

OPEN GOVERNMENT DATA: A CATALYST FOR JAMAICA'S GROWTH AND INNOVATION AGENDA

ESTIMATING THE POTENTIAL
VALUE OF OPEN DATA TO THE
JAMAICAN ECONOMY



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EXECUTIVE SUMMARY

Open Data has emerged as a progressive approach to issues of fiscal transparency, public sector efficiency and new job creation. The international thrust for government departments and agencies to publish public data online (subject to valid privacy and security restrictions) for the public to easily access and reuse, firmly positions Open Data as an integral component and enabler of progressive governance. While preliminary work has been undertaken in the Caribbean to explore the potential for open-data enabled interventions none of these studies have attempted to quantify the economic value associated with these open data opportunities. This paper is the 2nd instalment in this research study, and builds on a companion paper “Open Government Data: A Literature Review & Synthesis of Valuation methods” that provided a comprehensive review of the current literature on the estimation of the potential value impact of Open Data initiatives. Specifically, this paper presents an estimation of the potential economic contribution of Open Data to the education, tourism and agricultural sectors, culminating with generic guidelines for developing Jamaica’s Open Data policy.

The Open Government Data (OGD) phenomenon has been propelled by growing consensus and an irrefutable logic in the notion that data created by public funds should be publicly accessible and freely reusable, both from the standpoint of economic efficiency and civic equity. Over 40 countries at different stages of development are pursuing Open Data policy actions and/or initiatives to influence social, political and economic change. From the survey of the literature, Open Data has the potential to contribute between 0.12 percent and 1.4 percent of GDP to many of these countries. Additionally, several studies underscore the economic potential for Open Data with estimates ranging from EUR 140 billion throughout the European Union (Vickery, 2011) to over \$3.2 trillion internationally (Manyika et al., 2013).

This paper estimates the potential impact of Open Government Data on the Jamaican economy at a macro level and at sector-specific levels, by scaling the expected GDP contributions derived from a meta-analysis of the existing literature. The results of this analysis show that Open Data implementation has the potential to contribute between JA\$2.2 and JA\$2.9 billion to Jamaica’s economy through the Education sector and JA 10 billion through the Agricultural Sector. Similar initiatives in the Tourism sector, are projected to improve productivity between 1-10%, realizing a potential economic impact of between JA\$ 2.4 and JA\$ 23.7 billion. Given the global importance of Open Data and the value opportunity that it represents in economic, as well as political and social terms, the GOJ has a significant opportunity to capitalize on the current wave of interests in Open Data by multi-lateral agencies such as the World Bank. Tangible linkages can be demonstrated between an Open Data policy and the current IMF-led the Memorandum of Economic and Financial Policies (MEFP) framework. Through deliberate and progressive policy actions and initiatives, Jamaica can demonstrate a leadership role in the region in terms of shaping and leading the open data discourse. A Policy framework is proposed to guide these efforts, based on the Sunlight Foundation’s globally accepted Open Data policy guidelines.

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CONTENTS

ACKNOWLEDGMENT	1
THE VALUE OF OPEN DATA – A RESEARCH SYNOPSIS	4
ESTIMATING THE VALUE OF OPEN DATA TO JAMAICA – A MACRO PERSPECTIVE	5
ESTIMATING THE VALUE OF PUBLIC SECTOR INFORMATION	6
DISCOUNT FACTORS AND MULTIPLIERS	6
OPEN DATA AND THE JAMAICAN ECONOMY	6
ESTIMATING THE VALUE OF OPEN DATA TO JAMAICA – A SECTOR PERSPECTIVE	7
BENEFITS OF OPEN DATA IN EDUCATION	7
BENEFITS OF OPEN DATA IN AGRICULTURE	9
BENEFITS FOR OPEN DATA IN TOURISM	10
LIMITATIONS OF THIS STUDY	13
POLICY CONSIDERATIONS	
LINKAGES TO THE IMF/MEFP FRAMEWORK	14
LEVERAGING CURRENT OPEN DATA INITIATIVES	14
THE OPEN GOVERNMENT PARTNERSHIP / OPEN DATA READINESS ASSESSMENT	14
POLICY GUIDELINES	14
POLICY COMPONENTS	17
OTHER CONSIDERATIONS	17
APPENDIX: ECONOMIC VALUE OF OPEN DATA GLOBALLY	19

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THE VALUE OF OPEN DATA — A RESEARCH SYNOPSIS

Open Government Data has emerged as one of the most globally significant policy and technological trends within the last 5 years propelled by growing consensus and an irrefutable logic in the notion that data created by public funds should be publicly accessible and freely reusable, both from the standpoint of economic efficiency and civic equity. Considerable impetus was derived from the Obama Administration's Open Government Directive (2009) which embraced the three principles of transparency, participation, and collaboration as the cornerstone of an open government.¹ This directive called for, among other initiatives, Government departments and agencies to publish government information online (subject to valid privacy, confidentiality, security, or other restrictions). The growing consensus is that data created by public funds should be publicly accessible and freely reusable, because data is not a rival good – it is not diminished by use.

