000
Social and Grassroots Innovation	3,130,000	3,130,000	3,130,000
Travel, Tourism and Entertainment Innovation	6,555,000	10,455,000	2,455,000
IT and emerging, enabling Industries	3,505,000	7,455,000	5,455,000
Rodrigues	4,500,000	6,500,000	6,500,000
Total	53,555,000	90,765,000	87,765,00

Overall Recommendation Implementation

Items	2022-2023	2023-2024	2024-2025
Dissemination	250,000	100,000	100,000
Human Resource	955,000	955,000	955,000
IT Equipment	150,000		
Overall Recommendation	4,695,000	1,555,000	1,555,000
implementation			

FIGURE 117 - OVERALL RECOMMENDATION IMPLEMENTATION COSTS



Total	6,050,000	2,610,000	2,610,000

I. Project Information

In view of the above, seven thematic areas have been identified:

- I. Blue and Green Innovation
- 2. Health and Wellness Innovation
- 3. Financial Innovation
- 4. Social and Grassroots Innovation
- 5. Travel, Tourism and Entertainment Innovation
- 6. IT and emerging, enabling Industries
- 7. Innovation in Rodrigues

In view of this flagship event, thematic working groups were set up for each of the thematic areas. These thematic working groups identified relevant projects/ actionable/ support mechanism which will help dynamize the concerned sector.

I. Objectives:

- Development of a national roadmap
- Provision of insights in emerging technologies and sectors
- Identification and introduction of strategies to drive leadership in emerging technologies and sectors
- Elimination of barriers to innovation
- Coordination disparate policies toward research, technology commercialization, investments, education, tax, trade, IP, government procurement and regulatory policies in an integrated fashion that drives economic growth
- Chart incentives for fostering innovation

2. Economic and Social Benefits (Expected Impact/ Outcomes)

- Finding potential solutions for national problems through pooling of innovative ideas with some having commercial potentials'
- Development of grassroots innovation initiatives
- Incubation of innovative ideas with potentials for job creation
- Creating an ecosystem fostering innovation in Mauritius
- Ignite an innovation spirit amongst the Mauritian Population
- Dynamize innovation in key economic sectors



Strategic Orientation	Projects	2022 2023	2024	2025	2026	2027
		JASONDJEMAMJJASOND.	JEMAMJJASOND.	J FMAMJ JASOND	J FMAMJJ A SOND	J FMAMJJ ASONC
	Establishment of permanent high level National Research and Innovation Steering Council					
STRATEGIC ORIENTATION 1:	Creation of a harmonised Research and Innovation Act					
Harmonisation of Research and Innovation Initiatives across the Country	Establish a national platform for facilitation of research and innovation					
	Review policies and regulatory environment					
	Review funding mechanisms for Innovation					
STRATEGIC ORIENTATION 2: Development of an Innovation Scouting Unit	Development of an Innovation Scouting Unit					
STRATEGIC ORIENTATION 3 Development of a National Outreach/Communication Platform for Science, Research, Development and Innovation	Development of a National Outreach/Communication Platform for Science, Research, Development and Innovation					
STRATEGIC ORIENTATION 4: Conduct and Facilitation of Research on Identified National Priority Thrust Areas	Conduct and Facilitation of Research on Identified National Priority Thrust Areas					
STRATEGIC ORIENTATION 5: Comprehensive Revamping and Creation of Schemes/Support Mechanisms	Comprehensive Revamping and Creation of Schemes/Support Mechanisms					
	Foster creativity and innovation amongst youngsters					
	Development of a pool of trainers in creativity and innovation					
STRATEGIC ORIENTATION 6: Advocating for an Entrepreneurial Mindset, starting	Promote intrapreneurship in private and public organisations					
from the Grassroots Level	Enhance the entrepreneurial ecosystem in Mauritius through strategic public-private partnerships					
	Create regional and international linkages in view of					
	Position sunrise industries as potentially transformative ventures					
	Develop regional/international cross border research and innovation initiatives					
	Create regional and international linkages or partnership Enhance MRIC's capacity to attract external funding and					
STRATEGIC ORIENTATION 7:	support for research and Innovation					
Positioning of Mauritius as a Regional Research and	capture innovative ideas, start-ups and foster regional					
Innovation Hub	collaborations					
	Encompass and house all activities pertaining to innovation under a single building/facility (The Nucleus)					
	Gear incubators towards servicing regional start-ups					
	Launch joint regional funding initiatives					
STRATEGIC ORIENTATION 8: Creating Organisational Dynamism to achieve MRIC's Goals	Creating Organisational Dynamism to achieve MRIC's Goals					



Implementation Plan of Blue and Green Innovation

Scope of Sector

The aim of this thematic area is to promote and pioneer 'Blue and Green Innovation' for sustainable development to enhance the quality of life in Republic of Mauritius through focusing on agriculture and marine sector, and by incorporating blue and green strategies to address climate mitigation and adaptation.

Estimated Budget: MUR 13,655,000 Cost Breakdown:

FIGURE 119 - BLUE AND GREEN INNOVATION IMPLEMENTATION PLAN COST BREAKDOWN

Items	2022-2023	2023-2024	2024-2025
Quick Win Programmes/ Pro	ojects/ Support mechar	nisms (Short Te	rm)
I. Productive and Agriculture through smart farming	Sustainable 2,000,000 precision/	3,000,000	5,000,000
 Improved nutritional qual and food security through post-harvest technique processing zones and storage facilities 	ity of food n improved es, agro- intelligent	3,000,000	5,000,000
Medium Projects/ Support m	echanisms		
I. Circular Blue and Gree (innovative use of m biomaterials for ma products)	n projects arine and nufacturing	3,000,000	5,000,000
2. Innovative Marine ICT tools, satellite surveillanc technologies)	(modelling e, forecast	3,000,000	5,000,000
Long Term Projects/ Support	t Mechanisms	·	·
I. Marine biomed and nut (Medical use of fish sl skin regeneration and nu products from marine pr oil, antioxidant ingredients polysaccharide, etc)	traceuticals kin for utraceutical oteins, fish s, immuno-	3,000,000	5,000,000
2. Green production an (offshore hydrogen)	d export 2,000,000	5,000,000	10,000,000



