

# Support to Jamaica's Innovation System for Promoting Innovative Firms

Policy Links, University of Cambridge

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Cambridge Industrial Innovation Policy







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## A REPORT FOR THE INTER-AMERICAN DEVELOPMENT BANK (IDB) WITH SUPPORT FROM THE DEVELOPMENT BANK OF JAMAICA (DBJ)

## Contributors

The contributors to this report are: David Leal-Ayala, Michele Palladino, Ricardo González-Nakazawa and Tong Yee Siong.

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17 Charles Babbage Road, Cambridge, CB3 0FS, United Kingdom

ciip.group.cam.ac.uk

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# 1. Introduction

In a post Covid-19 context characterised by uncertain demand patterns for goods and services and growing competition from neighbouring countries, the application of new knowledge and ideas into productive economic activities can help stimulate Jamaica's growth potential, the generation of added value, and the creation of well-paid jobs. There is a need to further promoting innovative firms through deliberate efforts to develop national innovation capabilities. A strong national innovation system (NIS) supports firms and other key actors with the uptake and utilisation of new technologies for increasing innovation levels, productivity, and overall competitiveness.

Although Jamaica has implemented several initiatives in recent years to strengthen its national innovation system, innovation performance at firm level remains behind other competitor countries:

- The country ranks 72<sup>nd</sup> out of 131 countries in the 2020 Global Innovation Index, despite gaining 12 places since 2017.<sup>1</sup>
- The 2013-2014 firm level PROTEqIN survey revealed that approximately 12% of surveyed Jamaican firms are innovating, compared to 46% in Suriname and 24% in Trinidad and Tobago. Only 13% of Jamaican firms indicate having an R&D department.<sup>2</sup>

Against this backdrop, the Inter-American Development Bank (IDB), in collaboration with the Development Bank of Jamaica (DBJ), has commissioned this study to identify policy instruments that could potentially support local firms to access new value capture opportunities based on research and technological innovation. Specifically, the aims of this study are to:

- Identify a short list of areas (minimum of three key sectors or technological fields) where Jamaican firms may develop research and technological innovation with value capture potential.
- > For these areas, identify suitable policy initiatives to foster firm-level innovation capabilities.
- Create initial specifications and implementation plans for these policy instruments, to move towards developing the capabilities for firms to access these new value capture opportunities.

The rest of this report is structured as follows:

- Section 2: presents the approach and sources of evidence employed throughout this study.
- Section 3: discusses contextual economic and innovation challenges faced by Jamaica.
- Section 4: describes the steps taken to identify a short list of priority opportunities/areas to support Jamaica's innovation system.
- Section 5: introduces the policy mechanisms/initiatives selected to promote firm-level innovation in the chosen opportunity areas, together with implementation plans.
- Section 6: discusses next steps for the implementation of the recommendations presented in this report.

<sup>&</sup>lt;sup>1</sup> WIPO (2020). Global Innovation Index.

<sup>&</sup>lt;sup>2</sup> IDB (2016). Productivity, Technology, Innovation in the Caribbean. Available online:

<sup>&</sup>lt;https://publications.iadb.org/en/productivity-technology-innovation-caribbean>

# 2. Project approach

This study was conducted between June 2020 and February 2021, involving a combination of desk-based research tasks, interviews and online workshops with a range of local stakeholders from industry, government and academia.

The approach followed in this study involved four key tasks (Figure 2.1):

- i. Synthesis of existing economic data and key science, technology and innovation indicators. This included a desk-based review of relevant economic studies and data, as well as a review of market and technological developments and other science, technology and innovation (STI) evidence relevant to Jamaica.
- ii. **Identification of key innovation challenges and opportunities.** Three landscaping workshops were organised to identify a short list of areas for in-depth analysis and priority innovation and entrepreneurship challenges/opportunities within them (for existing and new firms).
- iii. Selection of feasible policy instruments based on international practice. This stage of work involved a review of international policy initiatives/mechanisms addressing similar opportunities and challenges in other countries, as well as the selection of policy initiatives for in-depth analysis in collaboration with the steering group of the project.
- iv. **Design of selected policy instruments (roadmapping) and implementation plans.** Three roadmapping workshops were held to define the initial specifications for selected policy initiatives and create implementation plans across defined timelines.

A distinctive feature of the project approach has been the efforts made to capture the knowledge of local stakeholders in a systematic way. To this end, the project drew heavily upon interviews and workshops to collect primary evidence from over 50 local experts. The full list of consulted stakeholders can be found in Appendix 1.

## Figure 2.1: Project approach





# 3. Jamaica's economic and innovation context

WHERE ARE WE?

# 3.1 Jamaica: macroeconomic overview

# As the largest island in the English-speaking Caribbean, as well as the most populated, Jamaica presents relatively high income and development levels.

In 2019, Jamaica had a population of 2,948,279, being the most populated island in the Caribbean. In 2013 the country launched a reform program aimed at stabilising the economy, fostering economic growth and reduce inequality that achieved, amongst other results, to halve the unemployment rate by 2019.<sup>3</sup> Income inequality is also among the lowest in the Latin America and the Caribbean.<sup>4</sup> As per 2021, the country is classified by the World Bank as an "upper-middle income economy".<sup>5</sup> Jamaica is also classified among the country group with a High Human development Index.<sup>6</sup>

## The impact of Covid-19 on Jamaica's economy and labour market was severe.

Jamaica's GDP growth rate is estimated to have contracted by 8.6% in 2020, following the impact of the national and international restrictions to fight the health crisis associated to Covid-19 (Figure 3.1). For example, between April and June 2020, Jamaica's GDP declined by 18.4% with respect to 2019.<sup>7</sup> Estimates for 2021 expect Jamaica's GDP to grow by 3.6%, but this will depend on whether restrictions will be extended further. In addition to domestic restrictions implemented by the Government of Jamaica, the country was also severely impacted by international restrictions and travel bans. According to World Bank data, before the pandemic, tourism accounted for almost 60% of total exports.<sup>8</sup> In the first semester of 2020, Jamaica's exports declined by 28.6% with respect to 2019.<sup>9</sup> Economic recession had a severe impact on employment too. The Jamaica Statistical Office estimates that by July 2020 the unemployment rate was 4.8 percentage points higher than the same period in 2019, passing from 7.8% to 12.6%. As a consequence, many Jamaican households experienced a loss of income, which was partially compensated by Government's aid or support, while other households relied on loans from friends and relatives, or started farming and fishing activities to produce their own food.<sup>10</sup>

<sup>10</sup> Ibid.

<sup>&</sup>lt;sup>3</sup> World Bank (2021) <u>The World Bank in Jamaica – Overview</u>.

<sup>&</sup>lt;sup>4</sup> Ibid.

<sup>&</sup>lt;sup>5</sup> World Bank (2021) World Bank Country and Lending Groups

<sup>&</sup>lt;sup>6</sup> UNDP (2020) <u>Human Development Index</u>

<sup>&</sup>lt;sup>7</sup> Statistical Institute of Jamaica (2020) Jamaica Labour Market: Impact of Covid-19

<sup>&</sup>lt;sup>8</sup> World Bank (2020) World Integrated Trade Solutions

<sup>&</sup>lt;sup>9</sup> Statistical Institute of Jamaica (2020) Jamaica Labour Market: Impact of Covid-19





Source: IMF (2020) World Economic Outlook Database, October

# Services account for almost 70% of both gross value-added and employment in Jamaica's economy. Tourism and the agribusiness sectors play a significant role within Jamaica's economic structure, which is mainly composed of micro, small and medium enterprises.

In 2019, the composition of the Jamaican economic structure was orientated towards the service sector, which accounted for 69.5% of the gross value added, and 69.1% of employment (Figure 3.2). In the same year, tourism (which involves "hotel and restaurants" but also activities that belong to other industries such as transportation, retail, real estate and art activities) accounted for 9.8% of Jamaica's GDP.<sup>11</sup> On the other hand, in 2019, manufacturing represented 9% of Jamaica's GDP. Within manufacturing, however, "food, beverage and tobacco" accounted for 58% of total sector value added.<sup>12</sup> In other words, the agribusiness sector (agriculture plus food and beverage) accounted for almost 14% of Jamaica's GDP in 2019.

<sup>&</sup>lt;sup>11</sup> Statistical Institute of Jamaica (2020) Jamaica Labour Market: Impact of Covid-19

<sup>&</sup>lt;sup>12</sup> Statistical Institute of Jamaica (2019) quarterly gross domestic product, July September 2019, Volume 8, N 3



## Figure 3.2: Jamaica – Gross value added and employment by sector, 2019

Source: Statistical Institute of Jamaica

The **agribusiness sector** is sustained by both the internal demand, given the relatively large population of the island and consumption from tourists, and by demand from foreign markets, particularly associated with the diaspora.<sup>13</sup>

Beyond "food and beverage", Jamaica's **manufacturing** activities include light manufacturing, assembly manufacturing, limestone-based industries, and contract manufacturing, with more than 300 companies doing business in the sector. Most recently, activities such as electronics assembly and fabrication manufacturing are starting to emerge in the sector.<sup>14</sup>

Limestone-based industries are sustained by over 50 billion tonnes of limestone reserves in the country. In this respect, the Jamaican **mining sector** can also rely on additional mineral resources such as bauxite, clay, shale and hard volcanic rocks, as well as marbles.<sup>15</sup>

Within the services sector, beyond tourism, an increasingly relevant area for Jamaica's economy is represented by the **ICT industry**, particularly by Business Process Outsourcing activities which have approximatively 60 companies providing call centre and other BPO services.<sup>16</sup>

Despite financial services accounting for more than 10% of the gross value added, the **financial sector** in Jamaica is not yet well developed. For example, the domestic credit to the private sector as a share of GDP (an indicator which is used to describe the development of the financial sector in a country) is 41.3%, against the 55.7% average for the Latin American and the Caribbean region, the 107.4% average for medium income countries, and below some countries in the Caribbean such as Saint Lucia (53.3%) and Barbados (79.7%).<sup>17</sup> Some analyses show that the cost of finance (i.e. interest rates) and access to finance are among the main constraints that firms face when doing business.<sup>18</sup> Opportunities exist to improve financial inclusion and access to finance, particularly for SMEs, thought the development of the Fintech sector. In this respect, in 2020 the

<sup>17</sup> World Bank (2021) World Development Indicators

<sup>&</sup>lt;sup>13</sup> JAMPRO (2020) Investment Opportunities in Agriculture. Trade and investment Jamaica

<sup>&</sup>lt;sup>14</sup> JAMPRO (2020) Investment Opportunities in Manufacturing. Trade and investment Jamaica

<sup>&</sup>lt;sup>15</sup> JAMPRO (2020) Mining – Sector overview. Trade and investment Jamaica

<sup>&</sup>lt;sup>16</sup> JAMPRO (2020) Investment Opportunities in Global Digital Services Trade and investment Jamaica

<sup>&</sup>lt;sup>18</sup> Mooney (2018) Jamaica: Financial Development, Access, and Inclusion: Constraints and Options. Inter-American Development Bank

Bank of Jamaica established a Fintech Regulatory Sandbox with the aim to "provide a platform to encourage innovation in financial products and services, incentivise digitisation to enhance access to digital financial services, promote sustainable financial inclusion, and promote competition while protecting consumers, mitigating risks associated with digital financial services". <sup>19</sup> In other words, regulatory sandboxes are formal regulatory programmes for market participants to test new products, services, or business models, with live customers, subject to certain safeguards and oversight.<sup>20</sup>

Like most countries, Jamaica's economy is characterised by the high prevalence of micro, small and medium size enterprises (MSMEs). It is estimated that approximatively 97.7% of all Jamaican businesses fall into this category, of which 83% are classified as micro enterprises. Overall, MSMEs account for more than 80% of jobs in Jamaica.<sup>21</sup>

The measures implemented to fight the spread of Covid-19 had a negative impact across all sectors of the economy, although the impact was more severe in certain sectors. For example, when comparing the second quarters of 2019 and 2020, value-added for the hotels & restaurants sector declined by 85.6%, wholesale & retail trade and repair of motor vehicles fell by 15.6%, transport, storage & communication fell by 20.8%, and construction by 14.5%. In terms on employment, accommodation and food services were the activities that experienced the highest decline in employment during the first half of 2020. This is mainly associated with the decrease in tourist arrivals that fell by 62.5% in the first half of 2020 when compared to the same period of 2019.<sup>22</sup>

# Jamaica's exports of goods rely on primary commodities, whereas manufactured goods account only for 3.3% of total merchandise exports.

In the last two decades, Jamaica's trade balance has been characterised by trade deficit. The trade account balance on GDP reached -20.4% deficit in 2008, which has been reduced to -1.9% in 2019.<sup>23</sup> In the same year, Jamaica's total exports of goods and services were US\$ 5.9 billion, of which 26.8% were exports of goods.<sup>24</sup> As already mentioned, Jamaica's exports are strongly dependent on tourism. However, when focusing on exports of goods, the contribution of manufacturing (including transport equipment) is relatively low, accounting for 3.3% of total goods exports. On the other hand, in 2019 Jamaica's imports of goods and services amounted to US\$ 8.3 billion. Imports of goods were US\$ 5.6 billion of which 44% were represented by manufactured goods<sup>25</sup> (Figure 3.3)

<sup>&</sup>lt;sup>19</sup> Garvey, K. (2020) *Transformation of the Financial Services by Fintech*. Background paper produced for the ADB technical assistance to Indonesia on Supporting Technological Transformation (Project Number: 51343-001). Jakarta.

<sup>&</sup>lt;sup>20</sup> Alaassar, A. *et al.* (2021) "Exploring a new incubation model for FinTechs: Regulatory sandboxes". *Technovation Available online 13 February 2021, 102237* 

<sup>&</sup>lt;sup>21</sup> The Government of Jamaica defines MSMEs as follows: micro, less than 5 employees; small, between 6 and 20 employees; medium, between 21 and 50 employees.

Jamaica's Ministry of Industry, Commerce, Agriculture and Fisheries (2018) Micro, Small and Medium Enterprises (MSMEs) & Entrepreneurship Policy

<sup>&</sup>lt;sup>22</sup> All data extracted from Statistical Institute of Jamaica (2020) Jamaica Labour Market: Impact of Covid-19

<sup>&</sup>lt;sup>23</sup> World Bank (2020) World Development Indicators

<sup>&</sup>lt;sup>24</sup> Ibid.

<sup>&</sup>lt;sup>25</sup> Ibid.



Figure 3.3: Jamaica – Merchandise trade by sector, 2019

Source: Statistical Institute of Jamaica

The main products exported by Jamaica include aluminium oxide, petroleum oils, aluminium ores, rum and tafia, and beer made from malt.<sup>26</sup> The United States remain its main trade partner, accounting for 41% of exports, and 42.4% of imports.

<sup>&</sup>lt;sup>26</sup> World Bank (2021) World Integrated Trade Solutions.

# 3.2 Jamaica's national innovation system<sup>6</sup> (NIS): characteristics, performance and key challenges ahead

# Lack of publicly available data on science, technology and innovation remains a challenge to effectively assess the performance of Jamaica's national innovation system.

