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TRINIDAD AND TOBAGO



THE HUMAN  
IMAGINATION  
AT WORK  
DRIVING COMPETITIVENESS,  
POWERING INNOVATION

# Human Imagination, Innovation and Competitiveness in the Caribbean

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Canada

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## INTRODUCTION

The paper aims to identify the potential gains for the Caribbean region<sup>1</sup> of investing in a competitiveness and innovation strategy that takes into account the “human imagination” and how it relates to business growth and economic and trade diversification. The concept of the human imagination and its impact on innovation performance is a difficult indicator to measure, particularly as it relates to small states given the paucity of data and literature. As such this paper will seek to use the available statistics on research and development as well as data on competitiveness<sup>2</sup> and innovation<sup>3</sup> to illustrate the overall performance of the Caribbean region. Specific attention will be given to indicators that highlight creativity as an expression of the human imagination on the premise that “creativity accompanied by individual and social learning can lead to the successful introduction of something new and useful.”<sup>4</sup>

The rationale behind the paper is that the Caribbean has a unique economic and social heritage which impacts on competitiveness, innovation and the human imagination but like many other small states it suffers from path dependencies and forms of structural inertia in public administration and in the private sector which have an inordinate impact on creativity and entrepreneurship.<sup>5</sup> As a consequence it can be argued that Caribbean economies are not adequately structured or properly positioned to respond to both the challenges and opportunities of contemporary globalization based on the trade and economic performance in the last two decades.<sup>6</sup>

From this standpoint the paper aims to assess the competitiveness and innovation performance of Caribbean countries in the last decade, then to analyze the role of key institutions, and lastly to identify some key areas for intervention and to outline a framework for implementing a competitiveness and innovation policy agenda. Before doing so the paper gives some perspective on the issue of small state innovation in the contemporary global economic environment.

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<sup>1</sup> The Caribbean includes Antigua and Barbuda; the Bahamas; Barbados; Belize; Dominica; Grenada; Guyana; Haiti; Jamaica; Montserrat; Saint Lucia; St. Kitts and Nevis; St. Vincent and the Grenadines; Suriname; and Trinidad and Tobago.

<sup>2</sup> WEF (World Economic Forum). 2013. *The Global Competitiveness Report 2013–2014*. Hampshire: Palgrave McMillan.

<sup>3</sup> Cornell University, INSEAD, and WIPO (2013): *The Global Innovation Index 2013: The Local Dynamics of Innovation*, Geneva, Ithaca, and Fontainebleau.

<sup>4</sup> Maaja Vadi and Harald Lepisk “Creativity and Learning in Innovation Processes” in Elias Carayannis, Urmaz Varblane and Tonu Roolaht, eds. *Innovation Systems in Small Catching-Up Economies: New Perspectives on Practice and Policy*. Springer: New York, 2012:

<sup>5</sup> See Ramkissoon, Harold. (2007) “Caribbean Survival: Critical relevance of Science and Technology” *Crisis, Chaos and Change: Caribbean Development Challenges in the 21<sup>st</sup> Century*. SALISES Conference: Trinidad and Tobago, March 26-28, 2007.

<sup>6</sup> See Thomas, Clive (1994), ‘An Innovation-Drive Model of Regional Cooperation: Biotechnology and Sugar in the Caribbean’ in L. Mytelka (ed.) *South-South Cooperation in a Global Perspective* (OECD: Paris): 224.

## Small State Innovation in Context

Competitiveness and innovation are key buzzwords in development circles today. The term “human imagination” has joined the chorus too and has gained traction within business<sup>7</sup> and government circles<sup>8</sup> as industry stakeholders recognize the important contribution that original and critical thinking makes to global competitiveness and innovation performance.<sup>9</sup> In this way, perspectives on the link between innovation and competitiveness have evolved in recent years to recognize the non-technological<sup>10</sup> and creative dimensions of the innovation process.<sup>11</sup>

The ongoing global economic downturn along with the rise of the Big South (China, India, Brazil, South Africa, Mexico, and South Korea) is resulting in a process of deindustrialization, slow growth and structural unemployment, in the developing world and particularly in small states. The intersecting crises of global finance, climate change and food and energy price rises suggest an increased need for developing countries to pursue an innovation-driven growth agenda to avoid the commodity and low value-added traps, especially in the context of anemic growth among traditional trade partners in the developed market economies.<sup>12</sup>

Many developing countries are engaged in a policy discourse aimed at identifying pathways to economic transformation as the basis for revitalizing or reinventing their economies. However, much of the debate is carried on without a clear understanding of the policy challenges of latecomers and small states catching up. Small states are generally faced with small home markets; an overdependence on export markets; low levels of financial and human resources for technology development; high administrative and logistics costs; strong vested interests and high levels of rent-seeking.<sup>13</sup> From this perspective it can be argued that the literature is largely skewed towards the “experiences of countries marked by high income levels, a broad knowledge base, lengthy

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<sup>7</sup> For an elaboration of the key ideas see interview of businessman Jay Walker.

<http://thinkbusiness.nus.edu/articles/item/122-imagination-the-fuel-of-innovation>

<sup>8</sup> Tewarie, Bhoe. “From Imagination to Innovation” Commonwealth Heads of Government Meeting 2013: Sri Lanka, Colombo

<sup>9</sup> Science, Technology and Innovation Council, Government of Canada (2011) *Imagination to Innovation: Building Canadian Paths to Prosperity* (Ottawa, Ontario).

<sup>10</sup> For a historical perspective on the evolution of the linear approaches to innovation see Godin, Benoit (2006). “The Linear Model of Innovation: The Historical Construction of an Analytical Framework”. *Science, Technology & Human Values* 31: 639–667.

<sup>11</sup> OECD (2005) *Governance of Innovation Systems*. Organization for Economic Cooperation and Development, Paris, p. 19.

<sup>12</sup> See Ashwini Desphande and Keith Nurse, eds. *The Global Economic Crisis and the Developing World: Implications and Prospects for Recovery and Growth* (London: Routledge, 2012).

<sup>13</sup> See Rainer Kattel, Tarmo Kalvet and Tiina Randma-Liiv “Small States and Innovation” in Robert Steinmetz and Anders Wivel, eds. *Small States in Europe: Challenges and Opportunities*. Surrey: Ashgate, 2010: 65-85.

experience of a market economy, well-functioning markets, developed and stable institutional frameworks, and advanced infrastructures for supporting innovation”.<sup>14</sup>

In contrast, there is a growing demand for critical and global perspectives that provide ideas about how small and developing states can move from being low-cost producers to be providers of more knowledge-intensive products and services.<sup>15</sup> Another key consideration is that “development is a moving target” and that a key dimension that has to be considered at all times is the techno-economic trajectory and the shifting marketplace requirements.<sup>16</sup> This is so because often the short-term costs of transition are high relative to the benefits and as such the old ways of doing business can only be replaced once the necessary institutional changes (government regulation, organizational changes, changes in people’s life-style habits, etc.) have been effected.<sup>17</sup>

This raises the issue of innovation governance which involves a wide array of policy instruments, from the traditional trade (e.g. tariffs) tax and credit policies to policies that facilitate research and development, technological upgrading and learning, export promotion and human resource development. It also includes ancillary business support services such as in-house technical assistance and trade facilitation in terms of export promotion, marketing, sales and distribution.<sup>18</sup> Additionally, innovation governance calls for coordination mechanisms and networking opportunities for stakeholders, which allows transactional costs to be lowered, which ultimately facilitate increased market entry and reduced uncertainty and risk, especially for small and medium-sized enterprises. In short, the goal of innovation governance is to “coordinate economic change, to promote experimentation, and to preserve diversity.”<sup>19</sup>

From this perspective it is argued that “country size matters...as it is one of the key determinants for company-level innovations”. It is further argued that “the implications for innovation policy are that these policies should be built following bottom-up logic:

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<sup>14</sup> See Elias Carayannis, Urmas Varblane and Tonu Roolaht, eds. *Innovation Systems in Small Catching-Up Economies: New Perspectives on Practice and Policy*. Springer: New York, 2012. Preface ix.

<sup>15</sup> See Elias Carayannis, Urmas Varblane and Tonu Roolaht, eds. *Innovation Systems in Small Catching-Up Economies: New Perspectives on Practice and Policy*. Springer: New York, 2012. Preface x.

<sup>16</sup> Carlota Perez “Technological Change and Opportunities as a Moving Target” *CEPAL Review* (2001) 75: 109 - 130.

<sup>17</sup> See Kemp Rene and Luc Soete “The Greening of Technological Progress: An Evolutionary Perspective.” *Futures* (1992) June: 438.

<sup>18</sup> See Lall, S. (1995). “Industrial Policy: A Theoretical and Empirical Exposition” in D. Pantin, ed. *Industrial Policy and Caribbean Development*. (St. Augustine: UWI, Department of Economics, Trinidad and the Consortium Graduate School Jamaica): 7-58; and, Samuels, W. (1995). “Industrial Policy and Regionalism” in D. Pantin, ed. *Industrial Policy and Caribbean Development*. (St. Augustine: UWI, Department of Economics, Trinidad and the Consortium Graduate School Jamaica): 100-119.

<sup>19</sup> See Kosacoff, B. & A. Ramos. (1999) “The Industrial Policy Debate” *CEPAL Review* 68: 35-60.



creating local networks and scaling them up into wider networks". An interlinked three pronged approach is suggested:<sup>20</sup>

1. First, small states must build administrative and coordinating capacity in order to be able to function in and take advantage of both regional and international networks.
2. Second, policies targeting private sector efforts at innovation need to be sector, technology, and value-chain specific while keeping in mind their global natures.
3. Third, linking macroeconomic policies with innovation policies in order to be able to deal with the financial fragility inherent in free market economies is crucial for long-term sustainable development in small states.