Staffing			
Human Resource	955,000	955,000	955,000
Logistics	•	-	
Logistics, office space, overheads	700,000	600,000	600,000
Total	13,655,000	21,555,000	36,555,000



Strategic Orientation	Projects	2023	2023	2024	2025	2026
Blue&green		JASONDJFN	1 A M J J A S O N D	J F M A M J J A S O N D	JFMAMJJASOND	ЈҒМАМЈЈА
	Satellite and aerial imagery for sustainable land use and targeted agricultural inputs					
	Development of smart machinery and equipment to improve farming practices					
Strategic Orientation	Blockchain food traceability					
Enhancing nutritiona	Use of IoT to monitor livestock					
quality and food security	Use of sugarcane fibres in nutrition					
	Development of smart greenhouse horticulture structures for tropical climate					
	Use biotechnology in breeding, soil rehabilitation & biosecurity					
Strategic Orientatior	Improved post-harvest techniques and development of intelligent storage facilities					
2: Enhancing food	Mapping of agro-processing zones					
processing from loca	Use of solar energy for post-harvest techniques					
sources	Using biotechnological tools to breed crops with a longer shelf life					
	Innovative use of blue and green materials in the fashion industry					
Strategic Orientation 3:	Phytocosmetics – innovative use of plant materials for cosmetics					
Circularblue and green economies	Manufacturing of biodegradable and compostable blue and green products					
	Upcycling waste to develop future cities					
	Using modelling tools for ship management and coastal management					
Strategic Orientatior	EEZ monitoring – Leveraging on satellite observation and surveillance/ drone/ IoT					
4:	Use of forecast technologies to predict weather phenomena					
Marinetechnology	Fish movement and monitoring					
	Assess marine genetic biodiversity and adopt sustainable resource conservation					
Strategic Orientation	Biological wound dressing from fish skin					
5: Marine and plant	Development of pharmaceuticals from marine organisms					
biomed	Development of thalassotherapy units in coastal hotels					
Strategic Orientation	Investigation of health benefits from marine biodiversity					
6:	Investigation of health benefits from terrestrial biodiversity					
bioprospecting and	Development of the blue nutraceutical industry					
bioprocessing	Development of the green nutraceutical industry					
	Feasibility study for an offshore hydrogen plant					
	Feasibility study of exportation of hydrogen as fuel					
Strategic Orientation 7:	Local manufacturing and export of raw materials for renewable energy production					
Blue-green	Conversion of biomass to transportation fuel					
export	PV Power generation with aquaculture					
	Feasibility for production of electricity from coconut oil in outer islands					
	Feasibility study for implementing net zero energy buildings in Mauritius					



									20	27	,				
5	0	N	D	J	F	м	A	м	J	J	A	s	0	N	D
					_		_		_						

Implementation Plan of Financial Innovation

Scope of Sector

Financial innovation can be defined as the creation and popularization of new financial products, processes, markets, and institutions (Llewellyn, 1992; White, 1997; Tufano, 2003; Mishra, 2008; Sánchez, 2010; Delimatsis, 2011; Gubler, 2011; Lerner and Tufano, 2011). This definition suggests that financial innovation is a process that can be managed and governed to achieve desired results (Tidd et al., 2005; Tidd and Bessant, 2009). Financial innovation includes improvements in products (e.g., hedge funds, derivatives), processes (e.g., mobile payments) and institutions (e.g., companies being set up to provide specialised services).

Estimated Budget: MUR 9,530,000

Cost Breakdown:

Items	2022-2023	2023-2024	2024-2025					
Quick Win Projects/ Support mechanisms (Short Term)								
I. Creation of Digital ID for natura and legal person	1,000,000	1,000,000						
 Setting up of Mauritius FinTech Laboratory 	ו,000,000	10,000,000						
3. Financing of FinTech Start Ups	1,000,000	10,000,000	10,000,000					
Medium Projects/ Support mechani	sms							
4. Creation of National Researcl and Innovation Chair for Financia Innovation	n 3,000,000	5,000,000	5,000,000					
5. Education (e.g., FinTecl Knowledge)	<mark>ו 500,000</mark>	3,000,000	5,000,000					
6. Issuing guidelines by the MRA (in relation to smart contracts)	<mark>ו 500,000</mark>	1,000,000						
7. Development of Digital Knov Your Customer (e-KYC)	v 500,000							
8. Open Banking	500,000							
9. Tax Policy	500,000							
Long Term Projects/ Support Mechanisms								

FIGURE 121 - FINANCIAL INNOVATION IMPLEMENTATION PLAN COST BREAKDOWN



10. Development of FinTech Agreements between FinTech Regulators			
II. Literacy			
 12. Taxation of individuals (in relation to crypto currencies) 			
Staffir	ig		
Human resource	480,000	480,000	480,000
Logistics	Logistics	Logistics	Logistics
Logistics, office space, overheads, etc.	550,000	500,000	500,000
Total	9,530,000	30,980,000	20,980,000



Strategic Orientation	Projects	20	22	2023	2024	2025	2026	2027
Financial		ЈҒМАМЈ	JASOND	JFMAMJJASOND	JFMAMJJASOND	JFMAMJJASOI	NDJFMAMJJASONE	JFMAMJJASON
	Payment Gateways							
	Payment management							
Strategic Orientation 1: Digitalization in the Financial Sector	Peer to Peer payments / Money Transfer							
	Payment infrastructure							
	CustomerOnboarding							
Strategic Orientation 2: Facilitate access to funds for individuals and companies to promote economic activities in the country	Loan processing s							
	Creditscoring							
	Customer Account Aggregators							
Strategic Orientation 3: Personal Finance/Treasury Management	Intelligent Cash Management							
	Capital Market Operations							
Strategic Orientation 4: Use of technology in Capital Markets	Investment Brokering							
	New trading models							
Staatuais Osiantation Sc	Equity Crowdfunding							
Technology in Fundraising activities	Rewards-based Crowdfunding							
	Asset-backed Tokenization							
	Customer Risk Management							
Strategic Orientation 6: Compliance with Internationa Best Practices	Regulation Tech (REGTECH)							
	Supervision Tech (SUPTECH)							



Implementation Plan of Travel, Tourism and Entertainment

Innovation

Scope of Sector

The scope of this thematic sector covers areas that will focus on improving the travel, tourism and entertainment sector of Mauritius with a view to attract high value-added, sustainability-minded tourists through the offering of high-quality service.