This complicates efforts to monitor the effectiveness of innovation policies. Nonetheless, Jamaica is included in the Global Innovation Index (GII) ranking alongside leading as well as a number of economies from Latin America and the Caribbean (LAC). The GII serves as a good basis for understanding and benchmarking the country's innovation performance.<sup>27</sup> Furthermore, the recent Government of Jamaica blueprint titled *National Science, Technology and Innovation Policy: Catalysing National Development 2019-2029* is another useful source of information.

# The importance of science, technology and innovation to foster economic growth has been recognised in Jamaica's policy agenda.

Jamaica has long recognised the importance of leveraging science, technology and innovation (STI) for economic growth. For example, the *Science and Technology Policy 1990* led to the establishment of a national coordinating entity for STI, the *National Commission on Science and Technology* (NCST), and its funding arm, the *National Foundation for the Development of Science and Technology* (NFDST).

The NCST (to be the National Commission on Science, Technology and Innovation or NSCTI as part of a proposed name change) has since remained the key coordinating body for fostering and advancing the national STI policy. However, it has not been able to effectively fulfil its mandate due to its size and structure that are constrained by limited funding.<sup>28</sup> Many ministries, departments and agencies have 'independent' STI-related agenda, mandates, functions and associated infrastructure – leading to a duplication of uncoordinated efforts. The NFDST – by the government's own admission – has not produced any major achievements from its funded activities and programmes.<sup>29</sup>

Jamaica has also a Government Laboratory System that consists of a number of public laboratories. However, a review of these laboratories conducted in 2015 found that they were mired in severe shortcomings in human resources, equipment maintenance, budgets and overall performance. Infrastructure for R&D activities also remains limited and, in some cases, inefficient.<sup>30</sup>

The latest National Science, Technology and Innovation Policy 2019-2029 complements the National Development Plan (NDP), otherwise known as Vision 2030 Jamaica, which identifies STI

<sup>&</sup>lt;sup>27</sup> The country ranks 72<sup>nd</sup> out of 131 countries in the 2020 Global Innovation Index, despite gaining 12 places since 2017.

<sup>&</sup>lt;sup>28</sup> Ministry of Science, Energy and Technology (2019). *National Science, Technology and Innovation Policy: Catalysing National Development 2019-2029.* 

<sup>&</sup>lt;sup>29</sup> Ibid

<sup>&</sup>lt;sup>30</sup> Ibid

as a cross-cutting enabler of economic development. The NDP's two-pronged strategy to create a technology-enabled society focuses on integration of science and technology into all areas of development, and establishment of a dynamic and responsive national innovation system (Table 3.1).<sup>31</sup>

Vision 2030 Jamaica Strategy	Agency
Integrate science and technology into all areas of development Establish a dynamic and responsive National Innovation System	<ul> <li>National Commission on Science and Technology</li> <li>Scientific Research Council</li> <li>Ministry of Mining and Telecommunications</li> <li>Ministry of Education</li> <li>University of the West Indies</li> <li>University of Technology</li> <li>Northern Caribbean University</li> <li>College of Agriculture, Science and Education</li> <li>Jamaica Library Service</li> <li>Office of the Prime Minister</li> </ul>

Table 3.1:	Strategies and	d agencies f	or creating a	technology-enabled	society
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Source: Vision 2030 Jamaica.

# Improving coordination among agencies and ministries in charge of STI is a key objective of Jamaica's innovation policy.

The *National Science, Technology and Innovation Policy 2019-2029* calls for better coordination of STI portfolios across ministries, departments and agencies. It also calls for specific improvements to the STI landscape through strategic measures in priority areas including agriculture, healthcare, education and training, and crime prevention and public safety. Some of these measures are:<sup>32</sup>

- Integrate STI to ensure efficient and impactful delivery of public goods;
- Repair, re-equip and rationalise existing laboratory facilities ensuring efficient, effective, collaborative and coordinated use across sectors;
- Develop national standards/codes of operation for all national/ training infrastructure to ensure facilities are conducive for learning and innovation;
- Encourage private sector involvement in the development of STI infrastructure through Public-Private-Partnerships (PPP);
- Develop policy for science, technology, engineering and mathematics (STEM) education, to include curriculum development and delivery and teacher capacity;
- Establish a grant fund in tertiary institutions to allow potential innovators, scientists and entrepreneurs, at the tertiary level and equivalent institutions, to vie for funds through a competitive process.

<sup>&</sup>lt;sup>31</sup> Planning Institute of Jamaica (2009). *Vision 2030 Jamaica: National Development Plan – Planning for a Secure and Prosperous Future.* 

<sup>&</sup>lt;sup>32</sup> Ministry of Science, Energy and Technology (2019). *National Science, Technology and Innovation Policy: Catalysing National Development 2019-2029.* 

# Jamaica ranks seventh among LAC economies and 72th globally in the Global Innovation Index, showing an improvement of its performance in the last years.

None of the LAC economies is among the top 50 countries in the Global Innovation Index (GII) ranking. Except for four high-income economies (Chile, Uruguay, Trinidad and Tobago, Panama), all LAC economies are in the upper and lower middle-income group (Table 3.2). Within the region, the top 3 economies in terms in innovativeness are Chile (54<sup>th</sup> globally), Mexico (55<sup>th</sup>), and Costa Rica (56<sup>th</sup>). The GII describes the region as "a region of great imbalances… overall characterised for its low investments in R&D and innovation, its incipient use of IP systems, and the disconnection between the public and private sectors in the prioritisation of R&D and innovation".<sup>33</sup> Moreover, most R&D investments are primarily public, with a low share of private sector financing.

Country/Economy	Income	Score (Global median = 30.94)	Global Rank	Regional Rank
Chile	HI	33.86	54	1
Mexico	UM	33.60	55	2
Costa Rica	UM	33.51	56	3
Brazil	UM	31.94	62	4
Colombia	UM	30.84	68	5
Uruguay	HI	30.84	69	6
Jamaica	UM	29.10	72	7
Panama	HI	29.04	73	8
Peru	UM	28.79	76	9
Argentina	UM	28.33	80	10
Dominican Republic	UM	25.10	90	11
El Salvador	LM	24.85	92	12
Paraguay	UM	24.14	97	13
Trinidad and Tobago	HI	24.14	98	14
Ecuador	UM	24.11	99	15
Honduras	LM	22.95	103	16
Bolivia	LM	22.41	105	17
Guatemala	UM	22.35	106	18

## Table 3.2: GII score and ranking of LAC economies, 2020

Note: HI: High Income; UM: Upper-middle Income; LM: Lower-middle Income Source: Global Innovation Index 2020.

Jamaica ranks seventh among LAC economies and 72th globally. It's GII score – at 29.10 – is slightly below the global median of 30.94. Jamaica's innovation performance has improved over the years. In 2015, it ranked 15<sup>th</sup> among its regional peers and 96<sup>th</sup> globally. In 2020, Jamaica becomes an innovation achiever for the first time in the GII ranking.<sup>34</sup> It means relative to GDP, Jamaica is performing above expectations for its level of development. Jamaica also produces more innovation outputs relative to its level of innovation investments. In particular, Jamaica performs above average compared to its LAC and/or upper middle-income peers in three aspects:

<sup>&</sup>lt;sup>33</sup> Cornell University, INSEAD and World Intellectual Property Organization (2020). *Global Innovation Index 2020: Who Will Finance Innovation.* The GII 2020 consists of 80 indicators built around five innovation input-related pillars (Institutions, Human capital and research, Infrastructure, Market sophistication, Business sophistication) and two innovation output-related pillars (Knowledge and technology outputs, Creative outputs).

<sup>&</sup>lt;sup>34</sup> Innovation achievers are those economies that outperform their peers based on level of development, defined by GDP per capita in PPP US\$.

- Institutions (political, regulatory and business environment)
- Business sophistication (knowledge workers, innovation linkages such as university-industry collaboration, knowledge absorption such as high-tech imports)
- Creative outputs (intangible assets, creative goods and services, online creativity)

## In Jamaica, innovation among firms is still limited.

It is widely accepted that small states generally have more difficulty growing their economies due to factors including limited economies of scale, weak diversification, and vulnerability of trade shocks. Among the Caribbean small states, Jamaica's firm-level innovation is better than most but lower than some, including Trinidad and Tobago, Suriname and Guyana.<sup>35</sup>

## In Jamaica, human capital development lags behind the average of LAC economies.

Among the LAC economies, Jamaica's total enrolment in tertiary education (expressed as a percentage of the total population of the five-year age group following on from secondary school leaving) is 27%, which is lower than the regional average of 52% (Figure 3.4).



Figure 3.4: Gross tertiary enrolment of selected LAC economies, 2017

Note: Total enrolment in tertiary education (ISCED 5 to 8), regardless of age, expressed as a percentage of the total population of the five-year age group following on from secondary school leaving. Source: World Bank (2020) Education Statistics - All Indicators

## Jamaica's manufacturing high-technology exports are comparatively very low.

In the previous section, it was remarked that Jamaica's international trade of goods is concentrated toward exports of primary commodities, with a low share of manufactured goods exported. In this respect, high-technology exports are products with high Research and Development (R&D)

<sup>&</sup>lt;sup>35</sup> IDB (2017) Exploring Firm-Level Innovation and Productivity in Developing Countries: The Perspective of Caribbean Small States.

intensity, such as in aerospace, computers, pharmaceuticals, scientific instruments, and electrical machinery. The higher the share of high-technology goods in a country's manufactured exports, the more complex its production base is assumed to be. In 2018, only 2% of Jamaica's manufactured exports were high-technology goods, far below the regional average of 14% (Figure 3.5).



Figure 3.5: High-technology exports (% of manufactured exports), selected economies, 2018

Source: World Bank (2020) World Development Indicators

## ICT services exports.

Information and communication (ICT) services have been the most dynamic components of international trade in recent decades. Many economies are taking advantage of the ICT boom to benefit from opportunities in the digital economy. In 2018, the share of ICT services in Jamaica's services exports – at approximately 4% – was below the regional average. Within the region, Costa Rica and Argentina were top performers and had ICT services accounting for more than 10% of their services exports (Figure 3.6).



Figure 3.6: ICT service exports (% of service exports), selected economies, 2018

Source: World Bank (2020) World Development Indicators



# Opportunities to support Jamaica's innovation system for promoting innovative firms

WHERE DO WE WANT TO GO?

# 4.1 Opportunity landscaping

Three online workshops were organised during 29-31 July 2020 to identify a short list of areas (minimum of three key sectors or technological fields) where Jamaican firms may develop research and technological innovation with value capture potential. Workshop participants were selected in collaboration with the steering group of the project. The aim was to choose participants that could provide a balanced representation of key economic sectors and innovation system actors within Jamaica.

The landscape roadmap template shown in Figure 4.1 was used to capture key information from participants about drivers for action (why do we need to support innovation at the firm level?), specific opportunities for innovation in existing and new sectors (what should we do?), and key resources and innovation capabilities required to pursue said opportunities (how can we do it?).



Figure 4.1: Landscape roadmap template

The outputs from each workshop were synthesised and merged into one single landscape roadmap, as shown in Figure 4.2. To summarise the ideas generated during the workshops, these were clustered in groups by affinity/similarity. Furthermore, key opportunities were identified through a voting session in which participants were able to express their top three preferences among all ideas included in the landscape roadmap.





# 4.2 Opportunity shortlisting

In collaboration with the steering group of the project, a set of parameters were defined to evaluate the potential and feasibility of each opportunity cluster included in the synthesised landscape roadmap shown in Figure 4.2 (i.e. agribusiness, health, ICT, blue economy, creative industries and mining). Scores from 1 (low) to 6 (high) were given to each criterion, as shown in Tables 4.1 and 4.2.

The average scores obtained in this evaluation were used to build an "Opportunity-Feasibility (O-F) Matrix", as shown in Figure 4.3. An acceptance area was defined as that in which both average opportunity and feasibility scores are roughly higher than 3.5. This resulted in the selection of two opportunity clusters for further disaggregated analysis: agribusiness and ICT.

## Table 4.1: Opportunity criteria & evaluation

			S	ector	/ Are	а	
Factor Explanation		Agribusiness	Health	ІСТ	Blue Economy	Creative Industries	Mining
Image & culture	Does it improve the image of the country in the international arena and interact positively with Jamaica's culture?	3	5	6	2	4	1
Employment	Does it create a relevant impact in job creation? (considering numbers of employees, job quality & human capital development)	4	5	6	3	2	1
Market size and growth	Market size Does the market size and the potential and growth rate of growth are attractive enough?		4	6	3	2	1
Innovation potential	Will it foster the creation of high impact innovations? (consider patent, product and companies creation)	4	6	5	3	2	1
Synergy	Does it provide potential benefits to existing sectors / areas or the possibility of new opportunities in combination?	6	3	5	4	1	2
	Average	4.4	4.6	5.6	3.0	2.2 2 1	1.2

## Table 4.2: Feasibility criteria & evaluation

			S	ector	/ Are	а	
Factor	Factor Explanation		Health	ICT	Blue Economy	Creative Industries	Mining
Technical	Do we have the necessary skills and						
capability &	technical competence to develop the area	6	1	5	2	3	4
Skills	of opportunity?						
Market	Can we have access to the markets and						
access &	the understanding of the requirements of	5	1	1 4	6	3	2
knowledge	the market?						
	Do we have the infrastructure and						
Infrastructure	production capability to develop the area	6	1	2	5	3	4
	of opportunity?						
Finance	Do we have the ability to finance the	4	1	5	6	3	2
	project?				_	_	
Strategic fit	Does it fit Jamaica's national	5	1	6	3	4	2
	development and innovation strategy?	-		-	-		
	Average	5.2	1.0	4.4	4.4	3.2	2.8
	Normalised scale (1-6)	6.0	1.0	5.0	5.0	3.6	3.1

## Figure 4.3: Opportunity – feasibility (O-F) matrix



Once the agribusiness and ICT and digitalisation clusters were selected for further evaluation, the detailed opportunities contained within them (Table 4.3) were put forward to the Steering Group of the project for discussion and assessment. Table 4.4 summarises some of the arguments that emerged from this discussion in favour of three opportunities shortlisted for consideration in the rest of this report. The key innovation challenges associated to these opportunities are described in Figure 4.4.

The following section describes the selected opportunities in further detail and discusses the policy initiatives suggested to support firm-level innovation in these areas.