Open Government Data (OGD) refers to government data and information that has been created or commissioned by a public entity which is made accessible for public use and re-use. A working group of open government advocates gathered in Sebastopol, California in 2007 (Open Data Working Group, 2007) classified Open Government Data as data that is:

- **Made available and not subjected to privacy, security or privilege limitations.**
- **Collected at source, at the most atomic level, not in aggregate or modified norms.**
- **Made available as quickly as possible, to preserve the value of the data, to the widest range of users for the widest range of purposes.**
- **Reasonably structured to allow automated processing.**
- **Available to anyone with no requirement of registration and a formatted so that no entity has exclusive control.**

Over 40 countries at different stages of development (eg. United States, UK, Singapore, India and Kenya) are pursuing Open Data initiatives as a platform to promote transparency, improve public sector synergy and efficiency and facilitate the creation of new businesses. This paper is the 2nd instalment in a research study, seeking to assess the economic potential of Open Government Data as a catalyst for Jamaica's growth and innovation agenda. The 1st paper in this series "Open Government Data: A Literature Review & Synthesis of Valuation methods" provided a comprehensive review of the current literature on the estimation of the potential value impact of Open Data initiatives. Several of these studies highlight the economic potential for Open Data with estimates ranging from EUR 140 billion throughout the European Union (Vickery, 2011) to over \$3.2 trillion of economic value estimated by McKinsey in the potential use of open data globally (Manyika et al., 2013). Specific to the Caribbean, preliminary work has been undertaken to explore the potential for open-data enabled interventions in Agriculture including the impact on the effectiveness of delivery of extension services to farmers in Jamaica. However none of these studies have attempted to quantify the economic value associated with these Open Data opportunities. The remainder of this paper therefore presents a quantitative analysis of the value of Ope

ESTIMATING THE VALUE OF OPEN DATA TO JAMAICA – A MACRO PERSPECTIVE



In order to assess the potential impact of Open Government Data on the Jamaican economy overall, we employ a bounds test method to obtain upper and lower limits of estimation values, derived through a meta-analysis of a number of the international studies that estimate the economic impact of Open Data or Public Sector Information (PSI). These impacts are then scaled to the Jamaican economy using a simple pro rata basis to estimate their contribution to GDP.

Estimating the Value of Public Sector Information

Since the economic value or value added of PSI is not explicitly captured in the national accounts of many countries, like traditional industries, varying techniques have been used to estimate this contribution. PIRA (2000) estimates that Public Sector Information (PSI) is valued between EUR 28 billion and 134 billion per annum or nearly 1% of the EU GDP by assessing how much the government invests in the acquisition of public sector information and the value added by users. A breakdown of this EU study also showed that PSI was valued at approximately 0.5 and 0.75 percent of GDP for France and the UK, respectively. Dekkers, Polman, Velde, and Vries (2006) investigated the generic uses of PSI in different organisations to statistically estimate that the overall market size for PSI in the European Union is valued at approximately 0.25 percent of the aggregated GDP for the European Union and Norway. More recently, Houghton (2011) concluded that the economic value of Open Data in the EU is equivalent to 1.4 percent of the EU's GDP. The study also purports that open data contributed to a gain of between 0.6 to 1.2 percent of GDP in Australia. Similar studies in the UK estimated that the value of public sector information to consumers, businesses and the public sector in 2011/12 was approximately 0.12 percent of the GDP in current prices. Some of the studies evaluated determined an estimated range for the economic value of open data. In cases such as these, the expected value of the range is utilized. Taking the estimation studies highlighted, the lowest potential impact of open data to a country was 0.12 percent and the highest estimated impact was 1.4 percent of the country's GDP. The result of the meta-analysis is shown in Figure 1. The average economic value of open data across the various countries and across the plethora of estimation techniques from the selected references was 0.67 percent of the country's GDP.

Discount Factors and Multipliers

The estimations referenced from the literature have mainly been conducted for developed countries some of which have actively initiated the use of Open Data. Given the differences in institutional arrangements and efficiency between developed and developing countries, the estimates from the literature require discounting before they are applied to the Jamaican context. The economic history of Jamaica is idiosyncratic and the trajectory of the economic indicators, institutions, efficiency of the public sector and differences in legislative maturity across countries provides the rationale for discounting.

The discount factor used for this study is the ratio of Jamaica's per capita income to that of the developed country case. This approach provides a measure of the degree to which the Jamaican economy is able to convert the potential value

of open data relative to other more developed economies. A discount rate of 87.77 percent was estimated for comparisons with the estimates from the McKinsey valuation and other country studies. That is, Jamaica can only exploit 12.23 percent of the benefits outlined with its present socio-economic conditions. As Jamaica develops the discount factor will get smaller in tandem with the assumption that better institutions allow for increased efficiency in the use of open data and hence an increase in its economic impact.

In addition to the direct contribution to GDP, there is increased evidence that open data plays a role in reducing corruption by both reducing its private returns and making it easier to detect. Jamaica is ranked 83rd out of 177 countries on the Corruption Index. Waller et al. (2007) suggest that over 70 percent of Jamaicans believed that it is difficult to detect corruption, with 21 percent of these individuals viewing the detection as very difficult. In relative terms, it is reasonable to expect a multiplier effect in the potential value impact of Open data in Jamaica relative to developed countries, which would tend to mitigate the discount factors calculated earlier. We do not explicitly account for these positive externalities that could be attained with the effect of improved governance through open data, and as such it is anticipated that the potential value of open data calculated by this scaling, discounted method is conservative and in likelihood could be even greater than estimated.