It is here that the concept of the human imagination gains traction as it focuses on the importance of original or critical thinking as the fuel of the innovation process. It is the capacity of individuals and whole societies or social communities to "think outside of the box" that generates the basis for innovation and the potential for globally competitive entrepreneurs, firms and industrial sectors. As such the meaning of human imagination extends beyond the psychological to embody the institutional and social world as well. However, it is recognized that "new ways of seeing, doing and being" can only be implemented, sustained and updated from one historical period to another if a country has the governance framework or institutional capacity to do so. From this vantage point the question is "how can the human imagination be further inspired and supported and thus enhance innovation and competitiveness, especially in small, developing and postcolonial societies like the Caribbean, given the legacies of a rote-oriented educational system, command and control management styles, a risk-averse business culture and bureaucratic governmental systems?" These challenges are further compounded by the fact that "while there are a few good R&D institutions, often organized on a sub-regional basis, most of these countries have almost no institutional basis, except for a few universities. Regulatory frameworks, intellectual property rights institutions, and information and technical services are either weak or non-existent."<sup>21</sup>

In this regard the Caribbean region is a useful case study given that most countries have experienced a decline in share of global trade and value-added.<sup>22</sup> The explanation in part has to do with trade diversion to super-exporting economies like Mexico, Brazil, India, China, South Korea and the other East Asian economies. On the other hand, there is also a recognition that the problem relates to the fact that the level of local value-added in manufacturing, agro-processing, services and other economic activities has historically been shallow and so vulnerable to global competition. As such it is timely to consider what

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<sup>20</sup> Rainer Kattel, Tarmo Kalvet and Tina Randma-Liiv, *Small States and Innovation*. In Robert Steinmetz and Anders Wivel, eds. *Small States in Europe: Challenges and Opportunities*. Surrey: Ashgate (2010): 80.

<sup>21</sup> See Alberto Melo, *Innovation Systems in Latin America and the Caribbean*. IADB (2001). p. 45.

<sup>22</sup> See Keith Nurse, Allison Francis and Keron Niles "The EPA and Beyond: The Case for Industrial and Innovation Policy" *The Bulletin* (Special Issue on the CARIFORUM-EU Economic Partnership Agreement) (Dec 2008).

role science, technology and innovation policies can play in addressing the problem of declining global competitiveness.

### **The Caribbean Competitiveness Context**

Over the last three decades Caribbean countries have become less competitive as exemplified by a decline in export diversification and increased concentration in exports and markets. Most countries have extremely high levels of trade specialisation, such specialisation usually being in the export of low-value-added raw materials, commodities, manufacturing (e.g. clothing and electronics) and services (e.g. tourism and financial services) which have had declining terms of trade and fetch low (and volatile) prices in global markets. Tourism, which is the major service export, source of foreign exchange and main contributor to GDP and employment, also suffers from low levels of local value-added and high levels of external control. The explanation for the poor performance is not just that of the cheaper wages of key competitors. It is that the levels of local value-added in key economic activities like manufacturing, agro-processing and services have historically been shallow and so vulnerable to global competition.<sup>23</sup>

The problem of reduced economic and trade performance has become so marked that some analysts are asking the question “Is There a Caribbean Sclerosis?”<sup>24</sup> The argument is premised on the fact that the Caribbean has not kept pace with global economic growth rates and specifically with the rest of small economies. This scenario is illustrated in the competitiveness rankings of Caribbean countries along with three selected small economies, namely, Costa Rica, Mauritius and Malta. In Figure 1 Caribbean countries are compared with selected small economies and it is only Barbados that comes close to these economies. Indeed, Barbados is ranked number 47 among countries in the 2013 World Economic Forum’s Global Competitiveness Index<sup>25</sup>. Barbados is favourably placed behind Malta and Mauritius but ahead of Costa Rica. All other Caribbean countries hover closer to the 100 rank with Haiti, the only LDC in the region, pulling up the rear.

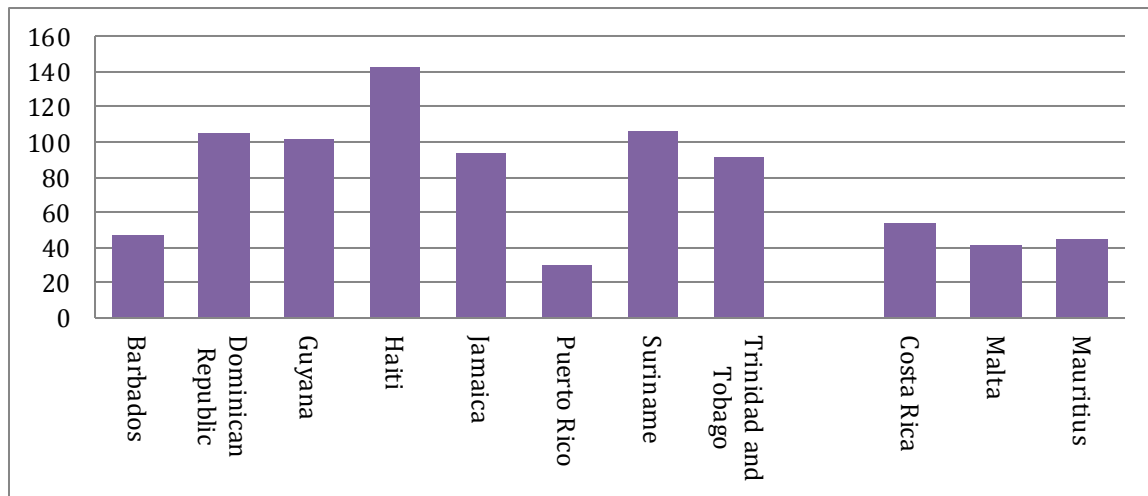
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<sup>23</sup> See Keith Nurse and Ginelle Greene “Aid for Trade and Economic Diversification: The Case of Barbados” in Marion Jansen, Mustapha Sadni Jallab and Maarten Smeets, eds. *Connecting to global markets challenges and opportunities: case studies presented by WTO chair-holders*. (Geneva: WTO, 2013): pp: 159-176.

<sup>24</sup> Ruprah, Inder; Melgarejo, Karl and Sierra, Ricardo. IDB (2014) “Is there a Caribbean Sclerosis?: Stagnating Economic Growth in the Caribbean”. (Washington, USA)

<sup>25</sup> WEF (World Economic Forum). 2013. The Global Competitiveness Report 2013–2014. Hampshire: Palgrave MacMillan.

**Figure 1: Global Competitiveness Ranking: Selected Caribbean and Small Economies**



Source: WEF 2012/13

Comparative reviews of several informational indexes illustrate varied levels of competitiveness within CARICOM countries. Utilizing the Global Entrepreneurship Model methodology it is observed that CARICOM countries are positioned at different stages: Stage 1, the factor driven stage, is one in which a country competes based on factor endowments, primarily low cost labour and natural resources. Stage 2, the intermediate or efficiency-driven stage where long-term growth increasingly depends on efficient factor markets and production processes at the firm level. Stage 3, the innovation-driven stage of development is where competitiveness is driven by efficient markets and production processes. From Table 1 below shows the relative position of several Caribbean countries. For example, it shows that Trinidad and Tobago is at the highest stage while Guyana remains at Stage 1.

**Table 1: Levels of Entrepreneurship Development within a selection of CARICOM countries**

	CARICOM countries	Other countries in this stage	Important areas of competitiveness
Stage 1 (factor driven) Income of less than US\$2,000	Guyana	India, Madagascar, Honduras, Nigeria, Pakistan, Phillipines	Basic requirements (critical) and efficiency enhancers (very important)
Transition from 1 to 2 Income of US\$2,000 – US\$3,000.00	Jamaica	Algeria, Egypt, Guatemala, Paraguay, Saudi Arabia, Venezuela	Basic requirements (critical) and efficiency enhancers (increasingly important)
Stage 2 (efficiency driven) Income of US\$3,000 – US\$9,000	Suriname	Argentina, Brazil, Peru, South Africa, Thailand	Basic requirements (very important) and efficiency enhancers (critical)
Transition from 2 to 3 Income of US\$9,000 – US\$17,000	Barbados	Chile, Croatia, Mexico, Russian Federation, Turkey, Uruguay	Same as above, but innovation factors become increasingly important
Stage 3 (Innovation-driven) Income more than US\$17,000	Trinidad and Tobago	Hong Kong SAR, Iceland, Israel, Taiwan, China, United States	All three areas important: basic requirements, efficiency enhancers and innovation factors

(Source: Sala-i-Martin et al., 2009<sup>26</sup>)

In a global context, the economies of the Caribbean also score quite poorly in the assessment of the institutional and market mechanisms that contribute to their competitiveness. Measurement of the global competitiveness landscape by the World Economic Forum in their Global Competitiveness Index<sup>27</sup> demonstrates weakness in CARICOM economies. Of the five CARICOM countries assessed in the survey, 4 out of 5 were ranked in the bottom 50 percent of the 148 countries ranked. Barbados ranked highest in the region and 47<sup>th</sup> globally leading in well-functioning and transparent institutions, well-developed infrastructure and quality education at all levels. Guyana, Jamaica, Trinidad, Haiti, Suriname, Dominican Republic excelled in a selection of indicators like effective investment incentives and mobile telephone subscribers respectively. However, the overall assessment of the economic environment of each economy is weak.

<sup>26</sup> Sala-i-Martin, X., Blanke, J., Drzeniek Hanouz, M., Geiger, T., and Mia, I. 2009. —The Global Competitiveness Index 2009–2010: Contributing to Long-Term Prosperity amid the Global

<sup>27</sup> WEF (World Economic Forum). 2013. The Global Competitiveness Report 2013–2014. Hampshire: Palgrave McMillan.

Table 2 demonstrates the diversity in competitive strengths and weaknesses faced by CARICOM countries. Examination of the five countries reveals diverse weaknesses and strengths that require different policy interventions. The few commonalities in weaknesses between the CARICOM countries analyzed are low ranking GDP (PPP \$billion) in Barbados, Guyana and Suriname. Business costs of crime and violence is also a major concern in Trinidad and Jamaica. Common strengths are efficient legal index in Barbados and Trinidad. Similarly, Guyana and Trinidad both shared effectiveness of taxation on incentives to invest.