Agribusiness	ICT and Digitalisation						
<ul> <li>High-value added agricultural products</li> </ul>	Education 4.0						
<ul> <li>Ready meals for export</li> </ul>	<ul> <li>Digital transformation of existing sectors</li> </ul>						
<ul> <li>Strengthening agroindustry with technology</li> </ul>	> e-Commerce						
<ul> <li>Getting into nutraceuticals</li> </ul>	<ul> <li>Tech and digital products (big data analytics/AI software)</li> </ul>						
	E-government & smart cities						
	<ul> <li>Fintech solutions</li> </ul>						

Table 4.3: Detailed opportunities considered for shortlisting

## Table 4.4: Shortlisted opportunities and Steering Group rationale for selection

Opportunities	Steering Group Rationale
<ul> <li>Digital transformation of existing sectors</li> </ul>	<ul> <li>Some of the opportunities highlighted in Table 4.3 can be included under a broader definition of 'Digital Transformation', including: e-government, e-commerce and tech and digital products.</li> <li>Digital transformation is perceived as the opportunity with the highest innovation potential for existing sectors among ICT and Digitalisation.</li> <li>This opportunity could create significant innovation</li> </ul>
	opportunities for established sectors of the economy and therefore maximise its impact (e.g. agriculture, creative industries, tourism, manufacturing, mining, health).
	Fintech is perceived as a new sector with significant economic potential which could provide significant benefits to the Jamaican economy in the short and medium term when compared to other opportunities.
<ul> <li>Fintech solutions</li> </ul>	Perceived as a nascent sector, the Steering Group considered that more could be done to directly stimulate the creation of a coherent innovation ecosystem for Fintech innovation, in alignment with existing initiatives such as the Bank of Jamaica's Sandbox.
High-value added	The agricultural sector is widely perceived as a well- established sector with solid innovation foundations that could be further developed to add value.
agricultural products	Due to its current importance for Jamaica's economy, strengthening this sector through innovation could have a significant impact on a broad share of the population.

## Figure 4.4: Shortlisted opportunities and related innovation challenges



## Digital transformation of existing sectors

- Low capabilities prevent firms from identifying productive digital technology opportunities, evaluating their feasibility, managing their risk, and allocating human resources effectively.
- Firms often have expertise and experience in their current methods and are reluctant to change even if new methods are superior.
- Firms can be "locked in" to an inferior approach due to industry segment or supply chain requirements.
- Continuing to use these practices can constrain moving to higher levels of performance and longerrun capabilities to be competitive.
- Firms' investments in innovation activities are modest and they receive little support and incentives.
- Lack of collaboration between firms and technology providers due to elevated cost of new technological solutions.
- SMEs "innovation fear" due to limited financial resources and investment uncertainty.



## **Fintech solutions**

- Nascent Fintech ecosystem in Jamaica does not offer dedicated incubation/acceleration support to local startups in this sector.
- Fintech startups lack access to specialised (and international) sectoral knowledge and advice beyond common business support offered by traditional incubator/accelerator programmes.
- Opportunity to create an incubation/acceleration programme that could feed the Bank of Jamaica's (BOJ) Fintech sandbox with new innovative local Fintech solutions.



## High-value added agricultural products

- Companies, particularly SMEs, do not usually have the necessary infrastructure and facilities to develop new high-value food and cosmetic products based on local agricultural ingredients and to scaleup production to access foreign markets.
- Public innovation and production facilities such as those from the Scientifc Research Council (SRC) already provide some support in this regard. However, the SRC's pilot plant can only support the production of small batches of products.
- There is an opportunity to complement SRC's current work by providing innovation services and public production facilities targeted towards the large-scale production of innovative food/cosmetic products for export.
- An innovation centre could support firms to develop new products and transfer of capabilities to local firms, resulting in improved performance, competitiveness and employment.



# 5. A policy toolkit to support firm-level innovation in Jamaica

HOW CAN WE GET THERE?

# 5.1 Introduction

After identifying three key areas in which targeted support could help to unlock opportunities for local firms to improve productivity and competitiveness through innovation (Figure 4.4), a program of interviews was designed to better understand the specific challenges faced by firms in these areas and the possible support initiatives that could best help them to address key innovation barriers. Based on the findings obtained from these interviews, combined with insights from an international review of best practices, three policy instruments were selected in collaboration with the steering group of the project to help address the innovation challenges identified in the previous section, as shown in Figure 5.1.

The rest of this section aims to:

- i. Define and explain each of these policy instruments in detail, providing a summary of general characteristics obtained from a review of policy literature and the examination of relevant international examples of similar initiatives used in other countries.
- Provide insights into how these initiatives could be implemented in Jamaica by presenting the outcome of a series of **online roadmapping workshops** organised during 1-3 February 2021. Three outputs are presented for each initiative:
  - a. Logic model contributions provided by workshop participants, including their views about the key objectives, inputs, activities, outputs, outcomes and impacts expected for each initiative.
  - b. A summary roadmap outlining the development vision foreseen for each policy instrument by workshop participants.
  - c. An implementation roadmap highlighting key practical steps needed to create and establish each instrument in the country, including key implementation milestones and stakeholders involved.

The policy instruments discussed in this section do not constitute a complete package for policy reform; nor do they intend to address all aspects relevant to growth, competitiveness or innovation in Jamaica. Instead, these initiatives represent key building blocks that can help to drive Jamaica's support for firm-level innovation in a post Covid-19 context, by addressing a number of priority challenges perceived by the local stakeholders consulted during this project, building on the country's strengths and complementing ongoing efforts.

## Figure 5.1: Suggested policy instruments to pursue shortlisted opportunities

### **<u>Opportunity 1</u>**: Digital transformation of existing sectors

• <u>Suggested policy instrument</u>: Digital technology advisory service and innovation voucher

Opportunity 2: Fintech solutions

• Suggested policy instrument: Fintech incubator/accelerator programme

**Opportunity 3**: High-value added agricultural products

• <u>Suggested policy instrument</u>: Food/cosmetics innovation centre

# 5.2 Digital technology advisory service and innovation voucher

## A. INTERNATIONAL EXPERIENCE

## 1) Definition

In general, technology advisory services provide the expertise to support companies in the adoption of technologies that can help them to improve their performance in a variety of business areas, such as production, human resource management, and information systems and supply chain management, among others. Technology advisory services tend to focus on SMEs since these companies usually face greater barriers when adopting new technologies.<sup>36</sup>

Advisory services are usually linked to other types of support, such as funding or training. This has been found to increase the impact of technology advisory programmes, particularly on SME performance, which would not engage in innovation activities without public support. Technology advisory services are usually funded by a combination of public resources and fee income.

Innovation vouchers are a common mechanism to fund this type of service. Vouchers consist of small grants provided to small and medium-sized enterprises (SMEs) to allow them to purchase services from external sources such as universities and public research centres, in order to improve firms' innovative performance.<sup>37</sup>

Example programmes that employ a combination of public resources and fee income include:<sup>38</sup>

- **Tech Depot in Singapore:** includes grants that cover up to 70 percent of technology solutions and technical assistance.
- Callaghan Innovation programme in New Zealand: funds up to 40 percent of the implementation costs through grants or vouchers.
- The Industrial Digital Transformation programme in Saudi Arabia: managed by the Saudi Industrial Development Fund, illustrates how loans can also be used to cover the costs of technology adoption and advisory services. The program provides long-term financing for the adoption of digital technologies in manufacturing (minimum repayment period of 7 years).

## 2) Rationale

Market and system failures justify the public provision of technology advisory services. Market failures include a lack of information on the benefits of technologies (information asymmetry) and constrained access to financial markets (incomplete markets), particularly for SMEs. Capability

<sup>&</sup>lt;sup>36</sup> Shapira, P. and Youtie, J. (2016). "The impact of technology and innovation advisory services". In Edler, J. et al. (Ed.) Handbook of Innovation Policy Impact. Chapter 6. Cheltenham: Edward Elgar. pp. 161–95.

<sup>&</sup>lt;sup>37</sup> OECD (2016). Policy Profile – Government Financing of Business R&D and Innovation.

<sup>&</sup>lt;sup>38</sup> Callaghan Innovation (2019). Statement of performance expectations 2019-2020; Callaghan Innovation (2010). Industry 4.0 Hub; Enterprise Singapore (2020). TechDepot; Government of Singapore (2019). Budget 2020; SIDF (2019). Annual Report 2018; Spring Singapore (2018). Annual Report 2017/2018.

and network failures also result in under-investment in technology adoption. SMEs tend to lack qualified personnel to select, integrate and operate new technologies. Weak linkages between innovation actors can make it difficult for technology benefits to diffuse, while linkages that are too strong can complicate the transition to new technological opportunities.<sup>39</sup> In this context, innovation vouchers also help to close financial gaps which may prevent companies from investing in new technologies or specialised advice. In this respect, innovation vouchers create a link between SMEs and organisations such as universities, RTOs and other innovation service providers that already have knowledge of specific technologies.<sup>40</sup>

## 3) General characteristics

Technology advisory services are not designed to develop new technologies, but rather to increase the diffusion and deployment of existing technologies to increase the absorptive capacity of recipient firms.<sup>41</sup> Technology advisory programmes usually involve a first assessment of a company's innovation and operational capabilities, a plan to improve those capabilities through the adoption of new technological solutions, and the implementation of that plan.

Technology advisory programmes can provide both technological and non-technological services to firms across a range of areas, as shown in Table 5.1.

Knowledge exploitation	Knowledge diffusion and demonstration	Business performance	Skills development
<ul> <li>Contract research.</li> <li>Product development</li> <li>Intellectual property protection and commercialisation</li> <li>Testing and prototyping</li> </ul>	<ul> <li>Technology, supplier and vendor sourcing and matching</li> <li>Networking activities</li> <li>Technology demonstration</li> </ul>	<ul> <li>Technology and business assessments</li> <li>Lean operations</li> <li>Quality improvement, including certification to standards and the use of statistical process control and methods</li> <li>Energy management</li> <li>Information technology</li> </ul>	<ul> <li>Technical skills training</li> <li>Lifelong training</li> <li>Career services</li> </ul>

Table 5.1: Example services provided by technology advisory programmes

Evaluations of technology advisory programmes have found that the characteristics of effective interventions include: accompanying advisory services with other innovation support (or coordination with other support programmes); professional and industrially experienced staff; good

<sup>&</sup>lt;sup>39</sup> BEIS (2014). The case for public support of innovation. At the sector, technology and challenge area levels. Report commissioned for Technopolis.

<sup>&</sup>lt;sup>40</sup> OECD (2013). Implementing a Pilot SME Voucher Scheme in Montenegro. Private Sector Development Project Insights.

<sup>&</sup>lt;sup>41</sup> The absorptive capacity of a firm is defined as "the ability to recognize the value of new information, assimilate it, and apply it to commercial ends" (Cohen and Levinthal, 1990). Such capacity is largely a function of the firm's level of prior related knowledge, and it is considered critical to its innovative capabilities.

Cohen, W.M., Levinthal, D.A. (1990). "Absorptive Capacity: A New Perspective on Learning and Innovation". Administrative Science Quarterly, Vol. 35, No. 1, Special Issue: Technology, Organizations, and Innovation pp. 128–152.

outreach and branding; effective systems to diagnose enterprise needs; flexibility; and the ability to maintain a long-term perspective.<sup>42</sup>

Regarding the personnel in charge of delivering advisory services, some desirable characteristics include: having industry experience, engineering or another technological background, and broad knowledge of business and financial processes.<sup>43</sup>

Advisory services are usually provided by, or in collaboration with, other institutions, including: universities, research centres, applied technology centres, trade associations and consultancy firms. From the three international programmes mentioned before, one is based in an innovation agency (Callaghan Innovation, New Zealand), one in a development fund (Industrial Digital Transformation programme, Saudi Arabia) and one in the SME office of an agency for science, technology and research (Tech Depot, Singapore).

In terms of programme budgets, international experience shows a large variation depending on the size and sophistication of the economy and the scale of the programme. The smallest budgets observed in a review of international programmes are around USD 25 million while the largest reach the USD 2 billion mark.<sup>44</sup>

## 4) Performance indicators and evaluation

The provision of technology-deployment advisory services usually leads to the development of new capacities and practices, which, in turn, result in improved business performance and broader impacts.<sup>45</sup> Some common performance indicators used to monitor and evaluate these programmes are shown in Table 5.2.

Intermediate outputs	<ul> <li>Improved manufacturing practices (e.g. measured in terms of higher efficiency, quality, price, flexibility/agility, speed of response, reduction in downtime, and speed of new product development).</li> <li>Increased investment in skills.</li> <li>Increased collaboration.</li> <li>New product or service development.</li> <li>Acquisition of new technology.</li> </ul>
Business outcomes	<ul> <li>Increased productivity.</li> <li>Reduced costs.</li> <li>Increased sales.</li> <li>Waste reduction.</li> <li>Improved use of equipment.</li> <li>Increased wages.</li> <li>Increased profits.</li> <li>Improved quality.</li> </ul>
Broader impacts	Increased value added.

<sup>42</sup> BEIS (2014). Op. cit.

<sup>43</sup> Ibid.

<sup>&</sup>lt;sup>44</sup> Shapira, P. and Youtie, J. (2016). Op. cit.; and Wain, M. et al. (2015). Review of international knowledge transfer policy and investment. A report commissioned by Knowledge Transfer Ireland. Technopolis.
<sup>45</sup> Ibid.

Impact evaluations of technology advisory programmes have found heterogeneous effects, depending on the characteristics of the companies and the methodology followed. However, there exists some evidence of positive effects on productivity (~ 3-25%) and sales, and value-added increments by a factor between 1.4 and 20 times per US dollar spent.<sup>46</sup>

## Box 5.1: Productivity Solutions Grant (Singapore)

The Productivity Solutions Grant (PSG) was launched on April 2018 by "gobusiness", the Singaporean government agency in charge of providing assistance to businesses, to help businesses in their digital transformation journey.

PSG supports the adoption of pre-scoped IT solutions, equipment and consultancy services that improves productivity, aligned to the industry roadmaps such as the Industry Transformation Maps (ITMs) and Industry Digital Plans (IDPs). The maximum funding support level was raised from 70% to 80% from 1 April 2020 to 31 March 2022 (capped at USD 22,000 per company) to encourage enterprises to continue their digitalisation and productivity upgrading efforts.

## Who can apply?

Business entities can apply for PSG if they meet the following criteria:

- Registered and operating in Singapore.
- Purchase/lease/subscription of the IT solutions/equipment/consultancy service must be used in Singapore.
- (For selected solutions only) Have a minimum of 30% local shareholding.
- (For selected solutions only) Have at least three local employees at the point of application.

## How to apply?

Companies willing to receive this assistance need to follow three steps:

- 1. Access the list of supportable solutions and identify relevant solutions that best suit the business needs.
- 2. For IT solutions: Get a quotation from the pre-approved vendor. For Equipment: Source for the equipment and get a quotation from the vendor. For Consultancy Service: Get a quotation from the pre-approved consultant.
- 3. Submit an application on the Business Grants Portal (BGP).

## Supportable solutions

PSG covers sector-specific solutions including the Retail, Food, Logistics, Precision Engineering, Wholesale, Building and Construction, Financial Service, and Landscaping industries. PSG also supports businesses' adoption of broad-based solutions that cut across all industries, such as Customer Relationship Management and Human Resource Management systems.

Businesses can choose from a list of pre-scoped solutions eligible to their sectors. Companies are reminded to carry out due diligence when engaging vendors. Solutions supported under the Productivity Solutions Grant are regularly reviewed.