Estimated Budget: MUR 6,555,000

Cost Breakdown:

FIGURE 123 - TRAVEL, TOURISM AND ENTERTAINMENT INNOVATION IMPLEMENTATION PLAN COST BREAKDOWN

Items	2022-2023	2023-2024	2024-2025					
Quick Win Programmes/ Projects/ Support mechanisms (Short Term)								
Community Attitudes towards Tourism	1,000,000	1,000,000						
Development in Mauritius								
A survey to identify the needs, attitudes and	500,000	500,000						
behaviours of tourists (Post-COVID-19)								
Brand perception of Mauritius among	500,000	1,500,000						
international travelers								
Developing social conscience and	1,000,000	1,000,000						
responsible citizenship								
Medium Projects/ Support mechanisms			·					
Interactivity and interpretive Signage	500,000	1,500,000						
Project								
To investigate the skills gap between	500,000	1,500,000						
tourism and hospitality graduates and								
industry expectation								
Improving Sustainable Tourism in Mauritius	500,000	1,500,000						
Through Greening the Value Chain of Tour								
Operators (SUSTAINABLE ISLAND								
MAURITIUS / SIM)								
Long Term Projects/ Support Mechanis	ms							
Sustainable Island Mauritius	500,000	500,000	I,000,000					
Staffing								
Human Resource	955,000	955,000	955,000					
Equipment								
Logistics								
Logistics, Office space, overheads, etc	600,000	500,000	500,000					
Total	6,555,000	10,455,00	2,455,000					



Strategic Orientation	Projects	20	22	2023	2024	2025	2026	2027
Travel Tourism and Entertainment		JFMAMJ	JASONDJF	MAMJJASOND	J F M A M J J A S O N D	J F M A M J J A S O N D	JFMAMJJASOND	JFMAMJJASOND
	Digital App for tourist nature-based activities							
	Digitalisation of the MauPHI Monitoring Tool							
Strategic Orientation 1:	Understanding community attitudes towards tourism development for policy making							
Strengthening efforts towards ensuring Sustainable Tourism	Understanding the post COVID needs, attitudes&behaviours of tourists for policy making							
	Develop social conscience&responsible citizens(innovative international best practices)							
	Proposal to set up a sustainable agri-tourism village in Mauritius							
Strategic Orientation 2:	Investigate the skills gap between tourism/hospitality graduates and industry expectations							
Human Capital Development and Capacity Building	post COVID Turnover&turn-away intention of Travel, Tourism&Entertainment employees							
	assessing the perception of customers and hotel employees on service robots							
	Digital mapping of natural heritage sites and other tourist attraction sites							
Stratonic Orientation 3:	Design and implementation of digital interpretive signage at tourist sites							
Marketing/Visibility of Mauritius as a Tourist	Credit-based system - willingness-to-pay of Mauritian citizens for recreational services							
Destination	Translation of Mauritian Creole into other foreign languages							
	Investigating the contribution of domestic tourism in Mauritius during lockdowns							
	Aggregation of forward-looking data from a number of sources							
Advocating for the use of forward-looking data	Investigating the use of big data in the Mauritian tourism industry							
and big data	Open innovation and social big data							
	The influence of low-cost carriers on tourism demand and growth							
Strategic Orientation 5: Increased Air Connectivity/	Tourism demand, airline capacity and trade: A case study of Mauritius							
Airline Seat Capacity	Airline deregulation in Mauritius: case study of other destinations and feasibility study							

FIGURE 124 - TRAVEL, TOURISM AND ENTERTAINMENT INNOVATION IMPLEMENTATION PLAN



Implementation Plan of Health and Wellness Innovation

Scope of Sector

Health is defined as the overall mental and physical state of a person; the absence of disease. Wellness refers to the state of being in optimal mental, physical, and emotional health. It is about living a life full of personal responsibility and therefore taking proactive steps for one's entire well-being. This means that a person living life very well controls risk factors that can harm them. Risk factors are different types of actions or conditions that increase a person's chances for illness or injury

The scope of the discussions includes the medical sector, the life sciences/pharmaceutical sector, the healthy lifestyle sector, including sports and nutrition and the health care including a core group of high-value activities, such as hi-tech medicine, medical tourism, medical education and wellness. **Estimated Budget:** MUR 6,630,000

Cost Breakdown:

FIGURE 125 - HEALTH AND WELLNESS INNOVATION IMPLEMENTATION PLAN COST BREAKDOW

Items	2022-2023	2023-2024	2024-2025						
Quick Win Projects/ Support mechanisms (Short Term)									
I. Innovative Technologies and practices with an emphasis on digital health technologies	1,000,000	1,000,000	1,000,000						
2. Harnessing the potential contribution of new fields of Health & wellness for economic growth	1,000,000	1,000,000	1,000,000						
Medium Projects/ Support mechanisms	5								
3. Innovating for a healthier population	1,500,000	2,000,000	2,000,000						
Long Term Projects/ Support Mechanis	sms	·	·						
4. Innovative Governance Mechanism to improve delivery of institutions	2,000,000	3,000,000	5,000,000						
Staffing									
Human resource	480,000	480,000	480,000						
Logistics	•	•	•						
Logistics, office space, overheads, etc	650,000	600,000	600,000						
Total	6,630,000	8,080,00	10,080,000						