Open Data and the Jamaican Economy

Scaling¹ the estimated value of open data from each of these reference studies and discounting appropriately yields the projected estimated impact of open data on the Jamaican economy as illustrated in Figure 2. The upper and lower bound estimates and the expected economic value are presented in Figure 3. The continuum of estimates of the potential economic value of open data has a lower bound of JA\$ 0.21 billion, an upper bound of JA\$ 2.42 billion and an average value of approximately JA\$ 1.08 billion. This range is representative only, but also demonstrative of the enormous potential of open data in terms of its economic impact, even with very conservative assumptions in the externalities associated with the discount and multiplier effects. In the next section, we examine the estimates at a sector level.



ESTIMATING THE VALUE OF OPEN DATA TO JAMAICA — A SECTOR PERSPECTIVE

The McKinsey Global Institute's international study estimated the potential impact of open data on specific sectors by assessing several levers or channels through which open data value can be achieved. Figure 4 shows the composition of the benefits of open data by sector based on the results obtained from the McKinsey Global Institute (see Manyika et al., 2013). The results show that 25 percent of the total benefits to be gained from open data implementation is accrued to the education sector, 22 percent of the benefits arise from product innovations and 20 percent results from increased efficiencies in the transportation sector. The use of open data in the electricity and Oil/Gas sector constitutes 18 percent of the benefits, 9 percent from health care benefits and 6 percent from consumer finances. The estimates are based on the global analysis of the annual impact of open data across the mentioned sectors. For this study, we adopt and extend the levers identified for the Education sector, and use the analytic framework derived in paper #1 as a guide to identifying sector-specific levers for Agriculture & Tourism. The economic value for each sector was then evaluated using the elasticities from the McKinsey study, with the requisite scaling and discounting factors applied¹.

Benefits of Open Data in Education

The McKinsey Global Institute (see Manyika et al., 2013) highlights five levers through which the economic value to open data can be exploited in the education sector. This sector accounts for 25 percent of the total benefit to be derived from open data, and values between 1.24 to 1.65 percent of a country's GDP. Majority of the benefits of open data in the education section comes in the form of improved efficiency in system administration, improved instructions and improved transparency in education financing. Substantial economic value will also be derived from more plausible matching of students to programs and matching of students to appropriate employment. In the Jamaican context, the McKinsey estimates suggest that the potential economic value of open data to the education sector ranges between JA\$ 17.55 to JA\$ 23.35 billion. When discounted, it is expected that open data implementation has potential economic value between JA\$2.15 and JA\$2.86 billion in the education sector. This estimation methodology is consistent with methods employed in the recently concluded study by Gruen et al. 2014. "Open for Business: How Open Data Can Help Achieve the G20 Growth Target."

Source: Manyika et al. (2013)

Table 1: Open Data in Education – Levers (Drivers)

Category	Levers (Drivers)
Efficiency & Effectiveness	<p>Efficient system administration. By using open data to expose variation in prices paid for supplies and services and benchmarking between regions, school systems can greatly improve the efficiency of school procurement. For instance, this comparative analysis would be applicable to system-wide expenditure on utilities (water, electricity, telephone), school-feeding programs, etc. And, by using open data to characterize school locations based on current and projected population demographics, administrators can allocate capital and operating education budget resources in a way that improves utilization and provides an intelligent program for school investments. It also leads to improved transparency, efficiency and accountability in the allocation of resources to schools, regions and education agencies</p>
Participation & Collaboration	<p>Matching students to programs. Open data can also be used to help parents and students identify the best fit in terms of school or program. By analyzing publicly available data on school performance (for example, educational outcomes and program offerings), they can select educational opportunities that match the student’s interests, abilities, and needs. This would be most relevant to post-secondary and vocational education and training options in Jamaica.</p> <p>Matching students to employment. Employers and job candidates can find one another more efficiently with tools that use open data to match the skills employers need with the skills candidates possess. Firms can access open-data enabled online services to analyze data on their employees to determine skills most necessary to succeed at the job, and then search for candidates with certified credentials in those specific areas. Similarly, students can locate and apply for positions that fit their skills and interests but that may previously have gone unnoticed. This process would be especially applicable to the NVQ qualifications and certifications.</p>
Transparency	<p>Improved instructions. The lesson plans are continually refined by analyzing large amounts of individual student performance data shared across systems and institutions, guiding educators to the most effective teaching methods. In the longer term, education curriculum reform is better informed by these derived insights.</p> <p>Transparent education financing. Open data allows for more transparent education financing, which also can expand the range of education options for students. By using financial aid tools that analyze open data on the true cost of education at various institutions as well as different financing options, parents and students can better understand trade-offs and choose programs based on the actual expected cost of education. This allows students to enrol in programs they may have previously considered out of reach, and it helps students who are deciding whether they can afford higher education to find suitable programs. It will also help to inform the financing and risk management decisions by public agencies such as the Students’ Loan Bureau and other private education financing entities.</p>

Benefits of Open Data in Agriculture

The agricultural sector forms an important part of Jamaica's productive capacity, contributing on average 6.5 percent of GDP over the period 2010-2012 (World Bank, 2014b). As of 2012, the value added in the agricultural sector was JM\$ 75 billion.