Source: https://govassist.gobusiness.gov.sg/productivity-solutions-grant/

<sup>&</sup>lt;sup>46</sup> Ibid.

## **B. IMPLEMENTATION IN JAMAICA**

Jamaica's unique innovation system context means that initiatives established in other countries cannot simply be replicated without adaptation. However, international examples can inform practical implementation in Jamaica by illustrating the variety of approaches that have been deployed to support industrial innovation in other countries.

In this regard, an online roadmapping workshop was held on 1<sup>st</sup> February 2021 to collect insights from local stakeholders on how to implement a "Digital technology advisory service and innovation voucher" scheme in Jamaica. The aim of the workshop was to produce three key outputs, as shown in Table 5.3 and Figures 5.2 and 5.3:

- a. **Summary logic model** based on inputs provided by workshop participants including their views about the key objectives, inputs, activities, outputs, outcomes and impacts expected for the "Digital technology advisory service and innovation voucher" initiative.<sup>47</sup>
- b. A summary roadmap outlining the development vision foreseen for this initiative, based on the logic model inputs provided by workshop participants.
- c. An implementation roadmap highlighting key practical steps needed to create and establish the "Digital technology advisory service and innovation voucher" programme, including key implementation milestones and stakeholders involved.

In particular, the programme would aim to address the following challenges:

- Low capabilities prevent firms from identifying productive digital technology opportunities, evaluating their feasibility, managing their risk, and allocating human resources effectively.
- Firms often have expertise and experience in their current methods and are reluctant to change even if new methods are superior.
- Firms can be "locked in" to an inferior approach due to industry segment or supply chain requirements.
- Continuing to use these practices can constrain moving to higher levels of performance and longer-run capabilities to be competitive.
- Firms' investments in innovation are modest and they receive little support and incentives.
- Lack of collaboration between firms and technology providers due to elevated cost of new technological solutions.
- SMEs "innovation fear" due to limited financial resources and investment uncertainty.

In summary, programme **objectives** are to:

- Raise awareness of the value of new digital technologies for business productivity and competitiveness.
- Develop partnerships with local support organisations to create an aligned ecosystem. This
  could include a network of technology demonstration facilities in institutions already
  present across Jamaica including universities and consultancy firms.
- Provide specialist advice to support the implementation of new digital technologies within firms.
- Provide specialist training in the use of new technologies.
- Provide funding support for technology acquisition and access to training through an innovation voucher scheme.

<sup>&</sup>lt;sup>47</sup> Logic model inputs from participants can be found in Appendix A.

## Table 5.3: Digital technology advisory service and innovation voucher – Logic model

	Objective	Input	Activities	Outputs	Outcomes	Impacts
>	Stimulate digital technology adoption and skills development to increase firm-level productivity and efficiency	<ul> <li>At least 10 technical advisors with digital technological and business expertise (advisors can also be sub- contracted from private sector and universities)</li> </ul>	Create website where companies can have access to information of new and emerging digital technologies, their benefits and vendors, and contact technical advisors	<ul> <li>100 projects approved per year</li> </ul>	<ul> <li>Increased adoption of digital technologies and tools by companies</li> </ul>	<ul> <li>Increased national productivity</li> </ul>
A	Raise awareness of the value of new digital technologies for business productivity and competitiveness	<ul> <li>Collaboration agreements with local support organisations to provide services if possible (e.g. consultancy firms, universities)</li> </ul>	<ul> <li>Receive and analyse support applications from client firms</li> </ul>	<ul> <li>Digital transformation roadmaps implemented</li> </ul>	<ul> <li>Increased digital capacity/skills within firms</li> </ul>	<ul> <li>Higher value-added products and services by local firms</li> </ul>
À	Develop partnerships with local support organisations to create an aligned ecosystem. This could include a network of technology demonstration facilities in institutions already present across Jamaica including universities and consultancy firms	<ul> <li>Financial resources:</li> <li>US\$ 500k per year for innovation voucher scheme to pay for technology acquisition and implementation training (100 vouchers at US\$5k each per year)</li> <li>Operational budget US\$500k per year (this will need to vary depending on whether technical advisors are hired to be in-house or sub-contracted from external partners, used to cover consultant fees and office expenses)</li> </ul>	<ul> <li>Engage firms and create digital transformation roadmaps</li> </ul>	<ul> <li>Vouchers awarded</li> </ul>	100 digitally enabled businesses working with local and overseas clients per year	<ul> <li>Increased international competitiveness/access to export markets</li> </ul>
٨	Provide specialist advice to support the implementation of new digital technologies within firms	<ul> <li>Website and marketing expert</li> </ul>	<ul> <li>Support roadmap implementation</li> </ul>	<ul> <li>Business and relevant team members certified in digitisation</li> </ul>	<ul> <li>Analytics on digital transformation initiative available to stakeholders</li> </ul>	<ul> <li>Economic diversification away from tourism</li> </ul>
٨	Provide specialist training in the use of new digital technologies.	<ul> <li>Facilities (e.g. offices, demonstration labs)</li> </ul>	<ul> <li>Provide voucher to cover the costs of technology solutions and related training</li> </ul>	<ul> <li>Useful data for program tweaking and expansion</li> </ul>	<ul> <li>Expanded sales, exports; more competitive products</li> </ul>	<ul> <li>Improved GDP</li> </ul>
٨	Provide funding support for technology acquisition and access to training through an innovation voucher scheme		<ul> <li>Measure and document the progress of each participant and showcase and network top program performers</li> </ul>	>	<ul> <li>Reduced costs, efficient businesses, increased profits, greater innovation</li> </ul>	<ul> <li>Jobs, particularly tech related</li> </ul>

Figure 5.2: Digital technology advisory service and innovation voucher – Summary roadmap (development vision)

[	Short Term (1 <sup>st</sup> year)	Mid-Term (2-5 years)	Long term (year 6→)						
Narrative	<b>Short-term Narrative</b> : Create the Digital Technology Advisory Service (DTAS) to foster the digital transformation ecosystem for existing sectors in Jamaica	<i>Mid-Term Narrative:</i> Start operations and expand the DTAS with impacts in # of supported firms, exports and job creation	<b>Long Term narrative:</b> Re-invent and Renew the DTAS based on previous successes and current challenges / opportunities						
	Approve 100 projects	100 firms supported per year Economic diversification	Re-invent / Re-new the						
Drivers (Strategic aoals &	Award vouchers	Increase exports (with DT)	to the long term challenges and						
objectives)	Create trust among the ecosystem	DT roadmaps implemented	opportunities						
		Analytics on digital transformatio	n initiative available to stakeholders						
	Receive and analyse support applications (based on DT roadmaps)	Provide vouchers	to finance projects						
	Develop training and certification capabilities	Provide training and ce	rtification to participants						
Activities	Engage firms and create DT roadmaps	Measure and doo	ument the process						
	Creation and formalization of the Digital technology extension and advisory service								
	Identify and liaise with potential partners	10 technical advisors after 2							
	Train the trainers and / or hire personal with skills	years							
Resources	Office Space & Marketing Campaign	Annual budget: adapt acco	ording to experience and expand						
	Annual budget - US\$500k (vouchers) and US\$500k (operation	(s) funding scale if feasible							
	Government will, leadership and coordination								

## Figure 5.3: Digital technology advisory service and innovation voucher – Implementation roadmap

		Quarter 1	Quarter 2	Quarter 3	Quarter 4	
	Implementation	Stakeholder buy in	Governance framework established	Define client needs	Website live Evaluation panel complete	
	Milestones	Strategic plan development	Budget assignment	Strategic plan approved	Operation rules in place Full advisory team assembled	
	Who should take					
What needs to be done?	the lead?					
Pre-Step: Approval and Announcement	DBJ, High level working group and key stakeholders	DBJ Approval Public-private working group along with consultant	Funding allocation			
	DBJ, Independent steering	Consultation Strategic plan	Operational Plan	Study clients needs	Marketing and communications Strategy	
Strategy and business planning	committee with stakeholders	to validate concept plan	Partnership with National Advisory Council for ICT	Focus groups, one on one discussions, pops-in	Develop impact evaluation framework based on KPIs	
Governance and management	DBJ, Independent steering	Need mechanism to ensure	Board of directors appointment Need dedicated teams to drive	Technical advisory group designation	Monitoring and	
structure set up	stakeholders	agility and beat bureaucracy	initiative	Application evaluation panel set-up	evaluation framework	
Personnel, operations and	Programme manager,		Combine execution and strategic teams	Organisational chart and job descriptions	Staff recruitment	
organisational structure set-up	dedicated project manager / team			Staff recruitment	Establish capacity building scheme	
Website set- un & facilities	Programme manager,			Web-site procurement	Develop online self	
	outsource and standardise			Lease offices	diagnose tool	
Advisory convice set up and	Programme manager,	Contact > 50 suppliers already		Recruitment of technical advisors or		
service delivery	lead by steering	working on digital transformation	Establish matchmaking process	partnerships with private sector advisors		
	committee above.	(0.6. 1 (0.1)				
Partnerships with technology	Programme manager, operational Staff,	Potential partnerships: JTVA (Computing Department); JAMPRO;		Establish partnerships with private	International	
service delivery	dedicated partner manager	SOJ; NICTAC		vendors and training suppliers	partiterships	
		Innovation voucher scheme approval	Leverage existing Define DBJ voucher scheme innovation	Define innovation	Appoint evaluation page	
	innovation vouchers	Define entity managing voucher scheme	governance (e.g. voucher BIGEE programme) operating rule	process		



# 5.3 Fintech incubator/accelerator programme

## A. INTERNATIONAL EXPERIENCE

## 1) Definition

A joint report by the OECD and the European Commission defines business incubators and business accelerators as "types of business development support programmes that provide a range of support services to entrepreneurs in business creation and during the early stages of the business lifecycle".<sup>48</sup> Business incubators and accelerators usually provide a range of services such as training, mentoring, business advice, marketing and access to finance, as well as premises where early stage businesses can operate.<sup>49</sup>

Overall, incubation refers to the process of providing support to entrepreneurs to develop their business ideas. Incubation consists of three stages (Figure 5.4):<sup>50</sup>

- **Pre-incubation:** it refers to activities needed to go from the business idea to the effective startup creation. At this stage, the entrepreneur is provided with the necessary assistance to write a complete business plan.
- **Incubation:** it refers to the support provided to the entrepreneur after the start-up has been set up to facilitate its expansion. This stage usually last three years, a time which is considered sufficient to understand whether the new established firm will have chances to further develop into a mature business.
- **Post-incubation:** it relates to the support, for example to boost sales or make productive process more efficient, that the mature firms may need once they leave the incubation stage. Incubators that offer services to firms at this stage are often called *"accelerators"*.

<sup>&</sup>lt;sup>48</sup> OECD/European Union (2019) <u>Policy Brief on Incubators and Accelerators that Support Inclusive</u> <u>Entrepreneurship</u>

<sup>49</sup> Ibid.

<sup>&</sup>lt;sup>50</sup> As defined in EBN (2010) <u>The Smart Guide to Innovation-Based Incubators (IBI).</u> The European Business and Innovation Centre Network (EBN)

Figure 5.4: Stages of incubation process



Source: adapted from EBN (2010) The Smart Guide to Innovation-Based Incubators (IBI).

## 2) Rationale

The rationale behind Fintech incubation can be related to three arguments: market failures; the need to accelerate the entrepreneurial process to foster economic growth; and the linkages between country's financial sector depth and economic development.

The market failure argument assumes that the private sector may be unwilling to absorb the high costs and risks, as well as the uncertain investment returns associated with setting up new businesses, particularly high-tech start-up companies such as those operating in the financial sector. There is indeed the scope to support early stage firms to guarantee that companies with high innovation potential will be set up.<sup>51</sup>

The second argument sees business incubators as institutions that can speed-up growth, financial and operational stability of start-ups by offering them targeted services to help firms to survive the competitive environment.<sup>52</sup>

The third argument in favour of Fintech incubation relies on the positive linkages between financial sector depth, access to finance, and economic development. Empirical evidence shows that access to financial service, particularly for start-ups and small and medium enterprises (SMEs) is associated with stronger innovation, job creation, and growth performance.<sup>53</sup> In other words, the development of Fintech sector could open more opportunities to access to finance, particularly for SMEs that currently struggle to raise funding through the traditional banking sector, thus improving the conditions needed to foster economic development. This is particularly true for countries such as Jamaica where access to finance is still one of the main constraints to business growth (Section 3).

<sup>&</sup>lt;sup>51</sup> Dee, N. at al (2012) A review of research on the role and effectiveness of business incubation for high-growth start-ups. Centre for Technology Management, Institute for Manufacturing, University of Cambridge.

<sup>&</sup>lt;sup>52</sup> Ayatse, F. et al (2017) Business incubation process and firm performance: an empirical review. *Journal of Global Entrepreneurship Research 7:2.* 

<sup>&</sup>lt;sup>53</sup> Mooney H. (2018) Jamaica: Financial Development, Access, and Inclusion: Constraints and Options. Inter-American Development Bank, Policy Briefs IDB-PB-301.

Business incubators have been associated to a variety of objectives that often depends on the specific business environment where the incubator is located (Table 5.4)

## Table 5.4: Objectives of incubation

Pri	mary objective	Secondary objective			
•	Real estate appreciation	<ul> <li>Create opportunity for technology transfer</li> </ul>			
•	Sell proprietary services to tenant	<ul> <li>Create investment opportunity</li> </ul>			
٠	Job creation	<ul> <li>Generate sustainable income for the</li> </ul>			
•	Positive statement of entrepreneurial potential	organisation			
•	Faculty-Industry collaboration	<ul> <li>Diversify economic base</li> </ul>			
•	Commercialise university research	Bolster tax base			
•	Capitalise investment opportunity	<ul> <li>Complement existing programmes</li> </ul>			
		Utilise vacant facilities			
		<ul> <li>Strengthen service and instructional mission</li> </ul>			
		<ul> <li>Capitalist investment opportunity</li> </ul>			
		<ul> <li>Create good will between institution and</li> </ul>			
		community			
		Product development			

Source: Dee, N. at al (2012) A review of research on the role and effectiveness of business incubation for high-growth start-ups. Centre for Technology Management, Institute for Manufacturing, University of Cambridge.

## 3) General characteristics

Business incubators and business accelerators share the common goal of supporting start-ups through the early and fragile stages of growth. With respect to funding models, business incubators are usually partly self-funded through the membership fees or rent they charge to resident firms. However, it's is not unusual a funding model where business incubators are also subsidised by a university or public funding.<sup>54</sup> On the other hand, the majority of accelerators are funded by either corporates or the public sector.<sup>55</sup> The services provided by business incubators and business accelerators span from access to finance, direct coaching and mentoring services, to hosting services and specific training. In this respect, it is worth to remark that physical incubation is a subset of the potential services that incubators can offer to start-ups, although one of the most important services. Furthermore, it is not possible to mark a clear distinction between services offered by incubator and accelerators. They may offer the same kind of service, such as mentoring and networking, which are however tailored to the needs of firms that are different development stages (Table 5.5)

	Business incubators	Business accelerators
Objective Support business creation and development.		Accelerate business growth.
Space provision Usually.		Occasionally, but there is a greater emphasis on business support
Service portfolio	<ul> <li>Training: Entrepreneurship skills.</li> <li>Mentoring: Focus on business model and initial business plan.</li> </ul>	<ul> <li>Seminars: Management skills.</li> <li>Mentoring: Intense, with focus on growth strategy.</li> </ul>

## Table 5.5: General characteristic of business incubators and business accelerators

 <sup>&</sup>lt;sup>54</sup> Bone at al (2019) <u>The Impact of Business Accelerators and Incubators in the UK</u>. BEIS Research Paper Number 2019/009
 <sup>55</sup> Ibid.