Strategic Orientation	Projects	202	22 2023	2024	2025	2026	2027
Health and Wellness	S	JFMAMJ	J A S O N D J F M A M J J A S O N	DJFMAMJJASOND	JFMAMJJASON	DJFMAMJJASOND	J F M A M J J A S O N D
	Development of mobile apps to promote and facilitate access to personalized nutrition						
Strategic Orientation 1:	Develop mobile apps to promote access to sports facilities and personalized fitness Development of the TeleHealth/MobiHealth platform for online consultation Storing and updating of all NCDs registers in a national database Conceptualize an allied health services with patient at the centre						
Technology/Practice	 Adoption of E-medical data file for patients SAdoption of innovative medical approaches and services Implement an allied health services with patient at the centre Establishing the communication channels between medical and paramedical experts Adopt Green energy for savings on electricity/petrol bill of Min. of Health&Wellness 						
	develop a plan for implementation of Ayurvedic Medicine and traditional medicine Identification of Mauritian plants for Ayurvedic Medicine						
	Identify of plants to develop a Mauritian pharmacopeia for the Nutraceuticals industry						
Strategic Orientation 2:	Upgrading the ecosystem for clinical research including training and awareness Design & Delivery of certificate and postgraduation certificate in Panchakarma Promote a wellness industry by training the local strength and local hospitality Conceptualisation on Wellness Industry, for e.g. Smoking, cessation services						
Harnessing the potential contribution	Cultivation of endemic, traditional medicinal plants on a large scale by small planters						
Health and wellness to economic growth	commercialise accumulated research data and knowledge on endemic medicinal plant.						
	Higher medical education as a prerequisite for Medical tourism Enhanced Residential care for the Elderly						_
	Establish an endemic herbs Pharmaceutical Plant for Ayurveda/nutraceutical Industry						
	Set up a National Laboratory/programme for Safety and Efficacy of traditional medicines			_			
Strategic	Feasibility study for introducing the innovative Performance Nutrition for athletes Feasibility study for inclusion of Exercise prescription to fight NCDs Sensitization campaigns for promoting healthy diets and lifestyle Promote health literacy to address communicable and non-communicable diseases Introduction of the complex care plan Inclusion of Ayurvedic Diet & Lifestyle at School level PHE curricula						
Orientation 3: Innovating for a	Setting up a mechanism to facilitate data sharing between institutions						
neaimer population	Observation studies on specific illnesses/diseases in different ayurveda clinics. Addressing NCDs and infectious diseases Implementation on Wellness Industry						
	Improve the elderly's lifestyle by proposing prototype of residential home for the latter						
	Develop a clinical and regulatory framework for setting up of a teaching hospital Improve the regulatory framework for free sharing of e-medical records with patients						
	Revamping of the Pharmacy Act Study for the development of framework on Nagoya Protocol Research and identification of plants for cultivation of large scale Updating the legislative framework for nutritional labelling						
Strategic Orientation 4: Innovative Governance	Developing a plan for the silver economy Attract overseas investors in the food, pharmaceutical and cosmetic sector Unleashing the potential of a nutraceutical industry in Mauritius						
Mechanism to improve delivery of	Establish an endemic herbs Pharmaceutical Plant for Ayurveda/nutraceutical Industry						
institutions	Set up a National Laboratory/programme for Safety and Efficacy of traditional medicines						
	Implementation of international benchmarking in the medical tourism ammend regulatory frameworks to attract foreign pharmaceutical companies Developing the silver economy						
	Set up of Pharmaceutical Plant and commercialization of products Setting up and recruitment for National Laboratory/programme Developing the Medical/wellness sector together with medical education						



Implementation Plan of Social and Grassroots Innovation

Scope of Sector

The limitations of top-down prescriptions to address enduring socio-economic or environmental vulnerabilities faced by local communities or specific social groups are now well established in development practice. Under the 'Social and Grassroots Innovation' rubric, the focus is about fostering a bottom-up, inclusive and participatory approach to (1) raise awareness (2) build a culture and (3) generate, promote and adopt socially innovative solutions to enduring social problems faced by people in their ordinary lives for positive and sustainable transformations and where possible celebrate and encourage the upscaling of these innovations.

Estimated Budget: MUR 3,130,000

Cost Breakdown:

Items	2022-2023	2023-2024	2024-2025							
Quick Win Projects/ Support mechanisms (Short Term)										
I. Mapping, showcasing and promoting Social and Grassroots Innovations to encourage upscaling	1,000,000	I,000,000	1,000,000							
Medium Projects/ Support mechanisms	·	·	·							
2. Scouting and Adapting pragmatic Social and Grassroots Innovations in the local context	1,000,000	I,000,000	1,000,000							
Staffing	I		1							
Research assistant	480,000	480,000	480,000							
Logistics			•							
Logistics, office space, overheads, etc	650,000	650,000	650,000							
Total	3,130,000	3,130,000	3,130,00							

FIGURE 127 - SOCIAL AND GRASSROOTS INNOVATION IMPLEMENTATION PLAN COST BREAKDOWN



Strategic Orientation	Projects	20	22	2023	2024	2025	2026	2027
Social and Grassroots		JFMAMJ	JASOND	JFMAMJJASOND	JFMAMJJASOND	J F M A M J J A SON D	JFMAMJJASOND	JFMAMJJASOND
Strategic Orientation 1: Shared Understanding of S&G Innovation	Organise awareness campaigns on the benefits of S&G innovation.							
	Developing local initiatives to support and strengthen local grassroots community.							
	Establish a Social Innovation Evidence Development and Knowledge Sharing Initiative.							
	formulate policies to promote crowdsourced sustainable development programmes							
	Develop a legal framework to enable social innovators and entrepreneurs to emerge.							
Strategic Orientation 2:	Developing a Social Innovation Ecosystem by incubating potential social enterprises							
Enabling Environment /Ecosystem with	Provide government with guidance for regulatory framework of highest standards.							
collaboration (Public- Private- Academia- Civil	Develop regulatory innovation capacity 'sandboxes' to experiment with new models.							
Society)	Establish research support programs to increase transparency and accountability							
	Establishing a multi-sectoral committee for social innovation							
Strategic Orientation 3:	Government support of pertinent entrepreneurships							
Entrepreneurship	Launch entrepreneurship awareness campaigns at national, regional and local levels							
	Stimulate private sector-led initiatives and strengthen networks among entrepreneurs							
Strategic Orientation 4:	Set-up a Special Innovation Fund to the disposal of researchers at the grassroots level.							
Capacity Building/Skills Development with a particular attention to	Empower NGOs and grassroots with innovation and social entrepreneurial skills							
capabilising grassroots communities and Civil Society as pillars of social innovation	Develop grant writing, fundraising support and facilitate networking.							
	Investigating the skills gap between social science graduates and industry expectations.							
	Develop social conscience & responsible citizens(innovative international best practices)	t						
Strategic Orientation 5: Open data and Research	Re-introducing the Solicited and Unsolicited Research and Innovation Grant Schemes							
	Developing research partnerships between community organisers and researchers.							
	Developing a repository for social initiatives.							