**Table 2: Main Trends in CARICOM Competitiveness Rankings**

Country	Competitive Advantages	Competitive Disadvantages
<b>Barbados</b>	Quality of education system (6th), Soundness of banks (11th), Legal rights index (12th), Quality of transportation structure ( 15)	Trade Tariffs % duty ( 146th), Domestic market size index ( 139th), GDP (138th), Foreign Market Size Index ( 135 <sup>th</sup> ),
<b>Guyana</b>	Imports as a percentage of GDP ( 16th), Flexibility of wage determination ( 25th), Country capacity to retain talent (36th), Quality of primary education ( 36th), Effect of taxation on incentives to invest (36th)	GDP (PPP \$ billions) (141st), Domestic market size index (138th), Gross national Savings (138th), Available airline seats km/week (135th) Reliability of police services (134th),
<b>Jamaica</b>	Prevalence of trade barriers ( 22nd), Regulation of securities exchanges (28th), Legal rights index (28th), Strength of auditing and reporting standards (34th), Quality of port infrastructure (39th)	General government debt %GDP (146th), Business costs of crime and violence (144th), Organized crime (140th), Venture capital availability ( 130th), Burden of government regulation (126th)
<b>Suriname</b>	Mobile telephone subscriptions (7th), General government debt (24th), Prevalence of trade barriers (24th), Total tax rate % profits (29th), Redundancy costs, Weeks of salary (33rd)	GDP PPP\$ billions (139th), Hiring and firing practices (138th), Mobile broadband subscriptions (136th), No. of procedures to start a business (135th) Internet access in schools (131st)
<b>Trinidad and Tobago</b>	Legal rights index (12th), Effect of taxation on incentives to invest (21st), Effect of taxation on incentives to work (22nd), Strength of investor protection (25th), Mobile telephone subscriptions (28th)	Business costs of crime and violence (145th), Cooperation in labor-employer relations (134th), Burden of customs procedures ( 133rd), Government procurement of advanced tech products (130th), Favouritism in decisions of government officials (125th)

Source: WEF 2012/13<sup>28</sup>

<sup>28</sup> WEF (World Economic Forum). 2013. The Global Competitiveness Report 2013–2014. Hampshire: Palgrave McMillan.

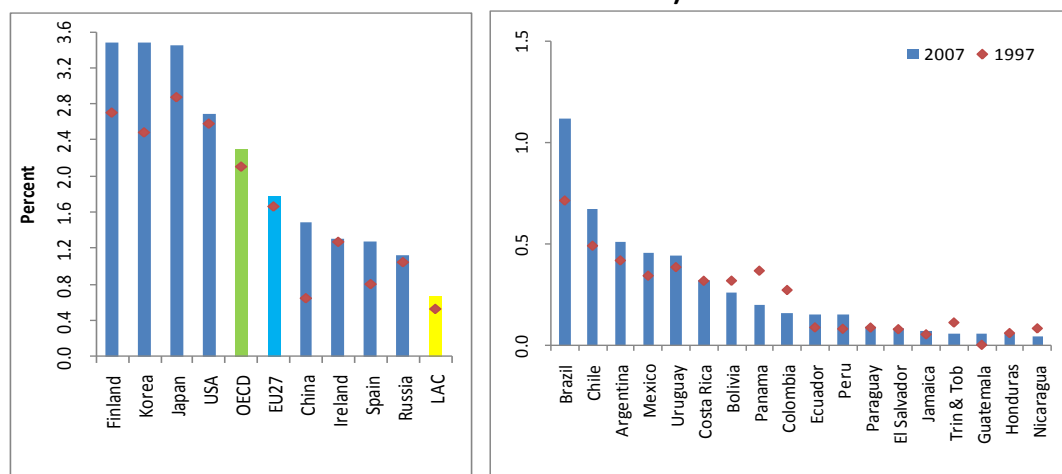
The design of a competitiveness agenda for the economies within CARICOM will likely require a variation of policy tools from country to country, and include actions tailored to each country's specific area of interest. However, decision makers in the region may find it useful to examine the regional strengths and weaknesses for the purpose of benchmarking against the best performers. This would allow decision-makers to identify and learn from best practices in selected dimensions of competitiveness with the intent to utilize this information to tackle their countries' competitiveness shortcomings at the national level.

### **Caribbean Innovation Performance**

There have been efforts in a few countries in the Caribbean region to address this problem and to move towards a more proactive and systemic approach to industrial upgrading as exemplified by national innovation systems or foresighting initiatives. For example, UNCTAD examined the potential of national innovation systems in Jamaica in the late 1990s. Jamaica and Trinidad and Tobago have conducted foresight studies in the 2000s. Barbados has lead with the establishment of a Productivity Council and some of the small economies from the Eastern Caribbean are currently exploring this option.

The question at hand is how to measure impact and outcomes from these investments. In the STI literature R&D expenditure as a share of GDP is used as important indicator of a country's investment in STI and often viewed as a proxy for commitment to innovation systems. When countries from the region (Jamaica and Trinidad and Tobago) are compared with developed market economies and countries from Latin America it is evident that investment levels in R&D are low and declining (see Figure 2). Jamaica's investment though low has remained constant between 1997 and 2007 at approximately 0.10 percent of GDP. Trinidad and Tobago's investment has dropped in the same time period from approximately 0.15% to 0.10%. These two Caribbean are ranked way behind the OECD average of 2.2%, the LAC average of 0.40% but just ahead of Guatemala, Honduras and Nicaragua.

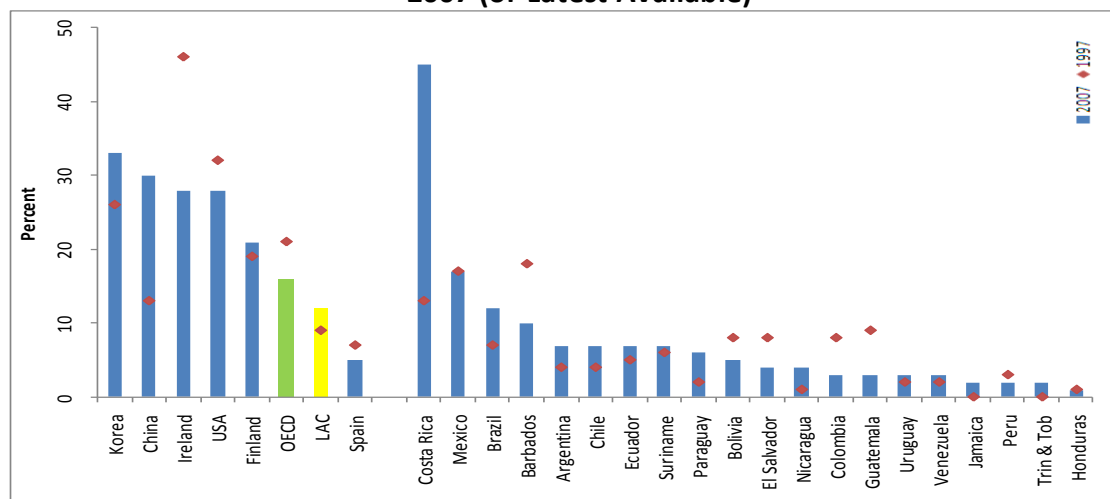
**Figure 2: R&D Expenditure as a Percentage of GDP 1997 (or Nearest Available) and 2007 (or Latest Available)**



Sources: OECD Main Science and Technology Indicators 2009-1; (MSTI) and RICYT.

Another key indicator of STI performance is share of high technology exports in manufactured exports. Here again the Caribbean region ranks lowly with the exception of Barbados which is in the top four after Costa Rica, Mexico and Brazil. Barbados' performance dropped significantly from 1997 to 2007 from approximately 18% to 10%, the biggest fall among LAC countries. Suriname is in the middle of the LAC rankings with a steady 8% share over the period. Jamaica and Trinidad and Tobago are close to the bottom of the rankings with approximately 2-3% shares in 2007 which was an improvement over 1997 figures. In comparison the LAC and OECD averages are 12% and 16%, respectively.

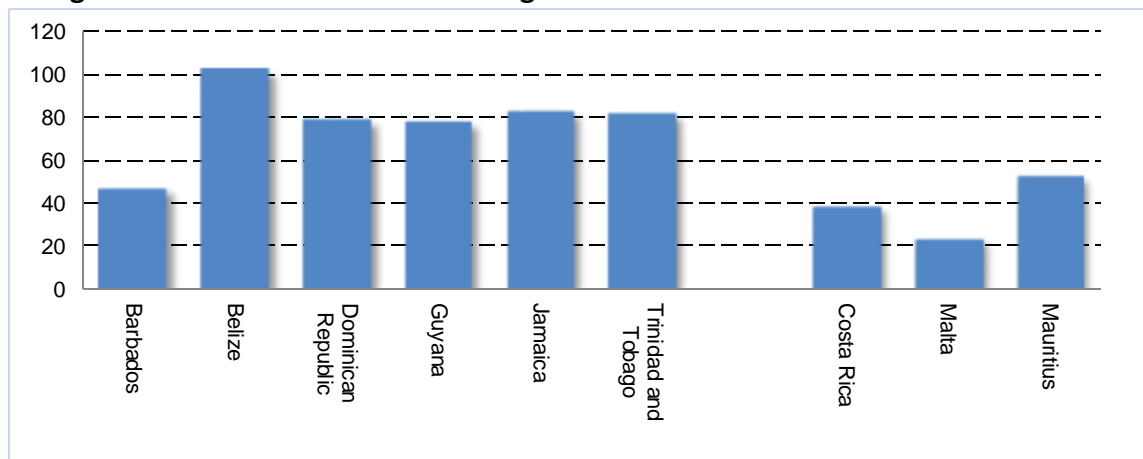
**Figure 3: High Technology Exports (as a Percent of Manufactured Exports) 1997 and 2007 (or Latest Available)**



Source: World Development Indicators.

More up-to-date data on selected Caribbean and small economies is available in the 2013 Global Innovation Index as depicted in Figure 4. Barbados is the highest ranking country from the Caribbean with a score of 47. It is the only Caribbean country ranked close to small economies like Costa Rica, Malta and Mauritius that are often viewed as successful countries that are engaged in technological upgrading. Barbados is ahead of Mauritius, whose rank is 53 but behind Costa Rica and Malta, that are ranked 39 and 24, respectively. All the other Caribbean countries are hovering around the 80 rank with Belize being the outlier and lowest ranked Caribbean country at 102.