	<ul> <li>Networking: Other entrepreneurs and actors in the broader entrepreneurial eco-system.</li> <li>Access to finance: Grants or seed capital.</li> <li>Other: Managerial support (e.g. accounting), access to specialised equipment</li> </ul>	<ul> <li>Networking: Other entrepreneurs and actors in the broader entrepreneurial eco-system.</li> <li>Access to finance: Debt or equity.</li> </ul>
Service provision	On-demand	<ul> <li>Mandatory and provided in a struc- tured programme.</li> </ul>
Length of support	• Often up to 3 or 4 years, or more.	Usually 3 to 6 months
Selection and exit criteria	<ul> <li>Admissions are typically on-going and selection is made according to the focus and criteria set by the incubator.</li> </ul>	Admissions are typically done in cohorts, through a competitive selection process.
Tenants	<ul> <li>Often enter at pre-start-up stage; few, if any, employees; little experience.</li> </ul>	Often enter after start-up stage; Often     1 or 2 employees; typically,     experienced.
Business model	<ul> <li>Mostly non-profit, with operating costs being largely covered by the rental fees collected.</li> </ul>	<ul> <li>Mostly for-profit, associated with private venture capitalist funds (in the US) or a mix of private and public investors (in Europe).</li> </ul>

Source: OECD/European Union (2019) Policy Brief on Incubators and Accelerators that Support Inclusive Entrepreneurship

## 4) Performance indicators and evaluation

A number of empirical investigations have been conducted to assess whether services provided by business incubators and accelerators had positive impacts on the performance of firms they support. Overall, the majority of studies is in favour of positive impacts on firm performance as measured by, for example, sales and revenue growth, job creation, venture funding, and other measures of technology transfer such as patent applications and research and development (R&D).<sup>56</sup>

Evaluation conducted on business incubators finds for example that they can increase the rate at which participating firms grow in employee size. Evidence for the impact of accelerators shows that they can increase the speed at which start-ups raise investment, grow their number of employees, and reduce the time it takes them to be acquired. In addition, analyses find that both incubators and accelerators may help funders to understand the viability of their business idea and thus, "help bad ideas to 'fail faster".<sup>57</sup>

However, it is also important to remake that incubation programmes could not produce positive outcomes on firm survival, for example, when the entrepreneur does not go beyond the services offered by the incubators, but rather seeks additional advice from their network and/or partners or join complimentary public support programmes.<sup>58</sup>

<sup>&</sup>lt;sup>56</sup> Ayatse, F. et al (2017) Business incubation process and firm performance: an empirical review. *Journal of Global* Entrepreneurship Research 7:2

<sup>&</sup>lt;sup>57</sup> Bone et al (2019) <u>The Impact of Business Accelerators and Incubators in the UK</u>. BEIS Research Paper Number 2019/009

<sup>&</sup>lt;sup>58</sup> OECD/European Union (2019) <u>Policy Brief on Incubators and Accelerators that Support Inclusive</u> <u>Entrepreneurship</u>

As a concluding remark, the OECD stresses the importance of business incubators and accelerators to provide services "tailored and delivered as part of an integrated package of support" as a success factor of incubation programmes.<sup>59</sup>

## Box 5.2: FinBlue – A Fintech Centre of Excellence (India)

## Mission

**FinBlue** is a Centre of Excellence operating in the Fintech sector set up by Software Technology Parks, an independent agency within India's Ministry of Electronics and Information Technology.

**FinbBue**'s mission is "to help provide resources such as mentoring, technology support and funding for Fintech start-ups". Through its incubation facility, FinBlue offers an integrated program for start-ups to scale up, from plug and play co-working space to access to the Fintech ecosystem including user bankers, financial institutions, mentors, and investors.

## Who can apply?

## Start-ups complying with the following criteria:

- Be incorporated in India since no more 10 years, with an annual turnover not exceeding Rs. 100 crores (~ US\$ 13.6 m) for any of the financial years since its incorporation.
- Not have been formed by splitting up or reconstructing an already existing business.
- Working towards innovation, development or improvement of products, processes or services or if it is a scalable business model with high potential of employment generation or wealth creation.

### Fintech incubator programme - selected services offered

## Infrastructure Facility:

- Access to US\$ 5,000 credit for cloud computing and business support from major cloud service providers like AWS, Azure etc.
- Access to the various products and knowledge support that will be provided by National Payments Corporation of India.

### Mentorship

- Responsible for identifying domain specific software tools and offering the same to startups.
- Creating a platform for accessing the mentor through an online portal.
- Train/educate start-ups in the fields of research, user experience and business technology courses with cutting edge programming and deep-tech applications.
- Support the start-ups for developing Proof of Concept, provide mentoring for designing & development and help start-ups to convert their idea into a reality.
- Transforming the start-ups from idea level to Prototype level, Prototype level to MVP (Minimum Viable Product) level, MVP level to GTM level and graduating the start-ups into full-fledged company status.

### Marketing

- Knowledge sessions, conducting road shows, creating the FinTech CoE web platform, organizing networking events, conducting social media marketing and connecting relevant service providers.
- Partnerships with key international promotional agencies shall be carried out for cross border collaboration.

### Monitoring

 Monitoring and guiding start-ups through dedicated portfolio managers and start-up support executives; reviewing the progress/performance of start-ups periodically and take necessary action as and when required in co-ordination with PMG.

59 Ibid.

### Funding and investment

- Supporting and guiding start-ups for raising funds towards PoC, MVP and Marketing as well as scaling up through grants, equity and debt by leveraging connections with potential customers and CSR/Corporate sources as well as angels,
- > Scaling-up by providing access to Sandbox environment
  - Integrated program to Start-ups to scale through its incubation facility by providing access to Sandbox environment, consisting of application programming interfaces (APIs) of different participating banks, National Payments Corporation of India NPCI products Core Banking Software and other enabling services through various stakeholders.

Source: https://finblue.stpi.in/

## **B. IMPLEMENTATION IN JAMAICA**

Jamaica's unique innovation system context means that initiatives established in other countries cannot simply be replicated without adaptation. However, international examples can inform practical implementation in Jamaica by illustrating the variety of approaches that have been deployed to support industrial innovation in other countries.

In this regard, an online roadmapping workshop was held on 3<sup>rd</sup> February 2021 to collect insights from local stakeholders on how to implement a "Fintech incubator/accelerator programme" in Jamaica. The aim of the workshop was to produce three key outputs, as shown in Table 5.6 and Figures 5.5 and 5.6:

- a. **Logic model** inputs provided by workshop participants including their views about the key objectives, inputs, activities, outputs, outcomes and impacts expected for the "Fintech incubator/accelerator programme".
- b. A summary roadmap outlining the development vision foreseen for this initiative, based on the logic model inputs provided by workshop participants.
- c. An implementation roadmap highlighting key practical steps needed to create and establish the "Fintech incubator/accelerator programme", including key implementation milestones and stakeholders involved.

In particular, the programme would aim to address the following challenges:

- Nascent Fintech ecosystem in Jamaica does not offer dedicated incubation/acceleration support to local startups in this sector.
- Fintech startups lack access to specialised (and international) sectoral knowledge and advice beyond common business support offered by traditional incubator/accelerator programmes.
- Opportunity to create an incubation/acceleration programme that could feed the Bank of Jamaica's (BOJ) Fintech sandbox with new innovative local Fintech solutions.

In summary, programme **objectives** are to:

- Offer a safe space for entrepreneurs to develop new Fintech solutions for the domestic and international markets.
- Provide business development support to new entrepreneurs.
- Provide technical Fintech and programming advice to new entrepreneurs.
- Connect startups to local and global networks of expertise and potential clients.
- Give information on potential markets, clients and funding sources for startups within the programme.
- Organise key knowledge dissemination and networking events for the broader fintech community in Jamaica.

## Table 5.6: Fintech incubator/accelerator programme – Logic model

	Objective	Input		Activities		Outputs		Outcomes		Impacts
À	Offer a safe space for entrepreneurs to develop new Fintech solutions for the domestic and international markets.	<ul> <li>Human resources with expertise in:</li> <li>Administration, networking/partnership, education/training</li> <li>Fintech legislation/regulation</li> <li>Business model development, marketing, funding and investment</li> <li>Enabling technologies</li> </ul>	AAA	Aid in market feasibility assessment for solutions using emerging tech Business model support – training sessions Launch mentorship programme: assign innovators to experienced industry players	A	Create 10 start- ups yearly	٨	Exporting of Fintech solutions that drive financial inclusion	AAA	Lower cost financial services to the consumer Increased financial inclusion Lowered use of cash
A	Provide business development support to new entrepreneurs.	<ul> <li>Mentors and experienced fintech entrepreneurs and industry experts</li> </ul>	AA	Foster partnerships with relevant international institutions Provide networking and marketing opportunities (regional and global supply chain)	•	Start-ups fully funded	٨	Faster time to market for Fintech providers	>	Re-alignment of traditional roles in financial services
٨	Provide technical Fintech and programming advice to new entrepreneurs.	<ul> <li>High capacity, reliable, redundant internet infrastructure</li> <li>Access to efficient technological resources</li> </ul>	۶	Guide Fintechs to develop proof of concepts and launch products while following legislation & aligning to best practices	•	Training and mentorship programmes completed	٨	Increased profitability for start-ups participating in the programme	٨	Improved regulation through connected services
À	Connect startups to local and global networks of expertise and potential clients.	<ul> <li>An operational budget of at least US\$250k per year to cover:</li> <li>Office space</li> <li>Infrastructure and knowledge products</li> <li>Operational staff salaries</li> <li>Mentors stipends and training expenses</li> <li>Networking and strategic activities (e.g. establishment of partnerships with global networks and sandboxes)</li> </ul>	×	Train/educate start-ups in the fields of research, user experience and business technology courses with cutting edge programming and deep-tech applications	٨	Graduation of Fintechs from incubator/acceler ator into sandboxes in Jamaica and internationally	A	Improved ability to adequately compensate employees in start-ups participating in the programme	A	Improved financial well- being of employees
>	Give information on potential markets, clients and funding sources for startups within the programme.	<ul> <li>Governance and policy framework</li> <li>Local companies to create initial opportunities</li> </ul>	>	Provide the technical tools for the continued development of solutions	٨	Certification and accreditation of Fintech solutions to enter new markets	•	Increase in the number of new business and opportunity to expand business	A	Increased ability to achieve organisation's mandate
>	Organise key knowledge dissemination and networking events for the broader fintech community in Jamaica.	<ul> <li>Private sector support in implementing the education program</li> </ul>	AA	Train firms on how to access funding Provide access to international sandbox environments and APIs (including Jamaica)	•	Start-ups accessing global markets		Faster and smoother process from incubation period to being market ready	٨	Increased opportunity for expansion

## Figure 5.5: Fintech incubator/accelerator programme – Summary roadmap (development vision)

	Short Term (1st year)	Mid-Term (2-5 years)	Long term (Year 6→)			
Narrative	<i>Short-term Narrative:</i> Creation of a Fintech Incubator / Accelerator Programme to foster high growth and high visibility Fintech solutions to develop the sector, increase financial inclusion and compensate employees adequately	<i>Mid-Term Narrative:</i> Stimulate innovation innovation Fintech opportunities by supporting start-ups and developed firms.	Long Term narrative: Consolidate the Fintech Incubator / Accelerator Programme and explore new opportunities to keep growing and developing the Fintech Ecosystem			
Drivers (Strategic	Start the development of a Fintech innovation ecosystem with active participation of academia, government and industry.	Greater efficiency in proces Faster time to market for Fintech Improved ability to adequately compen	ses providers sate employees Ecosystem (e.g.			
goals & objectives)	Facilitate knowledge share in the ecosystem	Exporting of Fintech solutions that drive fi	nancial inclusion Tech hub, Centre of Excellence, etc.)			
	Re-alignment of traditional roles in financial services	Improved access to market, technology, exp	ertise, training, mentoring and funding/capital			
	Build infrastructure with the ability to scale	Admit 10 new start-ups yearly to the progr into the sandbox at the	amme (and start graduating similar numbers end of the programme)			
Activities	Identify and focus on areas of high growth scale/high visibility	Guide Fintechs to launch product while follo Partner with investors experienced in hi regional and glo	wing legislation and aligning to best practices gh growth and with large firms to provide bal supply chain.			
	Create the Fintech Incubator/Acceleration Programme	Aid in market, implementation, access to	expertise, training, mentoring and funding			
	Experts in legal and regulatory Fintech environment	Regulatory framework to promote	e Fintech			
	High capacity, reliable, redundant internet infrastructure	Universities programme align with	n Fintech needs.			
Resources	Mentoring & experienced Fintech entrepreneurs	Networking with global fintech in	cubators			
	Adequate funding and access to capital (public ar	nd private) – An operational budget of a	it least US\$250k per vear			

Figure 5.6: Fintech incubator/accelerator programme – Implementation roadmap							
			Yea	r 1			
		Quarter 1	Quarter 2	Quarter 3	Quarter 4		
	Implementation	Stakeholders buy-in (entrepreneurs, banks, universities, etc.)	Manager appointed	Mentorship programmes designed	MOUs in place with strategic partners		
	Milestones	Budget assignment	Strategic Plan developed	Confirmation of location, facilities, infrastructure needs.	Core staff recruited		
What needs to be done?	Who should take the lead?						
Pre-Step: Approval and Announcement	DBJ / Steering Committee (strategy and planning support)	DBJ Funding allocation Approval Define key partners					
Incubator / Accelerator strategy and	DBJ / Steering Committee	Strategic planning process	Create five years business plan	Study of Fintech innovators needs	KPIs evaluation framework creation		
business planning	(strategy and planning support)	Consultation to validate concept plan	Financial planning				
Governance and management structure set up	DBJ / Steering Committee (strategy and planning support)	Consider model with public sector ownership and private sector (autonomous) lead	Appointment of board of directors Appointment of programme manager	Technical advisory group			
Personnel, operations and organisational structure set-up	Programme manager		Recruitment plan and operational process (inc. staff profiles)	Organisational chart and job descriptions Staff recruitment	Establish competences in key business and technology areas		
Facilities, infrastructure and Website	Programme manager		Negotiate APIs agreements	Define offices space and infrastructure requirements	Procure website		
Delivery of Mentorship programmes	Programme manager Mentors	Detailed design of mentorship programme	Recruit sector experts with entrepreneurial experience from Jamaica and rest of the world	Find and recruit successful startups to share lessons Leverage different initiatives from gov	Operational rules for mentorship programme ernment		
Partnerships / sector integration and communication	Programme manager	BOJ sandbox partnership Connection to the second se	turing exporters programme; PSOJ ); Branson Centre Links to vent	ministrues and their offices for Si for sector stakeholders Universities Banks, etc) ure capital funds and angel	VIES. International partnerships (e.g. incubators and banks for APIs) Create SAAS ecosystem best		
Others		Connection to regulator (BOJ)		Explore access to related regional initiatives	practice		
	Funding	Define budget for planning stage		Define budget for operation stage			

# 5.4 Food/Cosmetics Innovation Centre

## A. INTERNATIONAL EXPERIENCE

## 1) Definition

The proposed Food/Cosmetics Innovation Centre can be categorised as what is internationally known as a **Research and Technology Organisation (RTO)**, defined as "market-led, problem oriented, organisations serving all facets of technology transfer and innovation, and who secure their own ongoing existence and growth through success in this marketplace".<sup>60</sup> A complementary definition of RTOs suggests that these are "organisations focused on the exploitation of new technologies through an infrastructure which bridges the spectrum of activities between research and technology commercialisation. These can be in both established technology areas and in new, emerging technologies".<sup>61</sup>

RTOs such as the proposed Food/Cosmetics Innovation Centre can assume a co-ordination role to de-risk innovation projects, acting as a bridge between businesses and the research and academic communities to enable projects that no single actor would be able to perform by itself. They can also contribute beyond R&D in areas including: skills development; access to facilities (e.g. pilot plants) and expert advice; provision of test beds for new production processes and products; stakeholder engagement and network formation; and FDI attraction. As such, they represent a highly flexible tool to promote innovation and industrial competitiveness.