Source: World Bank (2014b)

There are several documented inefficiencies in the agricultural sector which open data implementation can significantly reduce. One major issue is the effectiveness

of access, analysis and delivery of business information to key stakeholders (both information providers and information consumers). Other challenges related to agriculture include data accuracy, currency, scale, precision, and completeness. Therefore the following Open Data levers have been identified for the agricultural sector:

Table 2: Open Data in Agriculture – Levers (Drivers)

Category	Levers (Drivers)
Efficiency & Effectiveness	<ul style="list-style-type: none"> • Improved logistics in the agricultural sector to mitigate spoilage, surplus and shortages – As the agriculture industry in Jamaica suffers from logistics and coordination problems especially in times of drought and glut, efficiency of crop production planning and distribution can be enhanced with the use of an open data platform that can electronically match demand to supply. Aggregate demand estimates could be derived from the needs of large consumers such as Agro-processors, Hotel industry, and Restaurants, combined with historical retail consumption patterns. Supply could be forecast from Agriculture production data captured by RADA/ABIS system together with current food imports and import licences. • Improved analysis of agricultural information to inform policy – As the Ministry of Agriculture tries to increase local production, local consumption and export, to ensure that there is no over-production which leads to wastage and underproduction which may drive prices upward, this increase in agricultural production planning must be data driven. Access to accurate agricultural data on consumption, production potential, time for crop maturity etc in crucial to ensuring that additional demand is met. • Enhanced access to geospatial information - With free access to geospatial information farmers can adhere to farming best practices by knowing where, and when to plant both for optimal yield and environmental preservation. • Open meteorological data - As the agricultural sector remains highly susceptible to weather conditions and natural disasters, open data can facilitate reduced losses during times of devastation by providing farmers with timely access to information on major disasters and also changes in weather patterns such as heavy winds or flash floods. Access to historical meteorological data can also help Extension officers to guide farmers in the planning phase as to where to plan and when and what crops are suited for particular areas based on meteorological patterns. • Efficiency in the delivery of Extension Services - RADA is continually challenged with providing sufficient resources to extension services to address the support demand of farmers across Jamaica. The effectiveness of the individual extension officer can be enhanced using Open Data combined with mobile Apps which can provide field-based decision support and information access to both aggregate and individual agriculture data stored within Government production systems. Typical functionality could include: on-demand data access to farm, crop and price information and location-based searching using the mobile phone's built-in GPS capability.

Participation & Collaboration	<ul style="list-style-type: none"> • Data accuracy, currency, scale, completeness – The efficiency, quality and timeliness of data collection on agriculture production, prices and location is a challenge to effective planning, oversight and decision-making in the Agriculture sector. Open Data and crowd-sourcing mechanisms can lead to improved accuracy and currency of data by mobilizing a larger pool of end users to contribute to the data collection and/or verification process.
Transparency	<ul style="list-style-type: none"> • Open access to business information to support farmers and retailers - Numerous tools and products must be invested in livestock, fisheries and ground produce for a successful yield. The costliness of these inputs has always been a grave concern to the agricultural sector and at times undermines investment in the sector. Therefore easy access to procurement information will help investors in cutting input costs. The facilitation of the comparison of supplier and retailer prices also increases competition in the sector allowing the consumer to get the best price possible. • Reduction in the theft of agricultural products – With the implementation of livestock registration mechanisms (passport) the use of Open Data can provide “real-time” access to agricultural data that can enhance the oversight and traceability of products from the farms to the final consumer. Combining this information with crowd-sourced open data on incidences of praedial larceny can provide security forces with an improved detection and investigative capability to tackle praedial larceny.
Creation of New Services & Businesses	<ul style="list-style-type: none"> • Agriculture innovation ecosystem - The release of official Government agriculture data as Open Data creates the opportunity for the emergence of a variety of <i>e-Agriculture Apps</i> that can encourage a broad base of domain experts, technical developers, and innovators to participate in the building and evolution of an Agriculture innovation ecosystem. • Software Development and Services - Published Agriculture Open Data becomes a catalyst for innovation opportunities for software developers and other service entrepreneurs. Currently there are a few small scale examples emerging of startup ventures that utilize Agriculture price and production data produced by the Ministry of Agriculture: (see for example: Agrocentral - http://agrocentral.co/; HarvestAPI: http://harvestapi.io/). A well-documented examples of a successful Agriculture open data startup is the Climate Corporation which leverages climate and soil open data to develop insurance products to help farmers protect and improve their farming operations. Climate Corp raised over US\$100million in venture capital.

Though the literature on the monetary value of open data usage has not explicitly incorporated the agricultural sector, the agricultural levers are closer aligned to those of consumer products highlighted in the McKinsey study. A modest 10 percent improvement in Jamaica’s agricultural value added, due to productivity gains facilitated by the levers identified, could contribute approximately US\$ 92 million to Jamaica’s GDP. This valuation is also below the lower bound value highlighted for consumer products in the McKinsey study.

Benefits for Open Data in Tourism

Tourism is an important economic activity for most Caribbean Islands, due largely to the perceived availability of free resource inputs: sand, sea and sun; the

potential to earn foreign exchange and provide jobs; and the economic stimulus that it provides through multiplier linkages with other sectors (construction, agriculture, transportation, manufacturing, etc.). In Jamaica, Tourism is the highest contributing sector to GDP. World Travel and Tourism Council (WTTC) (2014) notes that the direct contribution of tourism to GDP is JMD 109.3bn to GDP in 2013, with an indirect contribution of JMD 364.8 bn.