**Figure 4: Global Innovation Ranking: Selected Caribbean and Small Economies**



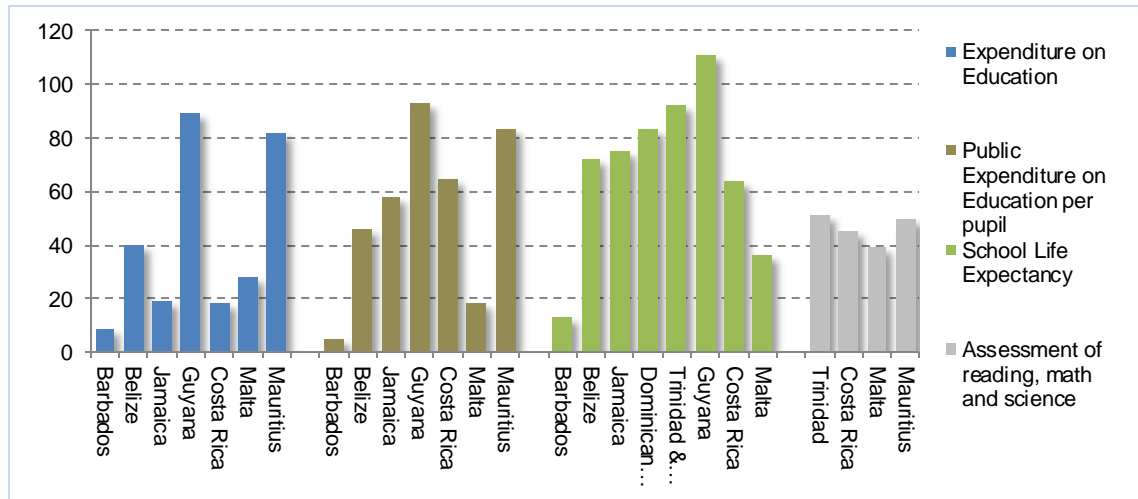
Source: Global Innovation Index 2013

The available data measuring the level of innovation infrastructure of Caribbean economies reveals consistently average scores when ranked among countries globally. The GII rankings demonstrate that Caribbean countries are weak in key innovation frameworks, score lower in the production of creative goods and export fewer high technology goods when compared to other economies.

Innovation performance in the Caribbean is not a uniform experience. As exemplified by the rankings there are differing degrees of advancement in certain indicators for various countries. A key example is that of education expenditure. Education plays an important role in the innovation infrastructure within each country. The economies of the Caribbean rank moderately in the development of education infrastructure with the exception of Barbados which ranks in the top 20 for expenditure on education (9), public expenditure on education per pupil (5) and school life expectancy (13) (See Figure 5). Jamaica also scored well in expenditure on education (19). The Caribbean countries ranked scored within the top 50 percent for expenditure on education. While all, with the exception of Barbados, ranked in the bottom 50 percent in the measure of school life expectancy. When compared to similar small economies like Costa Rica, Malta and Mauritius these countries also struggled with low school life expectancy with the exception of Malta which ranked 30<sup>th</sup>. Expenditure on education is also ranked in the top 50 percent with the exception of Mauritius.



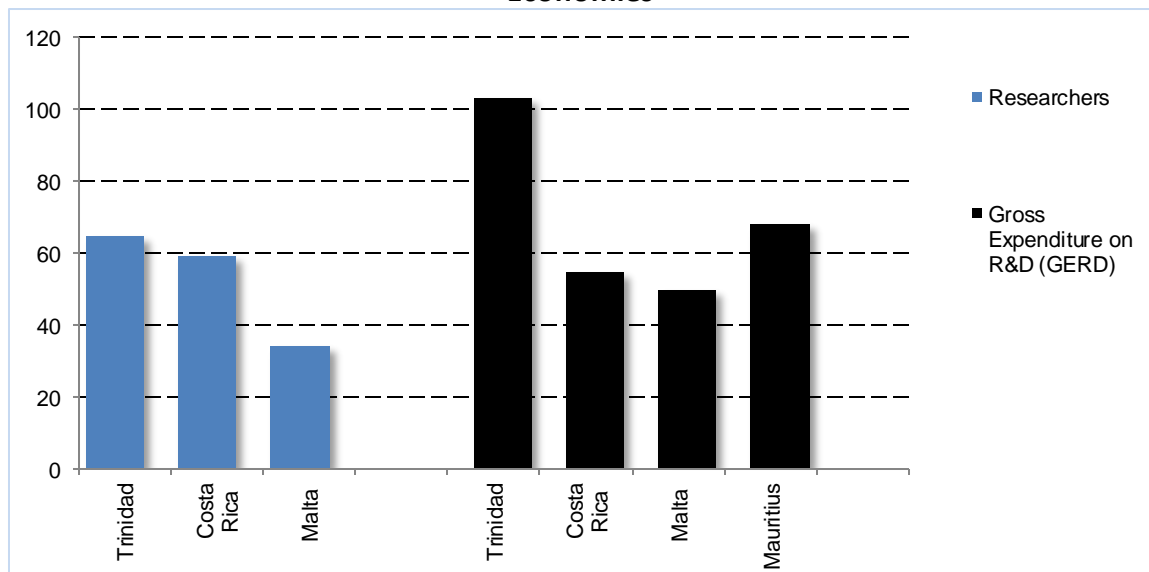
**Figure 5: Global Ranking of Education: Selected Caribbean and Small Economies**



Source: Global Innovation Index 2013

Analysis of the state of progress of Research and Development in the Caribbean is constrained due to lack of reporting (See Figure 6). Data available for Trinidad and Tobago demonstrate that the total number of researchers available and the Gross Expenditure on Research and Development is ranked in the bottom 50 percent of all countries that reported.

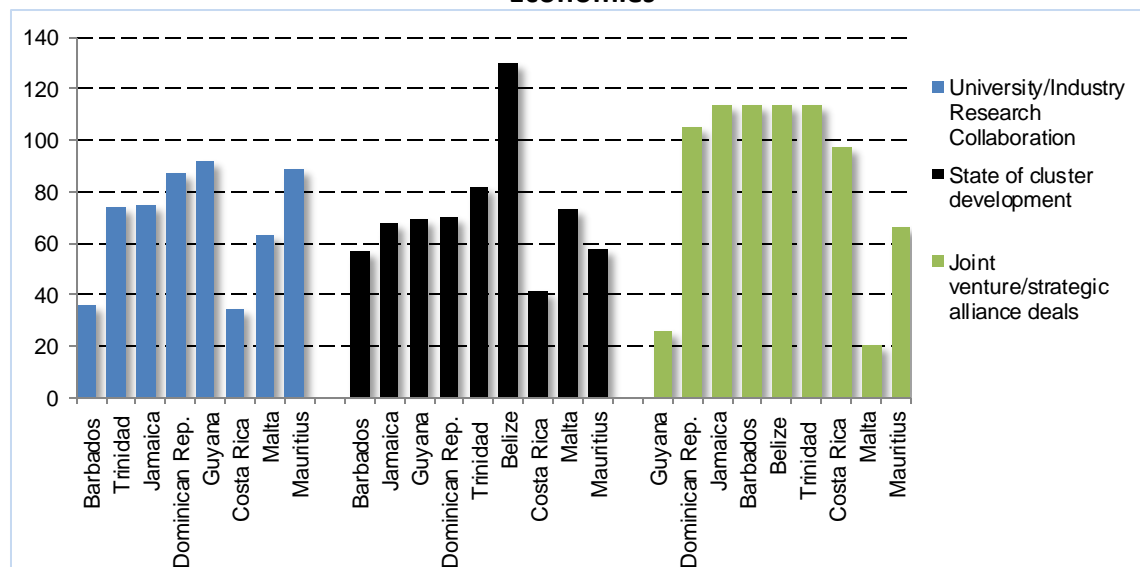
**Figure 6: Global Ranking of Research and Development: Selected Caribbean and Small Economies**



Source: Global Innovation Index 2013

The GII sought to analyze the Innovation Linkages (See Figure 7) at a country level by measuring *University/Industry Research collaboration*, the *state of cluster development*, *joint venture/strategic alliance deals* and *Patent families filed in three offices*. Characteristically, Trinidad, Jamaica, Dominican Republic and Guyana ranked in the bottom 50 percent in *University/Industry Research collaboration*. Barbados alone scored in the top 50 percent (36). Similarly, the reporting Caribbean countries scored in the bottom 50 percent of countries ranked in assessment of the *State of cluster development* except Barbados (57) and also scored in the bottom 50 for *Joint ventures/strategic alliance deals* with the exception of Guyana (26).

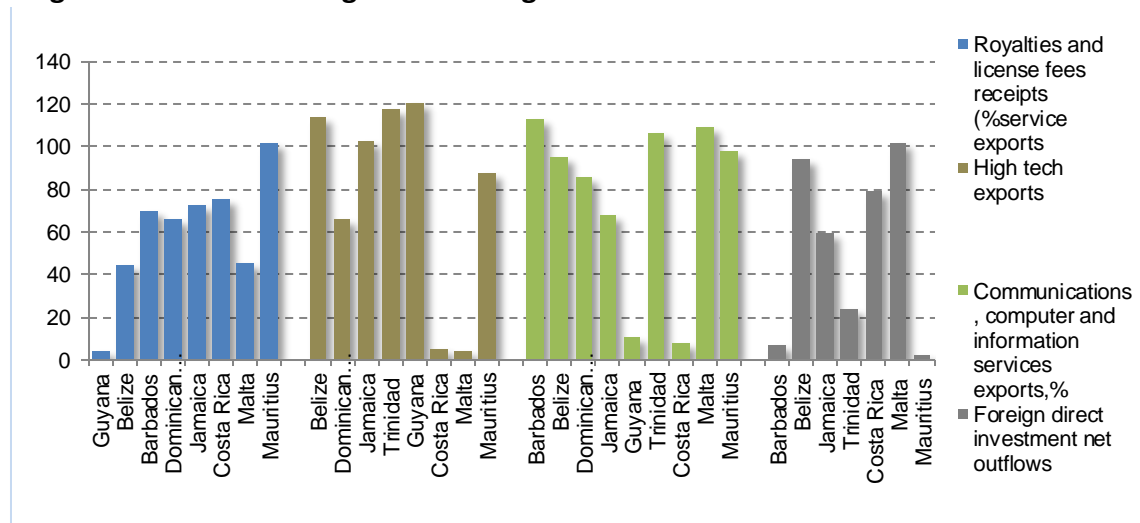
**Figure 7: Global Ranking of Innovation Linkages: Selected Caribbean and Small Economies**



Source: Global Innovation Index 2013

Assessment of overall *Knowledge diffusion* (see Figure 8) within the Caribbean reveals an average ranking by Barbados, Belize, Dominican Republic, Jamaica and Guyana in assessment of *royalties and license fees receipts*, *high tech exports*, *communications*, *computer and information*. For each of these categories the Caribbean countries assessed were ranked in the bottom 50 percent with few exceptions. Specifically, Guyana and Belize ranked in the top 50 percent of countries assessed in *export of royalties*. Guyana and Jamaica scored in the top 50 percent in assessment of communications, computer and information services exports. Interestingly, Barbados, Jamaica and Trinidad ranked in the top 50 percent of *foreign direct investment net outflows*.