FIGURE 128 - SOCIAL AND GRASSROOTS INNOVATION IMPLEMENTATION PLAN



Implementation Plan of IT, Emerging and Enabling Innovation

Scope of Sector

A participatory approach to define a new strategy leveraging on IT and Emerging Industries for the betterment of the lives and livelihoods of the people of the Republic of Mauritius.

Estimated Budget: MUR 3,505,000

Cost Breakdown:

FIGURE 129 - IT, EMERGING AND ENABLING INNOVATION IMPLEMENTATION PLAN COST BREAKDOWN

Items	2022-2023	2023-2024	2024-2025						
Quick Win Projects/ Support mechanisms (Short Term)									
I. Addressing Awareness of Emerging Tech by creating a Young Makers Club	500,000	1,000,000							
 Short term actions to address issues of National Importance using Emerging Technology. Among Others: Creation of a Technology Fablab; Technology Advisory Board 	500,000	1,000,000							
Medium Projects/ Support mechanisms									
3. Industry Led Applied Research Chair	500,000	2,000,000	2,000,000						
 Launching of a Technology Centred Incubator for promotion of Start Ups driven by Innovative technologies 	500,000	2,000,000	2,000,000						
Staffing			•						
Human resource	955,000	955,000	955,000						
Logistics									
Logistics, office space, overheads, etc.	550,000	500,000	500,000						
Total	3,505,00	7,455,000	5,455,00						



Strategic Orientation	n Projects	202	2	2023	2024	2025	2026	2027
IT and Emerging Industries		J F MAM I J	ASOND) FMAMJJA SON [IFMAM J J A S O N D	J FMAMJJASOND	J FM A M J J A SO N D	JFMAMJJASOND
	Development of "E-Education Scheme/Boosting IT Skills scheme" at MRIC							
	Set up a steering committee to direct and monitor the project milestones							
	Creation of an online platform where free IT related online courses will be available							
Strategic Orientation 1: Awareness &	IT related courses to be displayed online: python, graphic designing, SPSS, etc.							
Empowerment	Call for proposals							
	Pilot tests and surveys							
	Collection of data (free courses links to be attached online)							
	Implementation of project via defined milestones and strategies							
	Development of a website to display the idea bank							
	To advertise the website via social media							
	Awareness campaigns							
	To organize an innovation challenge or competition targeting students							
	Organizing focus groups and steering committee to monitor the competition progress							
	Call for proposals							
	Defined competition milestones, guidelines, and rewards							
	Administrative screening and procedures							
	Awarenessand sensitization campaigns							
	Promotion Strategies; advertisements on radio, TV, posters, and social media							
	Set up of focus group discussions and steering committee to guide and monitor the proposal							
Strategic Orientation	Internships allocation for Tertiary students							
2: Instigating the Maker Culture in the country	Implementation of workshops, seminars, and field works at Secondary Schools							
	IT Skills Development mentoring and consultation							
	Monitor progress and impact							
	Certifications to be provided							
	Focus group discussions and steering committee to monitor the awareness campaigns							
	To design and share posters on social media and billboards throughout the island							
	short videos for awareness on readily available IT tools and emerging technologies.							
	To monitor progress and impact							
	To advertise successfully implemented MRIC Projects related to AI and (IoT)							
Strategic Orientation	Set up a steering committee to direct and monitor the strategic plan/proposal							
3: Collaboration among public and	bridge research works of tertiary students and public sectors							
private sectors, academia, and	online platform to enhance collaboration between academic, private, and public sectors.							
society to enhance R&D in IT and Emerging	To create different specific platforms to enhance data sharing and collaboration							
technologies.	Use of research works done&data collected by students in developing national projects.							

FIGURE 130 - IT, EMERGING AND ENABLING INNOVATION IMPLEMENTATION PLAN



RodInov- Implementation of ARI Measures in Rodrigues

Scope of Sector Estimated Budget: MUR 2,500,000 Cost Breakdown:

FIGURE 131 - RODINOV- IMPLEMENTATION OF ARI MEASURES IN RODRIGUES COST BREAKDOWN

Items	2022-2023	2023-2024	2024-2025
Medium Projects/ Support mechanisms	·		
Blue Innovation			
Green Innovation	2 500 000	2 500 000	2 500 000
Health and Wellness/ Tourism Innovation	2,500,000	2,500,000	2,500,000
Social and Grassroot Innovation			
Total	2,500,000	2,500,000	2,500,000