It is estimated that this contribution will increase by 3.2 percent in 2014, further increasing by 4.3 percent annually between 2014 and 2024. Tourism also created direct and indirect employment opportunities approximated at 274,500 jobs in 2013 which is 23.4 percent of the country's labour force and this sector attracted 11.1 percent of total investment in 2013.

Implementing mechanisms to improve the efficiency and effectiveness in this sector has the potential to significantly impact GDP growth. The Mona School of Business and Management Centre of Excellence states that the tourism sector functions most effectively with the free flow of information about the tourism product, service providers and consumer experiences which provides the basis for awareness, choice and improved service delivery between the prospective tourist and operators in the sector (Centre of Excellence, 2013). The head of the World Travel & Tourism Council (WTTC) at the 2012 Caribbean Tourism Summit and Outlook Seminar posited that Caribbean Nations need to be united in their approach to tourism to reap optimal gains. In this regard,

the use of Open Data as an explicit policy and operational initiative presents some interesting opportunities for the tourism sector in the Caribbean.

Avenues through which Open Data policy and initiatives can improve the sector includes: Increased visibility and clientele for smaller tourism operators; Enhanced tourism product information and diversity of choices for discriminating tourists; Improved quality of service delivery in support services such as transportation, entertainment and merchandising. Open data provides the basis for awareness, choice and improved service delivery between the prospective tourist and operators. For the tourist industry increased access to public data can be used to build the domestic market, for example, providing digitised cultural heritage information on the spot on any mobile device Vickery (2011). Open Data also presents opportunities to increase linkages between tourism and other sectors such as Agriculture, Craft and Sports.

Table 4: Open Data in Tourism – Levers (Drivers)

Category	Levers (Drivers)
Efficiency & Effectiveness	<ul style="list-style-type: none"> • Improved quality of service delivery in support services such as transportation, entertainment and merchandising. eg. Tourists to Jamaica who take the opportunity to venture beyond the confines of the all-inclusive package and explore the rich cultural immersion experiences that the island has to offer, will often need to be able to locate a variety of service providers such as transportation services, on-demand. Open-Data-enabled mobile Apps that can facilitate the ability to engage with licensed, reputable operators at the right price would be valuable from a security and service delivery perspective. • Enhanced tourism product information and diversity of choices for discriminating visitors with niche interests (e.g. Eco-Tourism) • Enhanced Market analysis and selective targeting through access to tourism origin data. Although the JTB currently publishes arrival statistics, publishing the raw arrival data can stimulate Apps development, and enhance sector reporting, analysis and visualization to provide better data for tourist-related businesses to do targeted marketing, and to plan and price their services better.
Participation & Collaboration	<ul style="list-style-type: none"> • Increased linkages between tourism and other sectors such as agriculture, manufacturing, arts & craft, self-employed service providers. FAO studies estimate that only 30% of the total food purchases by hotels in Jamaica represent local purchases. Current efforts by the Ministry of Tourism to establish a Tourism linkages hub, that plugs into the databases of related Agencies such as Ministry of Agriculture and Fisheries, RADA, JAMPRO, the Jamaica Business Development Corporation (JBDC), the Jamaica Manufacturers' Association (JMA) and the EXIM Bank, can be significantly enabled/enhanced using linked Open Data initiatives. • Empower Community Tourism interests and stakeholders with greater participation and collaboration in the development of the community tourism product. Open Data initiatives can impact positively on the visibility, inclusiveness and welfare of small operators, within the tourism sector and become an enabler for local communities to evolve into sustainable business enterprises

Transparency	<ul style="list-style-type: none"> • Increased transparency in the allocation and disposal of resources/funds for the development of the sector (i.e. Tourism Enhancement fund; JSIF – community-based tourism development, etc.)
Creation of New Services & Businesses	<ul style="list-style-type: none"> • Increased visibility and clientele for smaller hotel properties, attractions. Small lodging properties and individual service providers have traditionally had an inherent disadvantage when compared to larger properties and more established brands, due to lack of financial resources, organizational capabilities and visibility. Open Data approaches and technologies can provide enhanced, multimedia information channels that can facilitate increased visibility of small operators, as well as enhance the interactions between the various actors within the tourism community including the tourism agencies, transportation and other service providers, larger hotel chains, tour operators, etc. • Enable product development and market access for community-based tourism initiatives • Innovation opportunities for software developers and other service entrepreneurs to exploit available Open Data to build service delivery Apps for guided tours, including planning, booking and transportation

Source(s): Adopted from Mona School of Business and Management – [Centre of Excellence \(2013\)](#).

Though it is extremely difficult to accurately tender estimates for the impact that these levers will have on the Jamaican economy, we may hypothesize as to some scenarios that may be realized. From the information highlighted above and others found in the literature, we can reasonably expect improvements in productivity in the tourism sector ranging between 1 percent and 10 percent moving forward.

The figure below shows that a 1 percent improvement in productivity in the tourism sector as a result of open data implementation will increase overall productivity in this sector by approximately JA\$ 2.37bn. Similarly, a 5 percent increase in productivity would improve the sector’s contribution by as much as JA\$ 11 billion, while a 10% percent improvement in the tourism sector can add over JA\$ 23.71 billion to the sector. These figures show the

potential improvements that open data implementation can have on the Jamaican tourism sector. Following implementation, it is reasonable to expect that the levers highlighted above will improve tourism earnings between 1-10%, which is between JA\$ 2.37 and 23.71 billion.