## 2) Rationale

Governments around the world are stepping up efforts to support their domestic industries in the face of uncertain economic conditions, increasing international competition and rapid technological change. Promoting the competitiveness of domestic firms has become a goal of policy programmes in many countries. Yet this remains an elusive target. The policy challenges are multiple: not only fostering innovation among existing businesses, but also promoting the emergence of new industries as well as addressing socioeconomic and environmental challenges that require new industrial solutions.

A country's innovation performance is defined by its ability to nurture new technology-based firms but also, critically, by the ability of existing firms to quickly absorb and apply new knowledge to upgrade, diversify and gain competitive advantage. There is broad agreement in economic literature that businesses, if left to alone, will under-invest in R&D and innovation due to a number of 'market failures' that lead to sub-optimal R&D outcomes. Example market failures include: <sup>62</sup>

<sup>60</sup> AIRTO (2017). Association for Innovation, Research and Technology Organisations. Website http://www.airto.co.uk/about/

<sup>61</sup> Hauser (2010). The Current and Future Role of Technology and Innovation Centres in the UK. A report by Dr Hermann Hauser for Lord Mandelson, Secretary of State, Department for Business Innovation & Skills, UK. <sup>62</sup> (EURAB, 2005):

## Externalities

- High risks associated to innovation investments.
- Inability of firms to reap full benefits of investments in R&D or training.

## Coordination failures

- Inability of firms to carry out joint investment without external coordination.
- Complexity of modern innovation challenges cannot be tackled by single firms due to their large-scale and multi-disciplinary nature.

## Information failures

- Firms lack information about potential benefits of technology.
- Firms (particularly SMEs) often unaware of existing business opportunities.
- Lack of technical competence to properly invest in R&D, particularly for SMEs.

## Network failures

- Lock-in or path dependency (e.g. existing business arrangements).
- Large firms might fear helping competitors.

RTOs are usually established and/or supported by governments to perform tasks that businesses and other innovation actors, if left alone, would probably not perform with sufficient reliability, stability and accountability due to market and system failures.<sup>63</sup> As such, arguments in favour of public support for organisations such as the proposed Food/Cosmetics Innovation Centre establish that:

- Public funding for RTOs represents a social investment and its rationale stems from the barriers to strategic and co-ordinated capability development, which may apply to infrastructure, equipment and skills that would not otherwise be in place to develop innovation.<sup>64</sup>
- RTOs exist to help firms innovate, and to solve innovation problems that are beyond the capabilities of individual firms.<sup>65</sup>
- Investment in RTOs generates returns to society through spill over effects which, for example, could lead to transfer of capabilities from the RTO to its customers. This would in turn result in improved performance of such firms, becoming more competitive, employing more people, paying more taxes, increasing the quality of life of the region.<sup>66</sup>

## 3) General characteristics

The main aim of an RTO is to foster innovation among businesses. However, it needs to be recognised that different firms will have different needs and challenges. While some companies might require advanced technological services and might be able to engage in cutting-edge research, others might not yet have the required capabilities to engage in such activities.

<sup>&</sup>lt;sup>63</sup> (EURAB, 2005)

<sup>&</sup>lt;sup>64</sup> (Hauser, 2010). (Arnold et al, 2010)

<sup>65 (</sup>Hauser, 2010).

<sup>66 (</sup>Arnold et al, 2010).

A large share of companies in Jamaica, especially SMEs, do not utilise the latest technological know-how to ensure world-class levels of quality, productivity and flexibility, due to their low internal R&D, innovation and managerial capabilities. In practice this means that they are often unable to update production processes and undertake the product development of new products on their own at a competitive scale. SMEs might also have an intrinsic "innovation fear", as an unsuccessful investment of their limited resources in an innovative project can greatly affect their financial performance and even jeopardise their survival.

In order for RTOS to foster innovation among businesses, their portfolio of services needs to carefully account for current industrial capabilities across different types of firms. This can only be achieved through a systematic analysis of the technical support mechanisms required at various levels of sophistication by firms in order to address gaps in the national institutional support infrastructure. In this regard, Table 5.7 summarises some of the key benefits that firms can obtain from cooperating with RTOs.

The mission focus of an RTO determines to a great extent the objectives and nature of its innovation activities, including its research portfolio and strategy. RTO missions can include, for example:

- Promoting industrial diversification.
- Contributing to a more favourable trade balance and helping balance inflows and outflows of foreign currency.
- Addressing the opportunities or challenges associated with particular technological domains.
- Responding to the technical innovation needs and priorities of specific sectors.
- Developing technological solutions to major societal challenges.

Depending on their core missions, distinct types of RTO require different budgetary arrangements for different time horizons. Strategic research programmes, for example, may extend over many years and require a decade or more of programmed work to reach fruition. By contrast, contract R&D assignments for enterprises may last just weeks or months. Hosting of big infrastructure facilities tends to be very long term, as well as surveillance work, requiring long-term budgets. Overall, both the level and type of funding varies significantly between distinct types of RTO. However, the sources of funding can be broadly categorised as:<sup>67</sup>

- Core funding from national and regional government: not always linked to specific activities or outcomes. A performance management framework is often in place when receiving this investment.
- Research grants and contracts from public bodies (primarily won on a competitive basis).
- Research contracts from the private sector: usually competitively tendered.

<sup>&</sup>lt;sup>67</sup>EARTO (2007). Research and Technology Organisations in the Evolving European Research Area – A Status Report with Policy Recommendations. European Association of Research and Technology Organisations; Hauser, H. (2014). Review of the Catapult Network – Recommendations on the future shape, scope and ambition of the programme. Department for Business Innovation and Skills, London.

## Table 5.7 – Benefits and value for firms cooperating with RTOs

Financial benefits:	Innovation and technological canabilities:
<ul> <li>Enhanced productivity</li> <li>Profit improvement</li> <li>Sales/turnover improvement</li> <li>Increase in export licence revenue</li> <li>Cost reduction</li> <li>Capital avoidance</li> </ul>	<ul> <li>Supporting and strengthening the innovative activity and ability of firms</li> <li>Ability to go beyond firms' internal technological capabilities</li> <li>Speeding up R&amp;D work</li> <li>Improving R&amp;D and technical capabilities of firms</li> <li>Improving ability to adopt new technology ("absorptive capacity")</li> <li>Improving intangible assets (e.g. knowledge-base, expertise)</li> <li>Facilitating project completion</li> <li>Reinforcing firms in their ability to carry out more ambitious projects</li> <li>Achieving greater breadth and depth of research</li> </ul>
Access to knowledge and expertise:	Solving technological challenges:
<ul> <li>(Early) access to technology/product/process/material/resources /techniques not available in-house</li> <li>Access to equipment or other facilities not available within the organisation</li> <li>Bringing together input from several disciplines and experts with which the client is not entirely familiar</li> <li>Getting new ideas</li> <li>Identification of sources of knowledge required to meet firms' technological demands</li> <li>Keeping abreast of technology developments</li> <li>Improved usage of external sources of knowledge and information on public funding schemes</li> <li>Promotion of networking</li> </ul>	<ul> <li>Understanding fundamental knowledge and technology</li> <li>Overcoming a technological problem</li> <li>Resolving a clearly defined research question</li> </ul>
Innovation output:	Marketing aspects:
<ul> <li>Introduction of new products/services/materials/processes</li> <li>Improvement of existing products/services/materials/processes</li> <li>Intellectual property creation</li> <li>External evaluation, validation or certification of new products or processes</li> </ul>	<ul> <li>Keeping abreast of industry developments</li> <li>Improved understanding of markets by firms' executives and employees</li> <li>Commercialisation of research results</li> <li>New business opportunities and markets</li> <li>Improved competitiveness</li> <li>Improved brand value</li> </ul>
Employee skills:	Risk and trust management:
<ul> <li>Learning and staff training</li> <li>Improved technical and other skills</li> </ul>	<ul> <li>Reducing the risk of innovation</li> <li>Securing confidentiality of cooperation with RTOs</li> <li>Positive influence on corporate dynamics and culture: intra-firm communication (inter-team cooperation, knowledge-sharing and problem-solving)</li> <li>Improving relations between the R&amp;D and other departments</li> </ul>

1

Source: Giannopoulou et al. (2019). Same but different? Research and technology organisations, universities and the innovation activities of firms.

## 4) Performance indicators and evaluation

Although there is no universal method for measuring the performance of an RTO, example key performance indicators (KPI) employed around the world include the following metrics:

- Basic science publications (number, citations)
- Applied science & engineering publications (number, citations)
- PhD / Eng. D. students graduated
- Turnover of experienced engineers / technologists into workforce
- Employer satisfaction with graduates
- Patents
- Industry funding
- Industry cost share
- Contract R&D income
- Necessary component of value proposition for FDI secured (jobs, \$, etc.)
- Spin-out companies (employment / turnover / etc.)
- Technical consulting income
- Education & outreach (increase in STEM students)
- Increased BERD (increased levels of R&D by corporate partners)

## Box 5.3: CSIRO's Food Innovation Centre (Australia)

CSIRO's food innovation centre makes it easy for food, ingredient and equipment manufacturing companies to access CSIRO's extensive expertise, technologies and support in innovation. From adopting innovative technologies and improving process efficiency to creating high value products for new markets, we partner with industry every day.

How can food companies work with the Food Innovation Centre?

- On strategic long-term scientific research and development collaborations
- On short-term technology transfer projects and fee for service activities
- Hire of our facilities, equipment or skilled labour for technical assessments, prototype batches and early-commercialisation work
- In consultancy arrangements providing technical expertise and assessments
- As on-site clients for start-up incubation or access to high-capital technologies
- Licensing CSIRO intellectual property
- Attending innovation workshops, industry forums and training.

The Food Innovation Centre also helps companies make connections between co-manufacturers, ingredient and equipment suppliers and consultants as well as submit grant applications.

## Key areas of work:

- > Food processing expertise and facilities for the food industry
  - Process engineering Create differentiated products, process efficiency, waste utilisation, supply chain sustainability
  - Advanced separations Extract valuable components from agri-food streams
  - Facility hire Food manufacturing R&D and pilot plants
  - Food ingredient technologies Solve innovation challenges in ingredient and food product development

Consumer science expertise and facilities for the food industry

- Consumer goods Create value-added manufactured food products that are cost efficient and appealing to consumers
- Sensory Integrate flavour science, objective sensory science and consumer acceptance and food choices
- Nutrition and health Demonstrate health benefits of existing or new food ingredients, foods, diet or technology products that are cost efficient and appealing to end-users

Source: https://www.csiro.au/en/work-with-us/industries/food

## **B. IMPLEMENTATION IN JAMAICA**

Jamaica's unique innovation system context means that initiatives established in other countries cannot simply be replicated without adaptation. However, international examples can inform practical implementation in Jamaica by illustrating the variety of approaches that have been deployed to support industrial innovation in other countries.

In this regard, an online roadmapping workshop was held on 2<sup>nd</sup> February 2021 to collect insights from local stakeholders on how to implement a "Food/cosmetics innovation centre" in Jamaica. The aim of the workshop was to produce three key outputs, as shown in Table 5.8 and Figures 5.7 and 5.8:

- a. **Logic model** inputs provided by workshop participants including their views about the key objectives, inputs, activities, outputs, outcomes and impacts expected for the "Food/cosmetics innovation centre".
- b. A summary roadmap outlining the development vision foreseen for this initiative, based on the logic model inputs provided by workshop participants.
- c. An implementation roadmap highlighting key practical steps needed to create and establish the "Food/cosmetics innovation centre", including key implementation milestones and stakeholders involved.

In particular, the programme would aim to address the following challenges:

- Companies, particularly SMEs, do not usually have the necessary infrastructure and facilities to develop new high-value food and cosmetic products based on local agricultural ingredients and to scale-up production to access foreign markets.
- Public innovation and production facilities such as those from the Scientific Research Council (SRC) already provide some support in this regard. However, the SRC's pilot plant can only support the production of small batches of products.
- There is an opportunity to complement SRC's current work by providing innovation services and public production facilities targeted towards the large-scale production of innovative food/cosmetic products for export.
- An innovation centre could support firms to develop new products and transfer of capabilities to local firms, resulting in improved performance, competitiveness and employment.

In summary, programme **objectives** are to:

- Catalyse the future growth and success of Jamaican manufacturing by helping to de-risk, accelerate and scale up new food and cosmetic product concepts to commercial reality without companies incurring significant capital costs.
- Create shared manufacturing facilities, including pilot production lines, which can be accessed by a number of local firms to scale-up their food and cosmetic production.
- Provide technical advice on how to develop and manufacture new food and cosmetic products.
- Offer advisory and support to local firms on how to enter international export markets by complying with the necessary certifications/regulations.