Implementation Timeline- Blue Innovation

Strategic Orientation	Projects	2022 2023	2024	2025	2026	2027
Blue Innovation		JASOND J FMAMJ J ASONI	J FMAM J J ASONDJ	FMAMJ JASOND	J FMAMJ J AS OND.	JFMAMJ JASOND
	Study on sustainable aquaculture methods					
	Exploration of sea mounts and banks around Rodrigues Island Development of sea fighting fighting development log for Bedrigues Island					
	Development of an offshore fishing development planfor koongues island To conduct a socio-economic evaluation of sustainable evoluitation of continental plateau fisheries in Rodrigues					
	Assessment of continental plateau fish species of commercial potential importance**					
STRATEGIC ORIENTATION 1	Establishment and formalization of bilateral collaboration with key organizations such as MOI, Albion Fisheries, University of Mauritius to improve research and innovation					
Development (with special	capabilities of Rodrigues stakeholders					
attention on Continental	Establishment of continental plateau fishing ground and sites based on satellite imagery development through the MOI**					
Plateau) and lagoon fishing	Development of fishing technologies and techniques to enhance off-fishing sector					
	Improvement of fishing infrastructures to improve seatood security in Rodrigues – Island					
	Impact of climate change on marine sciences					
	Fishing Development Plan (lagoon and offshore) ** special attention with continental plateau					
	Identity sustainable aquaculture activities					
	STRATEGIC ORIENTATION 2: Sustainable Marine and Coastal Resources Management					
	Continuous monitoring of marine and coastal resources					
	Development of a lagoon conservation and restoration integrated plan for Rodrigues Island**					
	Development of bioprospecting exercises on key marine and coastal species such as macroalgae, microalgae, sea urchins, sponges among other species					
	Development and operationalization of water quality monitoring action for Rodrigues					
STRATEGIC ORIENTATION 2	To identify new technologies and innovative means to ensure continuous monitoring of water quality for the lagoon of Rodrigues (Water Quality Index)					
Sustainable Marine and	Development and Operationalization of a manne Spatial Plan for the whole of lagoon of Rodrigues					
Coastal Resources	Assessment of the different types of aquaculture practices that can be done in Rodrigues					
Management	Identification of aquaculture sites					
	Evaluation and protection of sensitive coastal areas and marine resources					
	To investigate the socio-economic and environmental impact of desalination plant in Rodrigues Island					
	Set up of a legal and integrated management framework for optimal use of marine resources					
	Study on ways and means to store seafood					
	Investigate the impact of soil erosion on marine life					
	Identify the best mix of Renewable Energies that can help the island to move towards energy self-sufficiency and explore possibilities to attract private investment in this sector					
STRATEGIC ORIENTATION 3	Use of ocean-based energy to feed the desaination plants around koorigues Island					
Ocean-Based Renewable	To improve collaboration between Rodrigues Island and MARENA					
Energy	To develop sensitization and education campaigns on ocean-based renewable energy potential in Rodrigues Island					
	To assess human capacity development needs with regards to ocean-based renewable energy for Rodrigues					
STRATEGIC ORIENTATION A	Development and operationalization of a deep-sea exploration and mapping programs for Rodrigues Island					
Deep Sea Exploration	To develop the current and bathymetric profile of the waters surrounding Rodrigues Island					
	Investigation of the potential of manganese nodules exploitation and valuable minerals and metals					
	Improvement of maritime connectivity to foster export of seafood products to foreign market					
STRATEGIC ORIENTATION 5	: Assessment of impact of Rodrigues Port Development on Yacht Tourism, Cruise Tourism and Fishing sector of Rodrigues Island					
Martine connectivity	Possibility of greening of the Ports of Port Mathumn					
	Developing a pole of inpovation in Ocean Sciences in relation to forthroming Marine Academy and Research Centra**					
STRATEGIC ORIENTATION 6	Introduction of marine sciences at an early stage in the primary education system					
Improving the Ocean	Developing an atlas of existing marine and coastal living species in Rodrigues					
Governance Framework	Train people at grassroots level to develop capacity and expertise in offshore fishing					
	Development of a blue tourism/ecotourism activities portfolio for Rodrigues Island					
	To assess the legal and policy framework in view of improving blue tourism in Rodrigues Island					
STRATEGIC ORIENTATION 7	: To assess socio-economic potential of marine protected Areas and reserves of Rodrigues Island					
Sustainable Blue Tourism	To establish an ecosystem approach for a better environmental management of the coastal and maritime tourism					
	Managing the environmental sustainability of blue tourism in the Marine protected Areas of Rodrigues Island					
	To assess the blue ration notential of Rodrigues Island as a means of innovative finance for ecosystem-based management and development projects in Rodrigues Island					
	To conduct a socio-economic and environmental evaluation of Mangroves and mangrove-like species stands in Rodrigues Island and its islets					
	To conduct ongoing monitoring program on seagrass and mangroves in Rodrigues Island					
	To establish the carbon sequestration of potential of mangroves and seagrass as nationally determined climate contributions					
	To establish the nationally determined climate contribution of macroalgae (seaweed) farming of Rodrigues					
	To develop dedicated restorations programs for mangroves and seagrasses in Rodrigues respectively					
STRATEGIC ORIENTATION 8	To assess the contribution and potential of seagrass and mangroves in limiting siltation of the lagoon of Rodrigues Island					
BLUE CARBON	To develop community-based protection and restoration of mangroves and seagrass at target sites within the lagoon of Rodrigues Island					
	To improve sustainable costal marine and coastal erosystem management					
	To develop eligente and the electronic and coastal ecosystem management.					
	to develop climate smart fisheries through participation of local communities					
	To access the inpovative finance potential from hive cachon					
	ro assessmenniovauvennance potentiannom blue carbon					



Implementation Timeline- Green Innovation

Strategic Orientation	Projects	2022 2023	2024	2025	2026	2027
Green Innovation		JASON DJEVAVUJASONE	DJ FMAMJ JASOND) FIVANJ JASOND	J FMAMJ J ASONE) FMAMJ JASOND
	Professional and household farming					
	Valorization of 'Produit Terroir' including local crops , fruits and seedlings production					
STRATEGIC ORIENTATION 1:	Establishment of gene banks to provide locally produced seedling and conserve unique species (such as bee and lemon) to Rodrigues					
Enhancing food security	Bio-Farming i.e. Biocontrol, biological plant promoters, recycling of green waste**					
	Land and water management for food production					
	Build resilience towards climate change					
	Adding value to new local products through certification, market research, norms, and standards**					
	Storage and conditioning of Agricultural product for local consumption and export.					
	Optimizing food production i.e. proper processing and distribution channel					
STRATEGIC ORIENTATION 2: Agro-processing and Food	Capacity building in new techniques of food production.					
technologies	Encourage social innovation and entrepreneurship					
	Access to low-cost technologies that can be implemented in Rodrigues					
	Production of flour from breadfruit in Rodrigues					
	Study of irrigation systems adapted for Rodrigues Island					
	Identify the best mix of Renewable Energies that can help the island to move towards energy self- sufficiency and explore possibilities to attract private investment in this sector					
STRATEGIC ORIENTATION 3: Renewable Energies	Use of renewable energies in the agricultural sector to improve productivity and lower the cost of production					
	Safe disposal of used renewable energy equipment (e.g. PV cells)					
	Adaptation of the agricultural sector to climate change					
STRATEGIC ORIENTATION 4: Climate change	Development of a resilience strategy of food production in view of climate change. **					
	Develop a Guide Agricole for Rodrigues Island including a 'Calendrier Agricole'					