LIMITATIONS OF THIS STUDY

Estimating the economic value of Open Data in developing countries is still new to the literature and the evidence base on the realized value of these estimates is still largely anecdotal, especially in a developing country context. Therefore, this study is relatively conservative in estimates of the potential value of open data for the Jamaican economy. The estimates provided in this study are largely informed by, and congruent with the studies across various countries and suggest that, even with the most conservative estimates, open data initiatives are likely to yield very significant savings and higher levels of efficiency. What is even more compelling is the fact that many of the benefits associated with open data are not easily measurable and as such, even the upper bound of estimates included in this study may deflate the centrality of open data as a source of economic innovations.

Despite these analytic constraints, Open Data clearly presents an effective solution to issues of fiscal transparency, public sector efficiency and job creation. Furthermore this analysis demonstrates the potential of Open Data to contribute over JA\$ 30 billion to the national economy through initiatives in education, tourism and agriculture. It therefore seems prudent for the Government of Jamaica to commence active and deliberate action towards the drafting of its Open Data policy. The following section provides some of the key considerations and guidelines towards the formulation of such a Policy framework.

POLICY CONSIDERATIONS

Linkages to the IMF/MEFP Framework

Given the importance and topical focus on the GOJ's current IMF-led economic reform program, the degree of attention to new policy initiatives will likely be a function of their relevance to the Memorandum of Economic and Financial Policies (MEFP) framework. Open Government Data as a policy initiative demonstrates tangible linkages to this program in several ways: Two specific examples are the following:

Under Public Sector Reform (35): The government is committed to improving the efficiency, quality, and cost effectiveness of the public sector. The Open Data experiences in other countries have demonstrated significant economic, political and social benefits in realizing increased efficiency in public services, largely through more effective inter-agency coordination/data sharing across government, consolidation of overlapping data repositories and better financial controls. Under Reform of Social Spending (39). Spending on education will also be made more efficient and effective. The Open Data "levers" identified in Education highlight opportunities to increase efficiency and effectiveness in the allocation of education resources that facilitates higher utilization and leads to improved transparency and accountability in the disposal of these resources in schools, regions and education agencies.

In general, Open Data has been demonstrated to be a catalyst for innovation, one of the critical imperatives for the growth agenda under the MEFP. A recent publication and commentary by The Jamaica Information Technology & Services Alliance (JITSA) on the GOJ's MEFP makes the following assertion (pp. 21): Opinion #3 - Use Data to Grow and Fuel Innovation "The IMF reform programme should ensure a priority focus on integrated Open Data as a means of getting the country to a position of using "Business Intelligence", rather than speculation, as the basis for growth".

Leveraging Current Open Data Initiatives

There have been several grant-funded open data initiatives led by the Mona School of Business & Management at UWI, through the work of the Caribbean Open Institute (COI, 2014), which was established to facilitate open data initiatives in the Caribbean region. While not government-led, the initiatives have garnered active support from Government Agencies such as the Rural Agriculture Development Authority, Ministry of Agriculture and the Tourism Product Development Co (TPDCo), Ministry of Agriculture. The Ministry of Science & Technology has also endorsed active support for these initiatives in the Government of Jamaica's (GOJ) ICT Roadmap (Robinson, 2014, p. 47). Future GOJ Open Data policy initiatives should seek to build on the lessons learned and collaborative relationships fostered through these demand-side initiatives.

The Open Government Partnership / Open Data Readiness Assessment

The global importance of Open Data is a significant factor in the rapid emergence of the Open Government Partnership (OGP) – a high-level multilateral and multi-stakeholder forum launched in September 2011 which seeks to encourage open government initiatives. The partnership has already secured commitments from over sixty governments. However, Jamaica and the wider English-speaking Caribbean have largely been missing from this international coalition, though Open Data (OD) appears to provide considerable potential tackling some of the perennial economic and developmental challenges that confront the region. Trinidad & Tobago is the only country, thus far, to have already signaled its intent to join this new multilateral initiative.

The World Bank is an active proponent of Open Data initiatives and the Open Government Partnership and have already funded Open Data Readiness Assessment studies in Antigua and St. Lucia. They recently announced a new Open Data Project to support business innovation and transparency in the Caribbean, in partnership with UK-DFID (World Bank, 2014a). Jamaica is one of the countries targeted for an Open Data Readiness Assessment and related Policy support initiatives under this program. The GOJ has an opportunity to signal a strong intent and commitment to the Open Government Partnership and the Open Data Initiatives and to capitalize on these funded initiatives to play a leadership role in the Caribbean.

Policy Guidelines

The most direct policy action to be taken by the government in the creation of an Open Data policy involves releasing and ensuring that existing government data, which is created with the use of public funds, is readily accessible to the public through a government portal. The following guidelines are adopted from the Sunlight Foundation published Open Data guidelines, and address the following specific aspects of Open Data Policy:

1. What government data should be made public
2. What are the best practices in making government data public
3. How to implement Open Data policy:

What Government Data Should be Public?