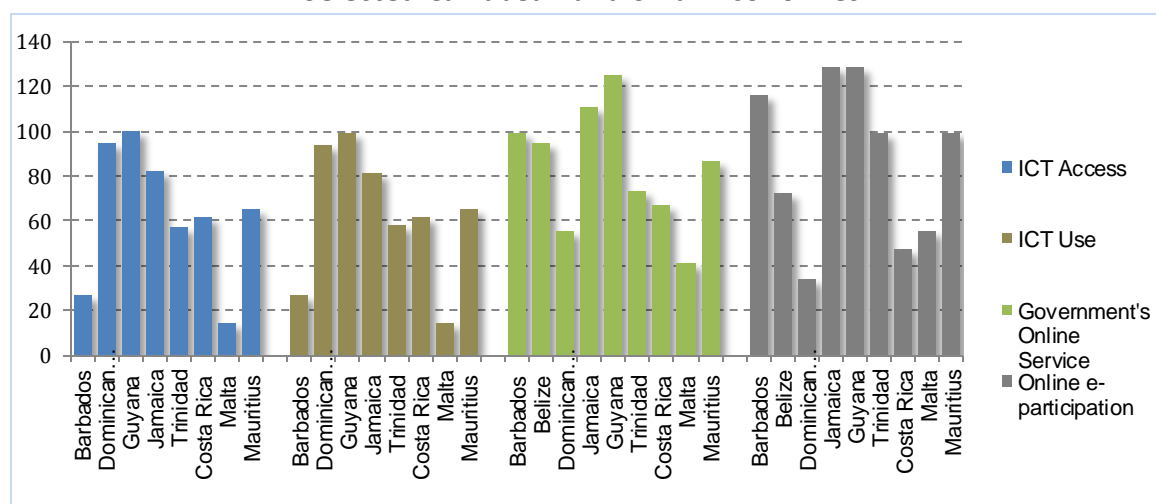
**Figure 8: Global Ranking of Knowledge Diffusion: Caribbean and Small Economies**



Source: Global Innovation Index 2013

Rankings in the Global Innovation Index reveal that Information and Communication Technology (ICT) infrastructure in the Caribbean is also relatively variable but weak overall (See Figure 9). Barbados, Dominican Republic, Guyana, Jamaica and Trinidad were ranked on ICT Access, ICT Use, Online Service and Online Participation. Of these indicators 4 of 5 countries scored in the bottom 50 percent when ranked in Government Online Service and Online e-participation. The Dominican Republic scored within the top 50 percent of countries surveyed. Ranking of ICT Access and ICT Use were also moderate with 3 of 5 countries scoring in the bottom 50 percent. Barbados and Trinidad ranked in the top 50 percent in both ICT Access and also in ICT Use.

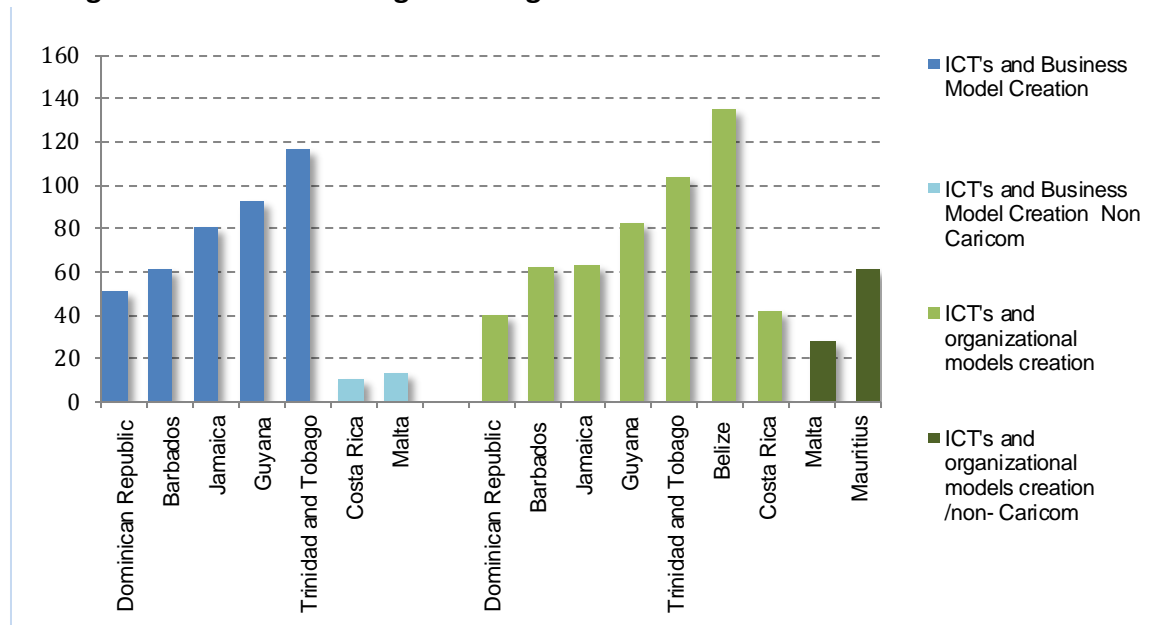
**Figure 9: Global Ranking of Information and Communication Technology: Selected Caribbean and Small Economies**



Source: Global Innovation Index 2013

Overall assessment of the Intangible Assets in Barbados, Jamaica, Guyana and Trinidad revealed rankings below 50 percent in *ICT's and Business model creation* and *ICT's and organizational models creation* (See Figure 10). In both rankings Barbados and Dominican Republic ranked highly in the top 50 percent of all countries ranked.

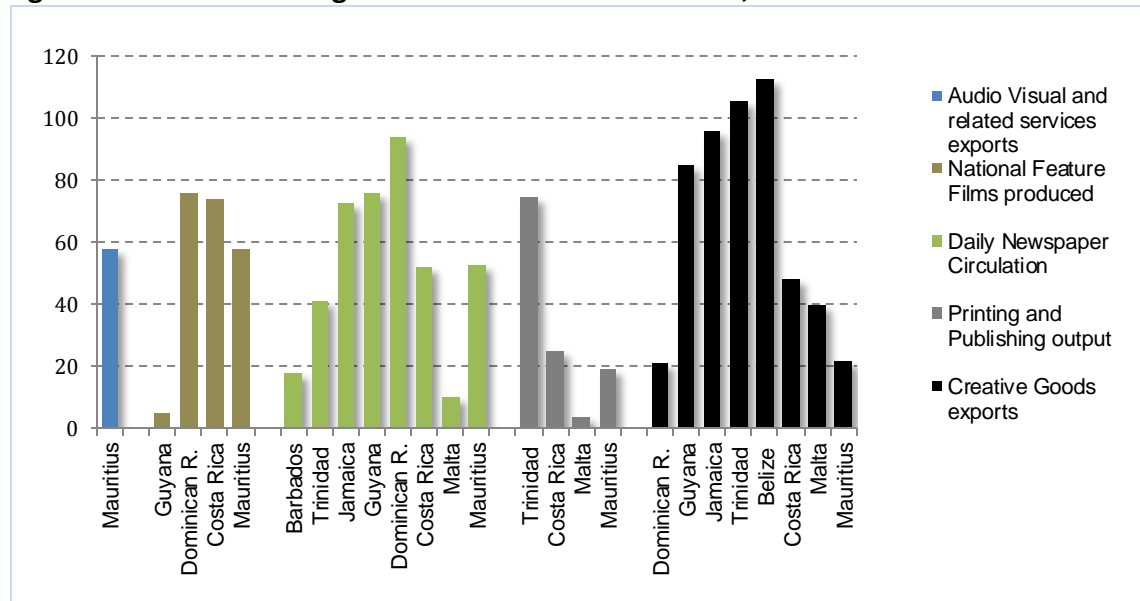
**Figure 10: Global Ranking of Intangible Assets: Selected Caribbean Countries**



Source: Global Innovation Index 2013

Assessment of creative goods and services rankings (see Figure 11) reveal note-worthy ranking of Guyana in production of *National feature films* which ranked 5<sup>th</sup> globally. Barbados ranked competitively (18) in *Daily newspaper circulation* while the Dominican Republic ranked 21<sup>st</sup> out of in *Creative goods exports*.