## Table 5.8: Food/cosmetics innovation centre – Logic model

	Objective	Input	Activities	Outputs	Outcomes	Impacts
A	Catalyse the future growth and success of Jamaican manufacturing by helping to de-risk, accelerate and scale up new food and cosmetic product concepts to commercial reality without companies incurring significant capital costs	<ul> <li>Productivity and manufacturing experts</li> <li>Experts in servicing technological aids</li> <li>Experts in product design and development</li> <li>Experts in global supply chain and export requirements</li> </ul>	<ul> <li>Provide access to equipment/ devices</li> <li>Demonstrate the use of basic productivity tools for stakeholders</li> <li>Provide cutting edge technology in food and cosmetics product design, development and production</li> </ul>	<ul> <li>Local SMEs accessing technology, using productivity tools and benefiting from troubleshooting</li> </ul>	<ul> <li>More SMEs scaling up their operations</li> </ul>	<ul> <li>Creation of opportunities/jobs</li> </ul>
	Create shared manufacturing facilities, including pilot production lines, which can be accessed by a number of local firms to scale-up their food and cosmetic production	<ul> <li>State of the art equipment and facilities that help with processing value addition</li> </ul>	<ul> <li>Feasibility studies to identify stakeholders needs</li> <li>Coordinate meetings in the local communities to provide forum for sharing ideas and challenges</li> </ul>	<ul> <li>Increased access to maintenance services for equipment and devices</li> </ul>	<ul> <li>Reduced risk associated with direct investment in equipment</li> </ul>	<ul> <li>More sustainable SMEs</li> </ul>
À	Provide technical advice on how to develop and manufacture new food and cosmetic products	<ul> <li>Register of local stakeholders</li> <li>Diagnostics platform on MSME needs</li> </ul>	<ul> <li>Acquire equipment/tools or network with relevant facilities</li> <li>Production of food and cosmetics/personal care products at central facilities for micro and small enterprises</li> </ul>	<ul> <li>Increased access to information on non- traditional markets</li> <li>Increased access to real time market information</li> </ul>	<ul> <li>Increased efficiency</li> </ul>	<ul> <li>Increased sector growth and competitiveness</li> </ul>
A	Offer advisory and support to local firms on how to enter international export markets by complying with the necessary certifications/regulations	<ul> <li>Marketing and communications team</li> </ul>	<ul> <li>Maintain information platform and online platforms for accessing services on demand</li> <li>Online access to diagnostic tool</li> </ul>	<ul> <li>Increased number of products developed and commercialised by MSMEs</li> </ul>	<ul> <li>Increased productivity</li> </ul>	<ul> <li>New business models</li> </ul>
٨	Provide access to technologies to facilitate R&D and production	<ul> <li>Links into global networks</li> </ul>	<ul> <li>Access to published research</li> <li>Workshops on sector opportunities: identification of key sub-sectors and products</li> </ul>	<ul> <li>Increased number of products entering the formal/regulated market</li> </ul>	<ul> <li>Increased sales</li> </ul>	<ul> <li>Sector coordination</li> </ul>
A	Increase productivity and generate greater output in local firms	<ul> <li>Network of researchers to conduct MSME research</li> </ul>	<ul> <li>Assistance in documentation and activities to support registration of products</li> </ul>	<ul> <li>Increased number of products entering the international/online markets</li> </ul>	<ul> <li>Better quality of products created</li> </ul>	<ul> <li>Investment attraction</li> </ul>

X	Provide capacity development and technical support	A A A	Funding: an initial annual operational budget of US\$2-3 million per year is expected based on international experience (plus capital investment to be defined during the detailed design stage). In this regard, budget calculations should be informed by using the Scientific and Research Council (SRC) as a close comparator It is expected that the Centre will offer low cost services to local MSMEs, which could constitute an important revenue stream moving forward Suggested funding structure: 2/3 from government or other institutional support (e.g. IDB); 1/3 from services revenue	A	Provide links to other essential services needed for commercialization /entering markets	A	Increase in output and sales for local MSMEs	À	More sustainable MSMEs created	*	Development of national brand/reputation for food and cosmetic products
4	Create a pipeline of investible companies	•	Policies and regulations to guide producers	۶	Provide maintenance services for devices and equipment	>	More financing provided to growers and processors	>	Access to global markets	٨	Economic diversification

## Figure 5.7: Food/cosmetics innovation centre – Summary roadmap (development vision)

	Short Term (1st year)	Mid-Term (2-5 years)	Long term (Year 6→)				
Narrative	Short-term Narrative: identify opportunities where innovation can have a great impact in: increasing productivity (efficiency), new product development (increase added value), and sustainability.	<i>Mid-Term Narrative:</i> stimulate innovation opportunities for: increasing productivity (efficiency), new product development (increase added value), and sustainability.	<b>Long Term narrative:</b> consolidate a vibrant innovation ecosystem for the Food & Cosmetic Sector (meaning the sector's growth is <b>driven by innovation</b> )				
Drivers	Identify high-value innovation opportunities (Innovation Centre focal areas)	Start operation of the Centre Increased MSEMs productivity	Sector's growth:				
(strategic goals & objectives)	Gather the necessary resources for the Centre (financial, HR, equipment, network)	Increased MSMEs added value Increased sustainability practice	"Driven by innovation"				
	Create trust among the ecosystem	# of users accessing the Centre s	ervices that has achieve % growth				
	Receive and analyse support applications (based on strategic innovation assessments and plans)	Provide access to laborato	ies and production facilities				
Activities	Engage firms and create strategic innovation assessments and plans to develop their innovation capabilities	Provide access to local and international research and technology Provide access to markets (local, international and non-traditional)					
	Align high priority opportunities / needs with market trends and research and technology capabilities	Coordinate the development of local Document intervel	research and technology in key areas. tions (case studies)				
	Build a local and international innovation network	Enhance innovation netwo	rks				
	Recruit experts and advisors for key specialisation areas	Develop expert and advisor g	roups				
Pesources	Identify and prioritise sectoral innovation opportunities	Apply innovation tool- Innovation obs	: ervatory:				
RESOULES	Research and technology inventory	kit to plan the Centre's collaboration with the 1. Continue inventor	ously update market research, technology y and innovation opportunities				
	Market research (including future trends)	companies 2. Docume	ent projects progress				
	Define the Innovation Centre's budget & fina	incing scheme (see logic model for initia	al recommendations)				

Figure 5.8: Food/cosmetics innovation centre – Implementation roadmap								
	Year 1 Vear 1 Vear 2							
	Implementation Milestones	Private sector buy-in Budget assignment	Governance framework established Strategic Plan development	Define client needs Strategic plan approved	MOUs in place with strategic partners Core staff recruited Facilities plan completed			
What needs to be done?	Who should take the lead?							
Pre-Step: Approval and Announcement	DBJ and SRC (strategy and planning support)	DBJ Approval Validation by sector stakeholders						
Strategy and business planning	DBJ and SRC (strategy and planning support)	Define legal entity type Consultation to validate concept plan Strategic plan process	Create five years business plan Financial planning	Study of client needs Sector studies	KPIs monitoring and evaluation framework			
Governance and management structure set up	DBJ and SRC (strategy and planning support)	Consider public-private partnership model	Board of Directors appointment Executive director appointment	Technical advisory group	Monitoring and evaluation framework			
Personnel, operations and organisational structure set-up	Executive manager		Recruitment plan and operational processes (inc. staff profiles)	Organisational chart and job descriptions Staff recruitment	Establish capacity building scheme Establish competences in key technology areas			
Infrastructure, equipment and location plan	Executive manager			Define location and facilities	Source necessary equipment (e.g. laboratories, pilot lines)			
Delivery of Service Portfolio	Executive manager Operational staff			Detailed design and planning of the Innovation Centre Services based on sector needs	Prepare start of operations			
Networking, alliances, sector integration and communication	Executive manager Operational staff Business development team	Potential partners: SRC; small busin association of Jamaica; manufactu association; JAMPRO; umbrella grou farmers: JIPO: bureau of standarc	ess ers p for Is	Engagement plan for sector stakeholders <b>(e.g. firms)</b>	International partnerships (e.g. UK, India)			
Others					Develop intellectual property policy			
	Funding	Define budget for planning stage	Define budget create and start the Innovation Centre	Define budget for operation stage				

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# 6. Next Steps

# 6.1 Detailed design and implementation

The evidence collected in this study suggests that, while opportunities exist to build on existing capabilities accumulated in local public and private sector institutions to support firm-level innovation in Jamaica, there are also opportunity areas to strengthen the country's national innovation system. In particular, there is a need to strengthen both the institutional infrastructure of the innovation system and the coordination of existing stakeholders and initiatives. In this regard, the policy initiatives suggested in this report need to both build on existing initiatives and capabilities within the country, as well as establish partnerships with key organisations to ensure complementarity and avoid acting as silos in a fragmented system.

The contents of this report are considered as a significant starting point to support the work of future programme managers and implementation teams in Jamaica. However, it is recognised that forthcoming work should focus on developing detailed operational guidelines and customising the initial implementation plans presented here.

In this regard, it is anticipated that next steps towards implementation of the policy initiatives discussed in this report could include the following activities (in accordance with the implementation roadmaps shown in Section 5):

- Obtain the necessary buy-in from DBJ stakeholders and, where relevant, government authorities and private sector actors to fund and support the creation of the proposed initiatives.
- 2) Assign the necessary budgets and formalise the legal status of each initiative.
- Create a governance structure for each initiative, including where relevant, a Board of Directors and Programme Managers.
- 4) Create interim delivery teams to assist the newly appointed Directors and Managers with the creation and formalisation of each initiative. These teams would help to establish each initiative prior to them having a final operating structure.
- 5) Define the required infrastructure, facilities and location plan for each initiative.
- 6) Create a detailed engagement plan for sector stakeholders.
- 7) Validate and refine the activities and services provided by each initiative (strategic business plans).
- 8) Once the funding is in place, recruit core staff and initiate annual work plans.



Appendix 1

# Consulted stakeholders

Name	Affiliation
Raquel Seville	BiBrainz
Stacey Hines	BizTech
Larren Peart	BlueDot
Melanie Williams	Bank of Jamaica (BOJ)
Elise Spencer	Bank of Jamaica (BOJ)
Ashley Bishop	Bank of Jamaica (BOJ)
Kadah Harriott	Bank of Jamaica (BOJ)
Wayne Guthrie	Bank of Jamaica (BOJ)
Dionne Clarke	CARDI Jamaica
Erica Simmons	Caribbean Maritime University (CMU)
Deborah Newland	Development Bank of Jamaica (DBJ)
Delano Walters	Development Bank of Jamaica (DBJ)
Audrey Richards	Development Bank of Jamaica (DBJ)
Christopher Brown	Development Bank of Jamaica (DBJ)
Edison Galbraith	Development Bank of Jamaica (DBJ)
Renay Johnson	Development Bank of Jamaica (DBJ)
Stephanie Reece	Development Bank of Jamaica (DBJ)
Anika Shuttleworth	EGov Jamaica Limited
Raymond Knight	Financial Services Commission (FSC)
Donna Harrilal	Financial Services Commission (FSC)
Delroy McLean	Flow Jamaica
Maureen Denton	GraceKennedy Limited
Marvin Hall	Hall of Learning Robotics
David Walcott	Infinity Partnership
Sheldon Powe	Innovate 10X
Ronald Blake	Jamaica 4H-Club
Keith Collister	Jamaica Chamber of Commerce
Diane Edwards	Jamaica Promotions Corporation (JAMPRO)
Imega McNabb	Jamaica Manufacturers & Exporters Association (JMEA)
Nadeen Matthews Blair	National Commercial Bank Jamaica Limited (JNCB)
	Ministry of Commerce, Industry, Agriculture and
Petronia Colley	Fisheries (MICAF) – REDI II
Kirk Anthony Hamilton	Destination Experience (DE)
Dwight Scott	ORBA Technology
Cliff Riley	Scientific Research Council (SRC)
Charah Watson	Scientific Research Council (SRC)
Dennis Chung	Supreme Ventures
Chris Reckord	T-Tech
Sean Thorpe	University of Technology (UTECH)
Daniel Coore	UWI Mona
Gunjan Mansingh	UWI Mona
Dmitri Dawkins	Ventures/Branson Centre
Wayne Beecher	World Bank



Appendix 2

# Logic model inputs from participants

## Digital technology advisory service and innovation voucher – Logic model inputs from workshop participants

	Objective	Input	Activities	Outputs	Outcomes	Impacts
Participant 1	<ul> <li>Develop the needs of specific sectors</li> <li>Collaborate with local private sector suppliers</li> <li>Create awareness of digital technology benefits</li> </ul>	<ul> <li>Operational budget - US\$500k to 1 million</li> <li>15 technical advisors after 2 years</li> <li>Marketing campaign (e.g. website) and office space</li> </ul>	<ul> <li>Receive and analyse support applications</li> <li>Engage firms and create digital transformation roadmaps</li> <li>Support roadmap implementation</li> <li>Provide voucher to finance projects</li> </ul>	<ul> <li>100 projects approved per year</li> <li>DT roadmaps implemented</li> <li>Vouchers awarded</li> </ul>	<ul> <li>100 firms supported per year</li> <li>Increased digital capacity/skills within firms</li> <li>Digital technologies and practices adopted by firms</li> </ul>	<ul> <li>Higher value-added products and services by local firms</li> <li>Increase international competitiveness / access to export markets</li> <li>Economic diversification away from tourism</li> </ul>
Participant 2	<ul> <li>Increase leadership understanding and capability on priority and relevance of digitization</li> <li>Create globally viable businesses</li> <li>Document and share pre and post state of companies Use data to define and guide outcomes of digital transformation initiative</li> </ul>	<ul> <li>Program partners designated resource touch points in the ecosystem</li> <li>Incentives for action (carrots) - funding; marketing; opportunities</li> <li>Roadmap or outcome tracker</li> </ul>	<ul> <li>Provide training with specific outcomes defined for participants</li> <li>Showcase, finance and network top program performers with local and overseas prospects</li> <li>Measure and document the progress of each participant</li> </ul>	<ul> <li>Business and relevant team members certified in digitisation</li> <li>Digitised, automation enabled businesses</li> <li>Useful data for program tweaking and expansion</li> </ul>	<ul> <li>100% of program participants have increased knowledge/ capability</li> <li>50 digitally enabled businesses working with local and overseas clients</li> <li>Analytics on digital transformation initiative available to stakeholders</li> </ul>	<ul> <li>Increased knowledge for business leaders</li> <li>Improved GDP</li> <li>Trust</li> </ul>
Participant 3	<ul> <li>Jamaican companies globally competitive (move up on index) – 4th Industrial Revolution</li> <li>Companies scalable and efficient</li> <li>Businesses attractive to investment capital</li> </ul>	<ul> <li>Array of grant funding</li> <li>Private capital funding</li> <li>Trained advisors/business intermediaries</li> </ul>	<ul> <li>Business restructuring/ change management</li> <li>Workshops to provide education of entrepreneurs on tech options</li> <li>Investment readiness training</li> </ul>	<ul> <li>Engagement at all levels of organizations</li> <li>Faster adoption of technologies</li> <li>Deal flow of investment ready businesses</li> </ul>	<ul> <li>Expanded exports; competitive products</li> <li>Efficient businesses; greater innovation</li> <li>Increased listings/PE investments/GDP</li> </ul>	<ul> <li>Jobs, particularly tech related</li> <li>Increased export revenues</li> <li>Private equity issuance/GDP &gt; 0.1% annually</li> </ul>
Participant 4	<ul> <li>Identify and engage stakeholders in the ecosystem. (i.e. financiers/ hubs/ entrepreneurs)</li> <li>Diversify Jamaica's heavy reliance on tourism sector with technology driven solutions</li> <li>Become more data driven in our decision making. i.e. make data more accessible</li> </ul>	<ul> <li>Government will</li> <li>Financial resources</li> <li>Expertise in data to educate</li> </ul>				