- **Explicitly state the goals, values and mission of the Open Data policy.** Publicising the goals and intentions of open data policy can assist in clarifying what the government hopes to achieve. This action may also serve to galvanize support and a greater ownership of the open data process from the wider public.
- **Create a comprehensive list of all information holdings, making it publicly available.** To commence an Open Data initiative it is imperative that an inventory of existing government data is conducted so that the public and the implementation taskforce are aware of the data that are available. This inventory will also strengthen the process of quantifying the impact and reach of the data release. Cataloguing and publicly release the sources of government data can also create efficiencies among government departments.
- **Proactively release government information online, specifying the method of release prioritization.** Many information disclosure laws such as the Access to Information Act are mainly structured for questions to be asked before responses are provided. A call for proactive disclosure is to guarantee the exact opposite, where disclosure of public information should automatically be made accessible to the public for use and reuse when desired. Open Data policy must therefore explicitly facilitate the continuous publication of newly created public data.
- **Although the proactive disclosure of all government data is advocated by open data policy, the release of data may be incremental due to insufficient funding or staffing.** We therefore suggest that the decision, regarding which government data are to be released first, should be guided by the public's high demand for information about government ethics and accountability. Realistic consideration must also be given to the cost of releasing individual datasets; however, these costs must be balanced against other priorities such as releasing a useful and publicly demanded collection of data.
- **Use existing public accountability and access to information policies as the foundation for Open Data policy.** Strong Open Data policies are founded in existing public accountability and access to information legislation as building on these laws can give credence to new open data requirements and inform the structure of the policy and the legislative requirements for its success. In the Jamaica two such examples are the Financial Audit and Administration Act and the Access to Information Act. Building legislation can also help define the term "data" as the next iteration of public records thus requiring data to be released proactively online as a part of the legal right to information.
- **Stipulate that Open Data policy also applies to government contractors and agencies.** Information that is gathered using public funds should remain publicly accessible, regardless of the governments decisions to

outsource. Ensuring that outsourced services are governed by the open data policy is important as denying access could present a loophole in the open data policy that facilitates the hiding of information. Similarly, open data policy provisions should explicitly apply to governmental agencies and similar organisations, government-sponsored entities and publicly-funded universities.

- **Appropriately safeguard sensitive information.** Open data policy should complement laws that exempt public access to information that is sensitive due to privacy, security or other reasons. There is need for specific scrutiny of individual-level data that identifies private individuals who are not serving as government vendors. Such sensitive information can often be released in aggregate or with anonymity to provide some degree of public information and value. Exemptions to the public availability of data must be carefully crafted to exclude only the most necessary categories of information. Valid privacy and security concerns should be addressed through provisions that recognize the public interest in determining whether information will be disclosed or not. Public interest refers to democratic accountability, justice and effective oversight.

What are the Best Practices in Making Government Data Public?

- **Create a central location devoted to data publication and ensure permanent access to data.** Data portals and similar websites can facilitate the distribution of open data by providing an easy-to-access, searchable hub for multiple data sets. At their best, these portals or hubs promote interaction with and reuse of open data and provide documentation for the use of information. There are several helpful features that should be included in the creation of data portals including a list of what data it contains. Another beneficial feature to include in data portals is a view of the data using analytical tools such as graphs and tables.
- **Once released, digitized government data should remain permanently available at a stable online location or through archives in perpetuity.** Although portals and websites can be vehicles for accessing this data over the long term, it is critical that the data's permanent release and accessibility is defined so as to apply to the data itself, not just the means of access.
- **Mandate appropriate data formats for optimal access and use.** Firstly, for Open Data to be effective, the data needs to be stored in a format that the computer can understand or "Machine-readable" and must also facilitate searching and sorting of information by the end-user. Data must be released in formats that allow for easy and efficient reuse of data. Data must therefore be stored in "open formats" or in a way that allows proprietary or non-proprietary software accessibility. An example is storing spreadsheet data as CSV instead of XLS because the former can be accessed by a greater number of software mechanisms.

- **Remove restrictions for accessing data including licensing.** The public must have the right to reuse government information. Technical restrictions such as registration requirements, access fees and usage limitations, among others must not apply to Open Data. To be “open,” government information should be released into the worldwide public domain which the need for licence to access or reuse data.
- **Publish bulk data and Application Programming Interfaces (API's).** Bulk access allows the public to download all of the information stored in a database at once. Whether offered as a feature of a data portal—or even as a simple “click to download” button on a government agency webpage—bulk access to information is one of the simplest and most direct steps a government entity can take to share public information. Although bulk data provides the most basic access to searching and retrieving government data, government bodies can also develop APIs, that allow third parties to automatically search, retrieve or submit information directly from databases online.
- **Mandate data-creating agencies to recommend an appropriate citation forms and publish metadata.** Users of government data should be encouraged to accurately cite the source of data. Proper citing of government data can be encouraged by having data managers develop model citations for their data sets. The publishing of meta-data and data creation processes are also crucial in allowing the end user to trace the source of the information garnered.
- **Providing a common and detailed cataloguing of how, when and by who data was collected along with a full description of the variables that comprise the data comprises metadata documentation.** A summary of the processes that were used to create a specific data set gives useful context to how data is used should accompany the data set’s release as this may not be included in the metadata package.
- **Mandate the use of unique identifiers. Unique identifiers are reference numbers used to identify unique individuals, entities or locations.** The use of unique identifiers within and across data sets improves the quality and accuracy of data analysis. Without unique identifiers, some analyses can become difficult or impossible, since similar names may or may not refer to the same entities. Importantly, identifiers should be non-proprietary and public. Several approaches could be taken to the development and dissemination of unique identifiers. For example, managers of individual data sets could be charged with developing the unique identifiers for the entities they most reference. Alternatively, a lead actor may oversee the development of a comprehensive identifier development system.
- **Require digitization and distribution of archival material. Open data policies should require the electronic publication archival material with budgetary constraints.** By digitizing old data on budgets etc researchers are

now able to use more comprehensive datasets for more accurate analyses.