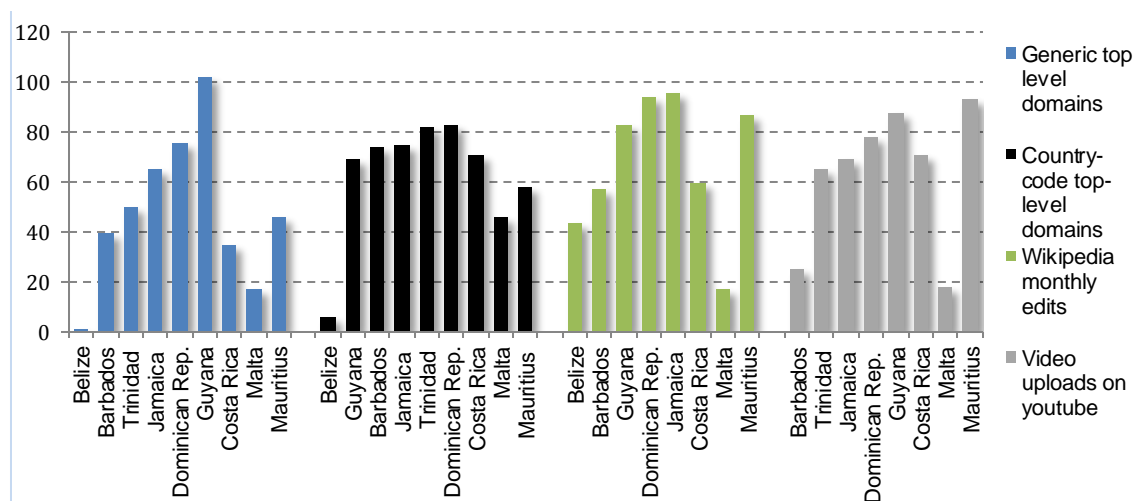
**Figure 11: Global Ranking of Creative Goods & Services; Selected Caribbean Countries**



Source: Global Innovation Index 2013

Assessment of online creativity on a country-level (See Figure12) revealed competitive rankings by Belize in the production of *generic top-level domains* and *country-code top-level domains* with rankings of 1<sup>st</sup> and 6<sup>th</sup> respectively. Notably, outside of Belize, Guyana, Jamaica, Trinidad and the Dominican Republic ranked in the bottom 50 percent in production of country-code top-level domains.

**Figure 12: Global Ranking of Online Creativity: Selected Caribbean Countries**



Source: Global Innovation Index (2013).

## The Role of Governments and Donors

Many Caribbean Governments invest little or negligible levels of public expenditure on R&D and innovation programs due in part to fiscal constraints as well as on account of the weak demand for innovation among the private sector. In spite of this many Governments still initiate some form of science, technology or innovation policy albeit small in nature. The four Caribbean countries examined below each have some form of innovation or competitiveness policy to improve innovation or competitiveness within a certain timeline.

### *Trinidad and Tobago*

The Government of Trinidad is focused on improving competitiveness through the institution of long-term innovation policy in which Trinidad will attempt to advance into the grouping of industrialised countries by 2020 through the use of science, research and development, technology, quality, innovation and entrepreneurship. The strategy for execution of this policy is: i) the development of a well-educated, adaptable and technologically capable population ii) support in training and research iii) investment in research and technology, particularly industry driven research and development supported by the national Science, Technology and Innovation institutions.<sup>29</sup>

Table 3 provides data on R&D expenditure in Trinidad and Tobago for the period of 2006 – 2011. When this period is compared with the 1999 – 2004 period the percent of expenditure dedicated to R & D in higher education has significantly improved. While expenditure dedicated to research institutions and government enterprises has declined. Similarly, R & D as a percentage of GDP declined from a peak of 0.06 percent to 0.04 percent.

**Table 3: R & D Expenditure by Sector (TT \$M) 2006 – 2011**

Sector	2006	2007	2008	2009	2010	2011
Higher education	26.3	26.5	16.2	25.1	28.7	26.08
Research institutions	20.2	22.1	15.7	17.6	19.8	21.98
Government departments	17.6	14.3	21.9	26	18.9	17.54
Total	64.1	62.9	53.8	68.7	67.4	65.5
R&D/GDP	0.06	0.05	0.03	0.05	0.05	0.04

Source: NIHERST Survey of S&T Indicators 2011<sup>30</sup>

### *Jamaica*

<sup>29</sup> National Task Force for Science, Technology and Innovation Policy (2000) "A National Policy on Science, Technology and Innovation for Trinidad and Tobago: Into a New Era of Industrial Competitiveness and Human Development" (Trinidad and Tobago)

<sup>30</sup> NIHERST (2006) Science and Technology Indicators 2000 – 2004. (Port-of-Spain: NIHERST)

The Jamaican Government has historically borne the burden of maintaining and establishing a functional Science and Technology system due to the small and weak nature of its' private sector. A large majority of advanced training in science and R&D take place within Government institutions. The first S&T policy in Jamaica was promulgated in 1960. Since then S&T entities including the Scientific Research Council (SRC) and National Commission on Science and Technology were established. The aim of Government policy since 2005 has been to utilize science and technology policy to augment the 2015 vision to "create a prosperous and dynamic Jamaica". Some of the key strategies for doing so are to : i) develop flexible policies to boost learning, acquire new skills and access unfolding knowledge ii) improve substantially the allocation of funds to S&T and R&D activities by reforming the present budgetary process iii) Participate in international partnerships to make-up for the islands small size and limited resources.<sup>31</sup> The strategy has led to adoption of more than fifty (50) national product and service standards, an increase in the number of conformity assessment bodies accredited to ISO/ IEC and the attainment of 'consolidated state of the practice' status by the International Centre of Environmental and Nuclear Sciences for its Nuutron Activation Laboratory.<sup>32</sup>

### *Barbados*

Innovation policy and innovation development in Barbados is administered by the National Council for Science and Technology (NCST) Barbados, a division of the Ministry of Industry, International Business, Commerce and Small Business Development. The main functions of the NCST in Barbados are to: i) collect, collate and review Science and Technology information and ii) to coordinate scientific research and development in Science and Technology Information. The NCST implements several programmes and policy aimed at promoting these objectives. Specifically, the NCST work to implement: i) lecture/debating series designed to increase public awareness especially youth of the importance of innovation ii) implementation of projects aimed at popularizing science iii) promotion of Annual Caribbean Youth Science Forum to young Barbadian scientists iv) Production of a science and technology publication entitled "The Monitor" which is designed to provide a mechanism through which S & T professionals and technologists will have the opportunity to publish articles on topics of S&T interest locally. Although the NCST Barbados is a Government Department/Agency, several of the Agencies projects were funded by the Department of Scientific and Technological Affairs, Organization of American States. The Ministry of Education, Science, Technology and Innovation (METI) supplements this effort through formulation of educational and human resource development policies.<sup>33</sup>

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<sup>31</sup> National Commission on Science and Technology (2005) "Science and Technology for Socio-Economic Development: A Policy for Jamaica" (Kingston, Jamaica)

[http://www.cepal.org/iyd/noticias/pais/7/31467/Jamaica\\_Doc\\_2.pdf](http://www.cepal.org/iyd/noticias/pais/7/31467/Jamaica_Doc_2.pdf)

<sup>32</sup> Planning Institute of Jamaica (2014) "Economic and Social Survey Jamaica 2013"; pp. X

<sup>33</sup> National Council for Science and Technology Barbados. [www.ncst.gov.bb](http://www.ncst.gov.bb)

## *Guyana*

In 2006 the Government of Guyana implemented their National Competitiveness Strategy. The strategy seeks to “enhance national competitiveness” through the implementation of 122 actions and planned activities. These actions were to be implemented through regular activities of various Government agencies and private sector actors, through existing programs like the Guyana Trade and Investment Support (GTIS) and the Agricultural Support Services Program etc. Interestingly, several of the existing programs utilized by the Guyanese Government to implement improved competitiveness are funded by the European Union for e.g. the EU Support to the Competitiveness of Rice Industry in the Caribbean, private sector support programs and numerous infrastructure projects.<sup>34</sup>

In the Caribbean, often even the limited innovation and competition strategies introduced by local Governments are funded through international donors, again highlighting the reality that government funding of innovation policy is constrained/weak.

A significant share of the funding that has been invested in the innovation framework across the Caribbean comes from international development agencies, international donors and international businesses. Funding from these agencies has filled a gap where local governments and private sector associations have been unable to offer support. Table 4 below shows a selection of initiatives designed to improve the innovation and competitiveness infrastructure within the Caribbean.

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<sup>34</sup> Government of Guyana (2006) “Implementing the National Competitiveness Strategy: Action Plan and Institutional Arrangements” (Georgetown, Guyana).



**Table 4: Selection of Private Sector Innovation Initiatives Implemented across the Caribbean**

Initiative	Applicable Countries	Donor	Details
Enterprise Innovation Challenge Fund	CARICOM countries	Compete Caribbean	\$US13.3 million to stimulate dynamic behavior within the private sector. The Program provides matching funds and grant financing of up to US\$500,000 to firms and clusters that seek to implement innovative, replicable and scalable business models with high potential for growth, exports and employment.
Caribbean Regional Entrepreneurial Asset Commercialization Hub (REACH)	CARICOM countries	IDB**	US\$1,070,000 to foster innovation and competitiveness in Caribbean SMEs through training and mentorship programs geared at assisting SMEs in commercializing their intellectual assets (technology transfer, creative industries, and product branding).
Innovation Fund for the Americas	Caribbean and Latin America	USAID	US\$ 100,000 to US\$ 15 million per project in funds utilized to address deteriorating citizen security, poor educational outcomes, high levels of youth unemployment, and extreme vulnerability to natural disasters in the Latin America and the Caribbean.
Caribbean Innovation and Entrepreneurship Project	English Speaking Caribbean	OAS funded project	Project designed to facilitate the generation and dissemination of new knowledge, technology transfer and experience exchange in innovation in business.
S & T Foresighting and Innovation Mapping Project	10 English Speaking Caribbean countries	OAS funded project	US \$220,527 to create a Solution-oriented process to help countries look at the future of science and technology in relation to business sectors and hence encourage the development of science, technology and innovation priorities in small countries.
Microsoft Innovation Centre	Jamaica	Private Sector Company: Microsoft Jamaica	Stimulate the local software economy in Jamaica
Improving Innovation Capacities in the Caribbean Project	Caribbean Countries	European Union	US\$ 1, 091,070 million to address low levels of innovation in the Caribbean. The project aimed to introduce entrepreneurship and creative problem solving to create an interest in science, technology and innovation.
The Improvement of Research and Innovation management capacity in Africa and the Caribbean for the successful stimulation and dissemination of research results	Caribbean Countries	European Union	US\$ 3, 547,000 million to strengthen the capacity of research institutions in the regions towards sustainability of research outputs and effective management of research and innovation activities.

\*\* In the approval phase. Project slated to begin 2015.