Implementation Timeline- Health and Wellness/Tourism Innovation

Strategic Orientation	Projects	2022 2023	2024	2025	2026	2027
Health Wellness &		LASON D IEM AM LLASON				LEMAM.LLASOND
Tourism	land an article of the second size is a still and the second size of the second second					51 11/11/11/5 57/0011/5
	Implementation of telemedicine nearth system in Roongues					
	Rodriques					
STRATEGIC	Identify health care services needed					
ORIENTATION 1:	Identification of specialist					
TELEMEDICINE	Agreement between RRA and Ministry of Health/international health department to implement the					
	telemedicine program					
	Assessing the impact of telemedicine on the economy**					
	Creating awareness on telemedicine To investigate the tourism correing consolity of the Dedrigues Joland inview of realizing the vision of reaching					
	100 000 tourists in 2027 **					
	Impact of tourism on the Rodrigues economy, society & culture, natural resources, environment, and health.					
	Strengthening of tourist services e.g. assessment of training needs, available Information to tourists,					
	digitalization of services					
	Identification of new ecotourism products directed towards a green destination					
STRATEGIC	Assess the training needs for the promotion of an ecotourism industry**					
ORIENTATION 2:	Assessment of the touristic revenue particularly in international events like kite surf and i rail de Rodrigues					
SPORT TOURISM	hotel, massage, spa, contrast bath, lunch in different restaurant, etc) and hosting international events					
	To develop sustainable Sport Tourismin Rodrigues**					
	Possibility of setting up a special care system for tourism. Proposed idea:					
	Each hotel must have a medical department that will provide quality health care to tourism					
	Setting up of a department liaise with all tourism sector to provide quality health services to tourist.					
	Innovative finance mechanism to identify foreign and private investment in sport tourism					
	Development of locally made supplements for sport					
STRATEGIC	A cultural perspective of nealth and wellness tourism. (Develop a cultural approach to attract tourist)					
ORIENTATION 3:	Rodrigues					
WELLNESS TOURISM	Promote sustainable Wellness Tourismin Rodrigues.					
STRATEGIC	Assessing current E-health system and use it to its full potential					
ORIENTATION 4:	Make E-Health work between all health department that is hospital, Areas Health Centres and Community					
E-HEALTH	Health Centres (Interconnection)					
	Framework to ensure data capture in the system Implementation of receasesh and innevention to promote traditional medicine					
STRATECIC	Gather information about all studies and knowledge that have been done regarding traditional knowledge **					
ORIENTATION 5:	Identify plants and other natural resources used in traditional medicine**					
TRADITIONAL	Identify traditional practices/medicine that are practiced in Rodrigues					
MEDECINE	Study the impact of traditional practices/medicine that are practice in Rodrigues					
	Valorisation and protection of Indigenous knowledge related to traditional medicine					
STRATEGIC	Study on non-injectable and injectable drugs that are present in Rodrigues					
ORIENTATION 6:	Assessing and improving rehabilitation and reinsertion program regarding drug and alcohol abuse.					
ALCOOL AND DRUG	Evaluating and improve sensitization program regarding drug and alcohol abuse (empower the youth to cope with drug and alcohol)					
ABUSE	Study of the social factors that contribute to alcohol and drug abuse on the Rodriguan society					
	Study the link between the food consumption and NCDs prevalence, with special focus on healthy eating					
STRATECIC	habits.					
ORIENTATION 7	Assessment/Evaluation of NCDs treatment.					
NON-COMMUNICABLE	Study to understand the causes of cancer					
DISEASES	Implementation of a cancer treatment Centre in Rodrigues.					
(NCDs)	implementation of Exercise referral as treatment for some NCDs					
	Study of the link between genetics and NCDs					
STRATEGIC	Study on prevalence of sexually transmissible diseases to know the estimate population.					
ORIENTATION 8:	Identify the key population that are affected by STDs.					
REPRODUCTIVE	Setting up of a Sexual Reproductive Health program.					
HEALTH	Evaluating and improvement of sensitisation program regarding NCDs. STDs and Teenage pregnancy					
	Baseline study on the carrying capacity of health sector					
STRATEGIC	Assessing human resource needs and priorities (e.g., redesigning job roles and work schedules to improve					