## Fintech incubator/accelerator programme – Logic model inputs from workshop participants

	Objective	Input	Activities	Outputs	Outcomes	Impacts
Participant 1	<ul> <li>Industry partnerships and experimentation.</li> <li>Companies and industries need to be accommodating of experiment and innovation.</li> <li>Universities need to redesign its educational resources to engage fit for purpose education.</li> <li>Government needs to have domain experts leading in these ministries to eliminate frictions in purposeful policy implications.</li> <li>Create a SAAS ecosystem best practices framework/platform and resell it to other countries. This innovation model gives companies rich valuations because they are distributed architecture and investors are attracted to this model</li> </ul>	<ul> <li>Establish Jamaica as an innovation hub to attract talent globally to join the local firms. Additionally, partner with various global incubators to look at their research and collaboration process to create MVP'S in the fastest ways.</li> <li>Design better funding infrastructure that is context driven. Generalised funding is inapplicable to create sustainable value. We have to identify investors who are interested in particular sectors and projects. Example impact investing, particularly in the renewable and sustainability space</li> </ul>	<ul> <li>Build go-to market channels, partners, platforms, locally, regionally and globally. The incubator should have experts in the areas of high-growth scale.</li> <li>Build technology infrastructure with the ability to scale globally without friction; and with extensibility for constant innovation.</li> <li>Partner with investors that are experienced in high-growth and scale investing. This is critical especially for SAAS companies</li> </ul>	<ul> <li>Build a culture of tech entrepreneurs who are experts in their respective industries.</li> <li>Build a shared services ecosystem to facilitate knowledge share</li> <li>Create 10 start-ups yearly. 52 training and stress-testing yearly.</li> </ul>		
Participant 2	<ul> <li>Create an ecosystem for the delivery of Fintech solutions to PSPs and DTIs, credit unions</li> <li>Foster the increased participation of MSMEs as tech providers</li> <li>Permit development of a tech hub for start-ups</li> </ul>	<ul> <li>Incentives and human resources for sector specific or industry Fintech providers</li> <li>Pipeline for MSMEs to access Capital and Bus Support services needed</li> <li>Linkages with BSOs and VCs, and customers</li> </ul>	<ul> <li>Feasibility assessment for appetite for Fintech in sector</li> <li>Fostering partnerships (regional and global supply chain inputs and support from larger Fintech mentors)</li> <li>M&amp;E</li> </ul>	<ul> <li>Graduation of Fintechs from incubator into sandboxes (Number of Fintechs that enter sandboxes annually)</li> <li>Fostering tailored solutions that drive financial inclusion via Fintech (associated lessons learnt by regulators)</li> <li>Improved access to the market share for Fintechs which can lead to better investment opportunities (positive cycle of investment)</li> </ul>	<ul> <li>Exporting of Fintech solutions that drive financial inclusion</li> <li>Proportionate</li> <li>regulation for Fintech solutions (industry specific)</li> <li>Faster time to market for Fintech providers</li> </ul>	
Participant 3	<ul> <li>Equip MSME's with tools/skills to promote innovation within specified periods of time</li> <li>Foster Partnership and an understudy program</li> </ul>	<ul> <li>Human resources categorised into following areas:</li> <li>Administration, networking/partnership, education/training</li> <li>Infrastructure</li> </ul>	<ul> <li>Guide Fintech to launch product while following legislation &amp; aligning to AML/KYC best practices</li> <li>Aid in market feasibility assessment for solutions using emerging tech</li> </ul>	<ul> <li>Entities that have come through incubator can be used as mentors/advisors for entities entering the incubator</li> </ul>		

	Objective	Input	Activities	Outputs	Outcomes	Impacts
		<ul> <li>○ Technological, legislation/regulation, clear transparent access to funding</li> </ul>	<ul> <li>Aid in implementation of required Legislation/Regulation</li> </ul>			
Participant 4	<ul> <li>Develop a compelling value- added solution for Financial Services</li> <li>Establishing Jamaica as a Regional Exporter/Producer of Financial Solutions</li> <li>Create Centres of Excellence in specific verticals to develop "Trust"</li> </ul>	<ul> <li>Robust and transparent entrance programme</li> <li>Expertise in the legal &amp; regulatory environment within which the proposal will target</li> <li>Private sector support</li> </ul>	<ul> <li>Networking and participating in high- visibility programmes</li> <li>Training in technical proposal development and access to expertise</li> <li>Provision of the technical tools for the continued development of solutions</li> </ul>	<ul> <li>Certification and accreditation</li> <li>Joint venture for a defined period, with selected institutions (private or government) for all "graduates"</li> <li>KPIs and metrics (e.g. number or percentage of participants completed, number or percentage of ventures fully funded, etc.)</li> </ul>		
Participant 5	<ul> <li>Develop an organisation that encourages and supports Fintech companies to grow and develop</li> <li>Provide technical assistance in completing feasibility studies</li> <li>Assist in stakeholder education</li> </ul>	<ul> <li>Governance and policy framework</li> <li>Highly trained technical expertise</li> <li>High capacity, reliable, redundant internet infrastructure</li> </ul>	<ul> <li>Training</li> <li>Provide business access</li> <li>Provide access to funding</li> </ul>	<ul> <li>Number of consultations held</li> <li>Number of consultations held</li> <li>Funding accessed</li> </ul>	<ul> <li>At least five startups registered over a three-year period at the least</li> <li>Local Fintech innovation to disrupt traditional financial services</li> </ul>	<ul> <li>Improved regulation through connected services</li> <li>Lower cost financial services to the consumer</li> <li>Re-alignment of traditional roles in financial services</li> <li>Retraining, retooling traditional roles after they become replaced by new Fintech tools</li> </ul>
Participant 6	<ul> <li>Provide start-ups with mentorship</li> <li>Assist businesses in their infancy to develop business models</li> <li>Provide innovators with seed capital</li> </ul>	<ul> <li>Adequate seed capital</li> <li>Mentors, industry experts</li> <li>Business model development experts</li> </ul>	<ul> <li>Launch mentorship programme: assign innovators to experienced industry players</li> <li>Business model support – training sessions</li> <li>Funding calls</li> </ul>	<ul> <li>Mentorship programme completed</li> <li>Training completed</li> <li>Receipt of applications for funding</li> </ul>	<ul> <li>Greater efficiency in processes</li> <li>Increased profitability</li> <li>Improved ability to adequately compensate employees</li> </ul>	<ul> <li>Increased ability to achieve organisation's mandate</li> <li>Increased opportunity for expansion</li> <li>Improved financial well- being of employees</li> </ul>
Participant 7	<ul> <li>Develop a programme that simplified business model</li> <li>Assist with the startup funding for new venture</li> <li>Develop an education Programme</li> </ul>	<ul> <li>Provide technical experts to assist with the development of the model</li> <li>Incentivise new business ideas</li> <li>private sector support in implementing the education program</li> </ul>	<ul> <li>Private sector engagement in facilitating new businesses</li> <li>Workshop on how to assess the funds to assist with business</li> <li>Designing targeted training</li> </ul>	<ul> <li>Number of new businesses that benefited from the development of business model</li> <li>Number of grants dispersed to assist with new business</li> <li>Education programme complete and certificate issued</li> </ul>	<ul> <li>Efficiency in the development of business model</li> <li>Increase in the number of new business and opportunity to expand business</li> </ul>	

	Objective	Input	Activities	Outputs	Outcomes	Impacts
Participant 8	<ul> <li>To provide mentorship</li> <li>To provide start-ups with funding</li> <li>To provide start-ups with proper infrastructure</li> </ul>	<ul> <li>Experienced Fintech entrepreneurs</li> <li>Access to efficient technological resources</li> <li>Regulatory framework to promote Fintech service</li> </ul>	<ul> <li>Workshops on how to access funding</li> <li>Mentorship on how to run a successful business model</li> </ul>	<ul> <li>Number of grants received</li> <li>Number of startups successfully entering a sand box</li> <li>Number of startups successfully launched out of the sandbox</li> </ul>	<ul> <li>Faster and smoother process from incubation period to being market ready</li> <li>Balance struck between regulating and promoting the sector</li> </ul>	<ul> <li>Increased financial inclusion</li> <li>Lowered use of cash</li> </ul>
Participant 9	<ul> <li>Identify customer problems</li> <li>Test ability to monetise on real customers</li> <li>Assess viable market size</li> </ul>	<ul> <li>Mobilise human capital</li> <li>Local companies to create initial opportunity</li> <li>Access to global incubators and companies</li> </ul>	<ul> <li>Prove concept with actual customers</li> <li>Pitch to investors to get seed capital</li> <li>Minimum viable product launch</li> </ul>	<ul> <li>Incorporate customer feedback into product</li> <li>Access global markets</li> <li>Access seed capital</li> </ul>		

## Food/cosmetics innovation centre – Logic model inputs from workshop participants

	Objective	Input	Activities	Outputs	Outcomes	Impacts
Participant 1	<ul> <li>To stimulate innovation</li> <li>To share cutting edge technology</li> <li>Share innovation success</li> </ul>	<ul> <li>Productivity experts</li> <li>IT Experts</li> <li>Successful innovators</li> <li>Access to laboratories</li> <li>ICT Platforms</li> <li>Engagement of stakeholders</li> </ul>	<ul> <li>Access to adaptable technologies</li> <li>Demonstrate the use of basic productivity tools to provide trouble shooting for stakeholders</li> </ul>	<ul> <li>Number of persons accessing technology</li> <li>Stakeholders using productivity tools</li> <li>Number of persons benefiting from troubleshooting</li> </ul>		
Participant 2	<ul> <li>Provide access to equipment/ devices</li> <li>Provide maintenance services for devices and equipment</li> <li>Provide real time market information</li> </ul>	<ul> <li>Inventory of small tools/devices</li> <li>State of the art Facilities that help with processing value addition</li> <li>Experts in servicing technological aids</li> <li>Register of stakeholders</li> </ul>	<ul> <li>Feasibility study</li> <li>Identify stakeholders needs</li> <li>Identify relevant technologies/ expertise</li> <li>Catalogue of stakeholders' products needs</li> <li>Acquire equipment/tools or network with relevant facilities</li> <li>Maintain information platform and online platforms for accessing services on demand</li> </ul>	<ul> <li>Increased access to technology aids among SMEs</li> <li>Increased access to maintenance services for equipment and devices</li> <li>Reduced risk associated with direct investment in equipment</li> <li>Increased access to information on non-traditional markets</li> <li>Increased access to real time market information</li> </ul>	<ul> <li>More SMEs scaling up their operations</li> <li>Increased efficiency</li> <li>Increased productivity</li> </ul>	<ul> <li>More sustainable SMEs</li> </ul>
Participant 3	<ul> <li>Provide cutting edge technology in agriculture and agro processing</li> <li>Help companies develop Seed Banks</li> </ul>	<ul> <li>Adequate tools in place to communicate information</li> <li>Critical HR to follow up on the objectives</li> <li>Critical expertise in specialisation areas</li> </ul>	<ul> <li>Training and meetings with international experts and businesses especial from developing countries</li> <li>Coordinate meetings in the local communities to provide</li> </ul>	<ul> <li>Meetings with external experts and businesses</li> <li>Meetings with local community</li> <li>Delivery of electronic routine communication</li> </ul>		

	Objective	Input	Activities	Outputs	Outcomes	Impacts
	<ul> <li>To get additional sources of funding for innovation products</li> </ul>	<ul> <li>Link into global network</li> </ul>	<ul><li>forum for sharing ideas and challenges</li><li>Send out electronic newsletter</li></ul>			
Participant 4	<ul> <li>Provide access to technologies to facilitate R&amp;D &amp; Production</li> <li>Provide technical support to facilitate R &amp;D and production</li> <li>Provide additional infrastructure for production</li> </ul>	<ul> <li>Capital injection- equipment and software</li> <li>Capacity building/ training for all players</li> <li>Policies and regulations to guide producers</li> </ul>	<ul> <li>Assistance in documentation and activities to support registration of products</li> <li>Production of cosmetics/ personal care products at central facilities for Micro and small enterprises</li> <li>Provide links to other essential services needed for commercialization /entering markets</li> </ul>	<ul> <li>Increased number of products developed and commercialized by MSMEs</li> <li>Increased number of products entering the formal/regulated market</li> <li>Increased number of products entering the international/online markets</li> </ul>	<ul> <li>Better quality of products created</li> <li>More sustainable MSMEs created</li> <li>Creation of opportunities/jobs</li> </ul>	
Participant 5	<ul> <li>Provide a facility to sustainably commercialise</li> <li>To increase productivity and generate greater output</li> <li>To enable agri-business to retool and mechanize</li> </ul>	<ul> <li>Actionable R&amp;D results</li> <li>Access to financing at competitive rate</li> <li>Policies &amp; implementation of policies</li> </ul>	<ul> <li>ID Markets: identification of key sub-sectors and products</li> <li>Agribusiness financing modality</li> <li>Business needs synchronization</li> </ul>	<ul> <li>Increase in output and sales</li> <li>Financing provided to growers and processors</li> <li>Number of users accessing the centre services that has achieved growth</li> </ul>	<ul> <li>Extent to which the programmes and policies being implemented have had the desired impact on target population</li> <li>Increase in productivity and sales</li> </ul>	
Participant 6	<ul> <li>Provide capacity development and technical support</li> <li>Provide market research</li> <li>Identify sector opportunities (including grant funding)</li> </ul>	<ul> <li>Diagnostics platform on MSME needs</li> <li>Network of researchers to conduct MSME research</li> <li>Innovation bank of sector opportunities</li> </ul>	<ul> <li>Online access to diagnostic tool</li> <li>Access to published research and action plan</li> <li>Workshops on sector opportunities</li> </ul>	<ul> <li>MSME diagnosis document</li> <li>Inclusion of market research in business development</li> <li>Number of persons in utilising sector research</li> </ul>		
Participant 7	<ul> <li>Create a pipeline of investible agri-tech companies</li> <li>Provide opportunity for research to be commercialised</li> </ul>	<ul> <li>Cutting edge equipment and facilities</li> <li>Business advisors within the Centre</li> <li>Reliable, sustainable sources of raw material</li> </ul>				



## About us

Cambridge Industrial Innovation Policy is based at the Institute for Manufacturing (IfM), a division of the University of Cambridge's Department of Engineering. CIIP brings together the Centre for Science, Technology & Innovation Policy at the Institute for Manufacturing, the Policy Links Unit from IfM Engage and the Babbage Policy Forum.

Cambridge Industrial Innovation Policy, 17 Charles Babbage Road, Cambridge, CB3 0FS, United Kingdom

ciip.group.cam.ac.uk