## Towards a Proactive Regional Innovation System

The above list of investments could be best described as “Aid for Innovation” projects which aim to address critical gaps in the innovation process. However, it is generally recognized that these efforts are ad-hoc and un-coordinated and so the return on these investments are often less than desired. A sector-wide approach to investment in innovation in the region is an important corrective to address this particular challenge. This would require greater levels of partnership and ownership by Caribbean governments. This would foster a more proactive approach to STI among Caribbean governments. Moreover, a regional innovation system would be the preferred modality given the small market size in most Caribbean territories. This would allow for some critical mass to be achieved as well as encourage collaborations, the creation of networks and foster learning across borders. The benefits of a regional innovation system are even more poignant where there is a predominance of SMEs as is the case in most sectors in the Caribbean economy.<sup>35</sup>

Another key issue is that a more demand-driven approach focused on the needs of business should be adopted. The essence of the argument is that we need to shift the paradigm away from the supply-push framework that dominates the landscape to one where an understanding of markets, sectors and products shapes the industrial upgrading and innovation policy agenda. In this regard, cluster development and value chain integration represents important mechanisms for small firms to overcome some of the challenges associated with diseconomies of scale. For example, it is observed “for small firms in less developed countries, participation in value chains is a means of obtaining information on the needs of global markets and of gaining access to those markets”.<sup>36</sup> Participation in clusters and GVCs are no panacea. For instance, it is argued that at the same time that global production is being fragmented and made accessible to a wider range of producers so are some of the production segments becoming more commoditized due to “low barriers to entry, global oversupply and declining terms of trade”.<sup>37</sup> This suggests that the real issue at hand is how to move up global value chains or facilitate industrial upgrading.

In this regard, it is increasingly recognized if not accepted that FDI and the participation of large domestic firms have not been sufficient to shift the path dependencies of most Caribbean economies and that a more dynamic and proactive policy agenda is required to break out of the commodity traps that are evident even in GVCs. The promotion of

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<sup>35</sup> Leonardo Pineda “Inter-Institutional Coordination as the Basis Function of Regional Innovation Systems” in *SMEs as a Factor for Integration: 35 Years of Sustained Efforts by SELA*. Caracas: SELA, 2011: 89-107.

<sup>36</sup> Carlo Pietrobelli and Roberta Rabellotti, eds. “Clusters and Value Chains in Latin America: In Search of an Integrated Approach” in *Upgrading to Compete: Global Value Chains and SMEs in Latin America*. Washington DC: IADB 2006: 1-40.

<sup>37</sup> Alessia Amighini “Upgrading in International Trade: Methods and Evidence from Selected Sectors in Latin America” in Carlo Pietrobelli and Roberta Rabellotti, eds., *Upgrading to Compete: Global Value Chains and SMEs in Latin America*. Washington DC: IADB 2006: 222.

innovation-driven enterprises (IDEs) is viewed not as a replacement but a complement to foreign firms and large local corporations because IDEs “retain high technology capabilities in the country and to lure back the scientific, technological and entrepreneurial diasporas.”<sup>38</sup> In effect, what is being proposed are institutional arrangements to facilitate the growth of startup companies.

At the 2013 Caribbean Growth Forum many of these issues were raised. The overarching recommendation was that there was a need to strengthen institutional platforms for innovation, productivity and skills development. The main recommendations that were discussed included the following areas<sup>39</sup>:

1. Public sector innovation was identified as a core issue given the important role of the government in shaping and guiding innovation policy, especially in small and developing countries. There was a general view that this was a priority area and that there was a huge gap in the policy framework hence the need for concerted effort in this arena.
2. The facilitation of industry associations was viewed as an important element of a forward-looking policy agenda in that advocacy, lobbying and networking were considered key building blocks for industrial transformation.
3. One of the core challenges for small states is the issue of scale. Most firms in the Caribbean region are too small to be globally competitive as stand-alone firms. In this regard it was suggested that more should be done to facilitate the growth of partnerships, shared ownership, collaborations and cluster development.
4. Funding start-ups was identified as critical area for promoting local investment and generating innovation in public policy. There was a clear view from the workshop that any innovation, productivity agenda should focus on enterprise development. An important distinction was made between small and medium enterprises (SMEs) and innovation-driven enterprises (IDEs). There was a view that the region was under-investing in the latter and that the policy agenda should correct this and facilitate the growth of IDEs. There was also a view that initiatives focused on venture capital and angel investors had not worked in the region thus far and so alternative approaches had to be sought, for example, incubators, crowd-funding or shepherding models.
5. A number of firm level recommendations were also made which were considered critical to generate the required synergies in the innovation eco-system. For

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<sup>38</sup> Carlota Perez “Towards the Latin American SME of the Future: Technological Dynamics and Social Inclusion” in *SMEs as a Factor for Integration: 35 Years of Sustained Efforts by SELA*. Caracas: SELA, 2011: 120.

<sup>39</sup> Keith Nurse “Report on Regional Skills and Productivity Thematic Area” Caribbean Growth Forum 2013, Regional Workshop, The Bahamas, 24-25 June 2013: 9-10.

example, it was argued that most Caribbean firms don't know how to collateralize intellectual property, know how to manage risk and know how to maximize on ICTs, Apps and mobile technologies. In this regard, entrepreneurial training was viewed as a critical area for development.

### **Areas for Intervention**

The above analysis of competitiveness and innovation performance and the role of governments and donors suggests that the policy agenda needs to embrace a holistic approach where enterprise development and policy development are promoted in concert. This calls for the integration of the three phases in the innovation chain: the research and development elements, the market demonstration and commercialization process, and lastly, the market accumulation and diffusion component. Whereas the first phase normally attracts some public investment in terms of research and development funding this is considered to be not sufficient if the demand-side policies are not in place. Similarly there is less chance of success if there is limited scope for market demonstration/commercialization. Indeed, the latter aspect is described as the 'technology valley of death' because the middle phase of the innovation chain often evades investment by both the public and private sectors.<sup>40</sup> It is here that both public policy and private sector initiatives and partnerships are greatly needed.

In the following sub-sections the facilitation of IDEs is looked at through the lens of hackathons to illustrate how the human imagination can be embodied in new business models and practices. Strategic government procurement is also examined to show how governments can play a more dynamic role in stimulating and supporting an innovation eco-system that taps into the human imagination.

#### *Imagination Competitions as a catalyst for Innovation*

A recent and effective trend has emerged which directly links imagination to innovation. Within the private and public sector internationally, organizations are engaging with their community to develop imaginative ways of solving existing organizational problems through what is called a 'hackathon'. The Hackathon is a competition that brings people with a range of skills together, typically for a day of brainstorming in which participants collaborate to craft solutions to real-life problems facing real organizations. The winning idea/innovation is utilised by the organization to solve the organization's problem. The result of the hackathon is emergence of innovative new procedures, products or services that solve a pre-existing problem. Originally, Hackathons were specifically geared toward computer programmers and others involved in software development,<sup>41</sup> however the

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<sup>40</sup> See Murphy, L., P. Edwards (2003) *Bridging the Valley of Death: Transitioning from Public to Private Sector Financing* (National Renewable Energy Laboratory, Golden, Colorado).

<sup>41</sup> [http://www.wired.com/2012/02/ff\\_hackathons/all/1](http://www.wired.com/2012/02/ff_hackathons/all/1)

concept has expanded to the healthcare, information, non-governmental organizations and other industries.

Health hackathons in the US have led to the creation of several innovative solutions to problems in the medical industry. Inventions of note have been the creation of efficient scheduling technologies which attempt to prevent patients from missing scheduled appointments. This invention could potentially save the US health care system up to US\$150 billion annually. In addition, the invention of 'Pill Pack', also borne out of a health hackathon, seeks to prevent patients from falling off of their medication. Patients who fall off of their medication schedule cost the US health care system US\$100 billion to US\$300 billion per year.<sup>42</sup>

Singapore has also benefitted from the hosting of hackathons. Hackathon events in Singapore have received wide approval from Universities, the private sector and Government alike. As a result their occurrence has grown to at least six per year. Two notable inventions resulting from these initiatives are i) the creation of a mobile app that allows caregivers of disabled persons to track their charges and ii) the development of an airborne drone that can monitor ship emissions. Hackathons held by Singapore's Maritime and Port Authority(MPA) were also successful and resulted in the creation of algorithms and data visualisation models that could be useful to the MPA's operations. The agency has partnered with the creators of the algorithms to implement applications that are directly relevant to their agency. Singapore's Economic Development Board Chief Information Officer acknowledges that the hackathon platform and other imaginative competitions bring together the government sector, industry and citizens to create interesting ideas.<sup>43</sup>

Hackathons can focus on any subject area and can be implemented by any type of government organization. To illustrate the widespread use of this tool globally Table 5 demonstrates a small selection of hackathons held recently in various location around the world.

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<sup>42</sup>[http://www.slate.com/articles/business/crosspollination/2014/04/medical\\_hackathons\\_is\\_this\\_the\\_future\\_of\\_health\\_care\\_innovation.html](http://www.slate.com/articles/business/crosspollination/2014/04/medical_hackathons_is_this_the_future_of_health_care_innovation.html)

<sup>43</sup><http://digital.asiaone.com/digital/news/hackathons-sparks-ideas-inventive-solutions>

**Table 5: Sample of Hackathon Initiatives Organized Globally**

Initiative	Country	Sector	Details
'Smart Money Hackathon' <sup>44</sup>	California, USA	Finance, NGO	Designed to create imaginative solutions to tackle lack of access to financial knowledge by the underserved and poor.
'Research Development and IHub Kenya Hackathon' <sup>45</sup>	Kenya	R & D, Agriculture	Established to address problems stakeholders face gaining access to agriculture and nutrition research data within Kenya.
'Hack The North' <sup>46</sup>	Waterloo, Canada	Tech, Computer Engineering	Collegiate hackathon uniting 1000 plus hackers to collaborate in the creation of web, mobile or hardware applications
'Creative Hackathon' <sup>47</sup>	Capetown, South Africa	Brand Communications	Facebook sponsored event with young creative designers encouraged to focus on linking creativity with technology
'IBM Lasgidi Hackathon' <sup>48</sup>	Lagos, Nigeria	Tech, Computer Engineering	Launched by Int'l firm IBM for young tech and computing practitioners & software developers. Focus on creating ideas incubation programme and training.

Similar to other destinations, imagination competitions organized by the public and the private sectors have emerged in several Caribbean countries. Those of particular note are listed in Table 6.