- **Mandate ongoing data publication and updates while optimizing methods of data collection. One of the touted benefits of online data is “real time” access as data can be made available shortly after collection.** It is therefore insufficient for open data policy to only mandate the one-time release of a data set, because information becomes outdated as soon as new data is generated. In order to ensure that the information published is as accurate and useful as possible, specific requirements should be put in place to make sure government data is released as close as possible to the time that it is gathered and collected. To optimize data quality and timeliness, disclosure regulations should take advantage of online data-collection methods. Electronic filing, also known as “e-filing,” is one method of optimizing the quality and timeliness of data collection.
- Ensure permanent access to data

How to Implement Open Data policy

- **Create binding regulations that incorporate realistic timelines for implementation.** Creating regulations or guidance help to steer the policy and creates a map for the successful execution of the policy. Regulations must be explicit in aiding the oversight committee with compliance. Deadlines or milestones must also be incorporated in the policy for the completion of specific phases of the Open Data project such as data release and scheduled reviews.
- **Appoint an oversight authority.** A single authority should be tasked with overseeing the creation, implementation and management of the open data policy to ensure that expertise is available for this highly technical process. The team will also resolve conflicts and ensure compliance with new open data measures. It is important to note that creating oversight does not require new staff but the responsibility can be distributed among public sector personnel with the requisite skill sets.
- **Incorporate the public’s perspective into policy implementation.** For the success of the Open Data programme the governments should create meaningful opportunities for the public to share their concerns about data quality, quantity, selection, and format, as well as the user-friendliness of the website or portals. This feedback should also officially form a part of the considerations during the policy review process.
- **Create processes to ensure data quality and mandate future review of potential changes to this policy.** An effort must be made to keep data up-to-date, accurate and accessible. Similarly, as the release and quality assurance process must be ongoing, the policy must be dynamic in order to keep up with current best practices and feedback from the policy oversight body. There should be mandated periodic reviews of the Open Data policy.

- **Ensure sufficient funding for implementation including potential partnerships.** The implementation of open data policy should be done in the context of the policy being sustainable and the “openness” of data being permanent. It is therefore imperative that sufficient funding is earmarked for both the execution and maintenance of the Open Data initiative. One way to do this is to consider partnerships which can assist in identifying funding sources. These partnerships can also be useful in increasing the availability of open data, and lending their expertise in data mining and open data.
- Ensure that the datasets published are not static, but are regularly updated and maintained by the custodian government agency
- Encourage and stimulate the local developer community by supporting and facilitating innovation events and activities that encourage the use of open data; eg. Digijam 3.0
- Encourage/Endorse collaborative innovation ventures between Government Agencies and Civil Society organizations (eg. the recent Code-for-the-Caribbean initiative between RADA in the Ministry of Agriculture, the Mona School of Business & Management, UWI and Slashroots Foundation)
- Provide incentives for the release of non-private, non-competitive open data by private sector companies such as Utilities (eg. Electricity consumption data for public sector agencies)

Policy Components

- In general, four (4) types of policy mechanisms have emerged from countries that have issued Open Data policies.
- Executive orders: The signature example of an open data executive order was the President Barack Obama’s Open Data Directive.
- Non-binding resolutions: This is a lightweight policy tool that is typically used as a declaration of intent by a city or state Government to signal a commitment to open data initiatives
- Internal Regulations: Guidelines issued internally by a department of Government on Open Data best practice, for use by other Government departments and agencies
- Legislation: that becomes enacted as law is the most binding example of open data policy tools. The most referenced example comes from San Francisco which started as an “Executive Directive” that was eventually turned into legislation.

Other Considerations

- Beyond the specific actions geared at the release and publishing of Open Data, there are other progressive Policy initiatives that should be considered by the Jamaican Government to ensure that Open Data policy does not end with statements of good intention and the publishing of a few data sets. The value in Open Data is realized, not from the publishing of data sets, but in their use and re-use by a wider group of stakeholders and interests. Government policy can encourage this in a number of ways:

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APPENDIX: ECONOMIC VALUE OF OPEN DATA GLOBALLY

Table 5: Economic Value of Open Data to Jamaica based on International Studies			
Authors	Open Economic Value to Jamaica	Data Value to	% of GDP
Pira (2000) (UK)	9.85		0.75
Pira (2000) (France)	6.57		0.5
Dekkers et al (2006) (Switz)	3.28		0.25
Houghton (2011) (EU)	18.38		1.4
Houghton (2011) (Australia)	11.82		0.9
Wirtschaftliche A (France)	3.02		0.23
Table 6: Open Data Estimates for Jamaica			
	Estimates (Billions)		
Lower Bound	3.02		
Mid-Point Estimate (Mean)	8.80		
Upper Bound	18.38		



ABOUT CaPRI

The Caribbean Policy Research Institute (CaPRI) is a not-for-profit, public policy think tank based at the University of the West Indies, dedicated to the provision of impartial, evidence-based knowledge to inform economic and social policy decision-making in Jamaica and the wider Caribbean.

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