FIGURE 134 - RODINOV HEALTH AND WELLNESS/TOURISM INNOVATION IMPLEMENTATION TIMELINE



Implementation Timeline- Social and Grassroots Innovation

Social & Grassroots	dentifying individual and systemic factors that facilitate or hinder the development of core competencies and 21st century skills (learning and innovation	.149
ld	dentifying individual and systemic factors that facilitate or hinder the development of core competencies and 21st century skills (learning and innovation	0.0
	kills; digital literacy skills; career and life skills), including career driven education	
	nvestigating the extent to which effective use of assessments and evaluation throughout the teaching-learning process improves the quality of education	
La	anguages in the formal educational system: Increasing the acceptance of the mother tongue and addressing issues of learning in second languages	
S	Supporting the literacy development of children through adult literacy initiatives and community-centre based literary activities	
M	Aeeting the diverse needs of all learners in inclusive education settings	۰.
N N	Vhat is the current level of post-secondary and career readiness of students of school leaving age?	
STRATEGIC ORIENTATION ar	Inderstanding normative human development in Rodrigues: are developmental milestones in the social, emotional, communication, physical, cognitive, ind functional domains universal?	
1: A Education and Human ris	Addressing factors typically associated with deviant developmental trajectories (e.g. teenage pregnancy, juvenile delinquency, mental health issues, and isk-taking behaviors (alcohol abuse, drug use, early sexual activity))**	
Development A	longitudinal cross-sectional study of teenage pregnancy. **	
In	mpacts of awareness and sensitization campaign to reduce taboo and stigmatization on the incidence of teenage pregnancy**	
S	Socio economic impact of teenage pregnancy**	۰.
E	ffectiveness and impact of social aid on the Rodriguan society	
M	Addality for effectiveness continuous professional and human development	۰.
in	roviding information and resources to youths on reproductive issues and sexual health, on the incidence of sexual activities, sexually transmitted nfections and pregnancies among teenagers**	
E	Empowering the TVET sector and addressing mismatch between job offers and skills	
D	Developing a community psychological approach to the understanding of teenage pregnancy in Rodrigues	_
B	Building the resilience of vulnerable groups to adapt to climate change, rise in the price of commodities, and the socio-economic impacts of COVID-19.	۰.
Id	dentifying opportunities for gender-mainstreaming and increased accessibility in current public policies and practices.	
pr	collecting data for basic socio-economic statistics disaggregated by gender, income level, disability status, and education status to better inform policy and ractice	d
STRATEGIC ORIENTATION A	Addressing issues that have a disproportionate impacts on females and vulnerable individuals such as those with disabilities, the unemployed and the Iderly, including climate change and rights violations (e.g. domestic or elderly abuse).	
Social Inclusion and M	Apping all NGOs in Rodrigues to develop avenues for collaboration in various sectors**	
Community Development Id	dentifying and applying solutions to common socio-economic problems affecting all SIDS communities	
En pa	Evaluating the effectiveness of bottom-up, community development approaches to achieve desirable socio-economic outcomes (e.g. inclusion and varticipation of individuals with disabilities, decreased gender-based violence)	
ln di	nvestigating the short and long-term impacts of the Rodrigues Youth Parliament on participants/alumni socio-economic contributions across the political livide	
A	An anthropological approach to Rodriguan culture, heritage and identity	
A	Analysis of the mother tongue of Rodrigues island	
	ocumentation & oral collection of traditions, folklore, and history of the inhabitants of Rodrigues island**	
C	Cataloging archeological artefacts of Rodrigues island	
STRATEGIC ORIENTATION B	Building the capacity of grassroots action groups to foster Rodriguan pride and identity	
Culture and Language	Genealogy research to identify the origins of the population of the island/retracing our ancestry	
	nvestigating changes in the structures of the Rodriguan family and their impacts on various social outcomes including (and not limited to) Oral transmission of cultural knowledge and know-how Rodriguan values Pride/Belonging Identity	
	Cataloguing the skills and competencies of the Rodriguan human resource by sector	
In	nvestigating new methods to develop high end quality products to boost the entrepreneurship sector	
STRATEGIC ORIENTATION	Social entrepreneurship as a means of increasing social participation and improving the socio-economic outlook of members of vulnerable groups (e.g. versons of low socio-economic status, single mothers with limited education, out of school youths, individuals with impairments etc.)	
4: Social Entrepreneurship	Strengthening women-led small and medium enterprises to address gender disparity in the economic sector	
	Studying and documenting existing social enterprises Evaluating the success of cooperatives, in Rodrigues, and identifying measures for success**	
	Studies to better understanding of failure of local businesses (incl. Cooperatives) in Rodrigues	
- I po	Developing of tailor-made education and sensitisation approach and programme to better guide and foster cooperative development in the general population of Rodrigues	

FIGURE 135 - RODINOV SOCIAL AND GRASSROOTS INNOVATION IMPLEMENTATION TIMELINE



22	2023	2024	2025
	AVJJAGUND		

Risks and Assumptions

Identifying risks and assumptions serves to assess whether the recommendations proposed are realistic and achievable.

In this context, a risk is defined as an uncertain threat that, in case of it occurs, could have a negative impact in the implementation. An assumption, on the other side, is the necessary condition that will enable the successful implementation.

General risks and assumptions can be either be related to the overall implementation of the roadmap or common to all recommendations included in the roadmap.

The following have been identified as part of the thought process for implementation:

- I. Economic stability
- 2. Political stability
- 3. Political will for implementation
- 4. Continuity and perennity of report
- 5. No pandemic or any major disease
- 6. No warfare
- 7. Environmental stability
- 8. No resistance to change within stakeholders
- 9. Stakeholders buy in
- 10. Human resources and expertise

A key assumption of the roadmap and in particular its strategic orientations is that the projects will be fully funded at the level of outputs and that there will be sufficient flexibility of the funding to allocate the resources to the activities and staffing, as required.


A Call to Action

Following the gaps and challenges identified facing research and innovation in the chosen thematic areas in the Republic of Mauritius, several recommendations, strategic orientations and possible projects/ programmes have emanated from Les Assises de la Recherche et de l'Innovation 2022 in Mauritius (ARI 2022) and in Rodrigues (RodInov). These have been incorporated into the National Roadmap for Research and Innovation.

While several institutions have shown their willingness and eagerness to collaborate and start working on some of the proposed projects/ programmes as soon as possible, these initiatives will not necessarily be easy to implement. They will not only require concerted efforts from the Government and key stakeholders, but also priority will have to be exerted in order to immediately go ahead with some of the projects/ programmes while other less urgent ones may be kept in abeyance for later.

It has been noted that often the best ideas come from unexpected places and persons, often from the bottom up. Therefore, the Government of Mauritius, through the Ministry of Information Technology, Communication and Innovation and the Mauritius Research and Innovation Council, will continue to encourage all key stakeholders, including the private sector, the public sector, academia, non-governmental organisations and more importantly, the general public, to formulate innovative ideas that will drive positive changes.

While the National Roadmap for Research and Innovation serves as a starting point, success will require testing, learning and refining throughout the implementation of projects and programmes. Exchanges between partner organisations and countries on successes and lessons learnt will lead to broader positive impacts across the Republic of Mauritius. As such, the National Roadmap for Research and Innovation will be adjusted at regular intervals – with the first review scheduled to take place in early 2024.

The conversation cannot stop here – consultations that have helped shape the strategic orientations need to become an ongoing process. We are just at the beginning of the journey to transform Mauritius through research and innovation. The MRIC is confident that by acting together and applying the recommendations, we will be able to make a concrete contribution and positive impact on the sustainability of the research and innovation ecosystem. We look forward to continuing the conversation and we are certain that with careful thought and reflection, the National Roadmap for Research and Innovation will help ensure the uplifting of citizens in the Republic of Mauritius for generations to come.



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