**Table 6: Sample of Innovative Competitions held in the Caribbean**

Initiative	Country	Sector Focus	Details
The Sagikor Visionaries Challenge <sup>49</sup>	Caribbean	Education	Students compete to develop effective, innovative and sustainable solutions to the challenges facing their respective schools.
Caribbean Innovation Challenge <sup>50</sup>	Caribbean	Economic/Social Development	Regional competition designed to reward innovative ventures led by young people that respond to economic and social issues in communities.
'Developing the Caribbean' <sup>51</sup>	Caribbean	Technology	24 hour hackathon held simultaneously in 8 Caribbean countries. Creative software designers and developers tackle a wide range of pressing economic, social and environmental challenges
Caribbean Mobile Innovation Programme	Caribbean	Technology	Programme offering training and challenges to entrepreneurs

In the future, it may be useful for policy makers in the region to look at these types of creative initiatives to encourage innovation, particularly in the framework of the

<sup>44</sup> <http://smartmoneyhacksf.org/>

<sup>45</sup> <http://www.ihub.co.ke/blog/2013/01/research-to-impact-hackathon-agriculture-nutrition-january-22-25-2013-ihub/>

<sup>46</sup> [www.hackthenorth.com](http://www.hackthenorth.com)

<sup>47</sup> <http://pctechmag.com/2014/09/facebook-to-host-its-first-hackathon-in-africa/>

<sup>48</sup> <http://www.ventures-africa.com/2013/11/ibm-launches-pan-african-hackathon-series/>

<sup>49</sup> <https://sagicorvisionaries.com/participate/about-the-programme/>

<sup>50</sup> <http://www.youthin-cic.net/about.php>

<sup>51</sup> <http://developingcaribbean.org/>

hackathon which attempts to harness the creative ingenuity of participants to resolve real-world organizational issues.

#### *Strategic Government Procurement*

A potentially useful area of intervention for Caribbean Governments in the effort to enhance imagination, innovation and competitiveness is Strategic Government Procurement.<sup>52</sup> Strategic Government Procurement aims to conduct government purchasing activities in a manner that would lead to increased innovation. Several theorists propose that Government Procurement procedures can be optimized to either i) stimulate the development of new products (goods, services and/or systems) ii) promote incremental innovations where existing products are tailored to meet the needs and requirements of the local market. This approach ensures public procurement encourages new capabilities.<sup>53</sup>

Government consumption accounts for a significant portion of GDP within all economies whether developed or developing. In the Caribbean, reported Government expenditure accounted for 8 – 21% of total GDP in Antigua, Barbados, Dominica, Grenada, Guyana, Jamaica in 2012 according to World Bank Indicators (see Table 7). This represents US\$ 100 million to US\$ 1 billion per year. Due to the high volume of Government expenditure, economists and researchers have theorized the potential to utilize Government expenditure on goods and services as a policy instrument.

**Table 7: Government Expenditure as a Share of GDP, Selected Caribbean Countries, 2012**

Country	Government Expenditure as a Share of GDP (2012)
Antigua and Barbuda	20.8
Jamaica	34.1
St. Lucia	23.2
St. Vincent & the Grenadines	26.1

*Source: World Bank Indicators (2012)*

A key tool for inducing increased innovation is through procurement processes that focus on the creation of new products and even more effectively through the innovation of existing products in new markets. The theory supposes that procurement will stimulate markets to a point where innovation is induced naturally or as a result of increased economic activity.<sup>54</sup>

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<sup>52</sup> For a perspective on the Caribbean see Sharlene Shillingford-McKlmon and Shirley Gayle-Sinclair, CARICOM: Small Market–Big Money: Amalgamating The Procurement Market To Transform Small Size Into An Economic Advantage. Inter-American Development Bank 2014.

<sup>53</sup> See Lember, V., Kattel, R. and Kalvet, T. "Public Procurement and Innovation: Theory and Practice.

<sup>54</sup> Lember, V., Kattel, R. and Kalvet, T. "Public Procurement and Innovation: Theory and Practice.

Historically, the idea of strategic government procurement originated prior to World War II when Governments recruited innovative products and machinery for the purposes of war. These innovative products diffused into the non-military industries for public consumption. Examples include the Internet, mobile technologies and jets. Soon after, government procurement in the US evolved to focus on improving technology with a similar effect. The positive spillover effects of the SPP influenced the premise for innovation-oriented public policy.

In the past technology procurement initiatives have been highly effective at generating new products and technologies that have diffused into the market. There has been no single approach to how governments have been applying public technology procurement. The scope and scale varies immensely. Important examples of technology focused government procurement policy which have led to the emergence of new products can be seen for fighter jets in the US and Sweden and toward the development of switchboard technology in Japan, Finland and Sweden etc.<sup>55</sup>

European Governments in particular have sought to implement public procurement as a key measure utilized for implementing economic growth in European Union policy. Currently Austria, Belgium, Finland, Norway and Poland have National Action Plans that include procurement as a strategy for development. In many contractual agreements with Government, innovation is listed as a criterion for procurement contracts. Within the European Union the UK, Finland and Norway lead in implementing procurement policies that aim to increase innovation as a main objective. These countries have specifically established programs for innovation procurement. Specifically, Small Business Innovation Research (SBIR) in the Netherlands, FCO in the UK and the Industrial Research and Development (IRD) programme in Norway. Across Europe it is estimated that fifty eight (58) percent of procurement documents include technical specifications that require or prioritize innovation in the provision of services.<sup>56</sup>

However despite of the positive accolades from many in academia and government, some research suggests that not all variations of innovation-oriented procurement may be equally effective. Specifically, innovation oriented procurement policy that is generic and not designed to tackle issues in a specific sector e.g. military or technology have been found to be ineffective. Generic- innovation-oriented public procurement attempted in the US, West Germany, Sweden and even recent implantation in China with their endogenous innovation initiatives has had less historical success of its implantation. Some argue that the innovation friendly public procurement can be too broad a target.<sup>57</sup>

In general there is little available data calculating the exact economic impact strategic government procurement may have, however the private sector seems to support SPP

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<sup>55</sup> Lember, V., Kattel, R. and Kalvet, T. "Public Procurement and Innovation: Theory and Practice.

<sup>56</sup> [http://ec.europa.eu/internal\\_market/publicprocurement/docs/modernising\\_rules/strategic-use-public-procurement-europe\\_en.pdf](http://ec.europa.eu/internal_market/publicprocurement/docs/modernising_rules/strategic-use-public-procurement-europe_en.pdf)

<sup>57</sup> Lember, V., Kattel, R. and Kalvet, T. "Public Procurement and Innovation: Theory and Practice.



due to the potential. Recently, the Canadian Manufacturer's and Exporters Association launched a lobby to the Canadian Government in support of SGP.<sup>58</sup> They argue that the Canadian Government should utilize SPP to foster innovation through the use of pre-commercial procurement aimed at inciting exploration to find solutions where there are no 'off the shelf' remedies to fulfil an identified need. Government procurement in this scenario could lead to the development of a new product that can be commercialized successfully.

Similarly, they argue that SPP could encourage more efficient utilization of Government investment if procurement policy for government goods and services were focused on industries in which Government has invested large sums of money geared toward research and development.

Strategic Public Procurement could be an effective method to generate increased innovation in the Caribbean as Government expenditure on goods and services represent a significant chunk of GDP within Caribbean economies. The procurement process within most Caribbean governments tends to be decentralized with procurement contracts tendered from differing Government agencies, a more policy oriented use of the current procurement contracts may generate positive benefits for technological innovation.<sup>59</sup>

### **Concluding Thoughts**

The state of innovation and competitiveness in the region is generally weak but the evidence suggests that there is some infrastructure present to build on. For instance, while Caribbean countries often rank below average there were a few standouts in some areas like Barbados being ranked 12<sup>th</sup> for Quality of Education, Jamaica being ranked 7<sup>th</sup> for mobile telephone subscriptions, and Trinidad being ranked 12<sup>th</sup> for legal rights index. Government policy focused on the promotion of innovation and competitiveness exists to various degrees of intensity within Jamaica, Barbados, Guyana and Trinidad. The region has also benefitted from international funding aimed at enhancing innovation and competitiveness as a regional objective and on a country-by-country basis.

As Caribbean economies move into the future new policy ideas need to be examined that can catapult the region forward. The analysis is suggesting that what is needed is a policy framework that fosters collaboration between the public and private sector while simultaneously encouraging the collaborators to harness creativity in solving ongoing problems. As noted a key policy that has generated significant progress in many developed market economies has been the implementation of Strategic Government Procurement. Similarly, government and private sector organizations alike have turned to

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<sup>58</sup> Canadian Manufacturer's & Exporters (2012) *Strategic Government Procurement: Driving Business Investment and Innovation through Strategic Government Procurement* (Canada).

<sup>59</sup> <http://www.ipppa.org/IPPC4/Proceedings/01ComparativeProcurement/Paper1-5.pdf>

an intensified version of collaboration through the 'hackathon'. The initiative has been utilized in developed, developing and middle income countries.

The analysis calls for a shift in thinking that embraces the notion that even small states can make a contribution to technological upgrading by making strategic investments in R&D. From this standpoint a more stakeholder-outreach approach is required to build inter-institutional linkages and collaboration from the industrial sectors. It is suggested that a more inter-disciplinary, pluralistic and networked approach is what is required to build the needed synergies in the contemporary knowledge-economy. In summary, what is being proposed is a shift from a "science push" approach to a critical thinking, networked and collaborative framework.

Another key area for institutional innovation is to break out of the state-centric approach of national innovation systems. Given the limited capabilities in most small economies in the Caribbean it is more appropriate to build regional and diasporic knowledge networks and linkages.<sup>60</sup>

Innovation and industrial policies initiatives are often divorced from trade policies. The same is true for most of the trade policy agenda in small states. Generally, what obtains are two parallel but disconnected processes, each failing to deliver expected outcomes. A key recommendation is that small states facilitate the integration of trade, industrial and innovation policies into the research, policy and negotiating agenda.

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<sup>60</sup> For a detailed assessment of the brain gain and brain circulation issues in the Caribbean see Special Edition of the Canadian Foreign Policy Journal (2011: 17.2) <http://www.tandf.co.uk/journals/rcfp>.

