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Editorial Board

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Editorial

Dear Reader,

The Journal of Arts Science and Technology (JAST) is the flagship journal of the University of Technology, Jamaica and its publication is in keeping with one of the objects of the University of Technology Act, to "preserve, advance, and disseminate knowledge through teaching, scholarship and research . . . and to make available the results of such research . . . to promote wisdom and understanding." The collection of papers in this issue of JAST covers a range of topics that reflects and underscores the multidisciplinary nature of the journal.

The issue's lead paper, **The Potential of Systematic Land Registration as a Tool for Jamaica's Sustainable Development**, addresses the important and topical subject of land. The paper critically discusses the relatively new concept of systematic land registration in Jamaica. One of the main objectives of this paper is to highlight the benefits of systematic registration of lands and its direct connection with the achievement of Jamaica's development goals.

The second paper, **A Perspective on Land Records and the Jamaica Cadastral System**, also addresses land, and it posits that, to improve or reform a cadastral system, various assessments must first be done to ascertain the aspects that can be made more efficient or more effective. The paper discusses the history and current status of the cadastral system in Jamaica against the background of the Cadastre 2014 vision and subsequent evolutionary cadastral theories.

Paper three, **Establishing a Fuel Economy Database for Jamaica Under Global Fuel Economy Initiative**, is about the Global Fuel Economy Initiative (GFEI) that was set up to assist governments and their transportation stakeholders to realize improvements in the average fuel economy of new light-duty motor vehicles (LDV) by 2030. This paper presents and discusses the rigors of establishing a local database for Jamaica, lessons learned, and challenges faced; the paper also demonstrates the use of output data for making recommendations to inform policy formulation.

The fourth paper, **Developing a GIS-Based Mobile Application for Heritage Education in Jamaica**, addresses gaps in knowledge of the tangible heritage sites that exist in Jamaican communities and investigated the utility of a pro-

totype Geographical Information System-based heritage education mobile application (app) as a possible solution.

Paper five, **The Perceptions of Jamaican Pharmacists on the Introduction of Pharmacist Prescribing to Jamaica**, investigated the important issue of the perceptions of Jamaican pharmacists toward pharmacist prescribing, the training required, and the identification of the barriers they perceived to the expanding scope of the profession.

The sixth paper, **School Leadership Response to External Evaluation Conducted by Jamaica's National Education Inspectorate**, breaks new ground by examining the perceptions and responses of the leadership cadre at a selected high school in central Jamaica to the inspection process of the National Education Inspectorate (NEI).

Paper seven, **Health Information Management Leadership Through the Triple Lens of People, Policy and Practice**, positing that effective leadership in Health Information Management (HIM) could help to enhance the practice and build capacities to meet the future needs of the profession, examined the perspectives of health care workers of leadership in HIM and sought to identify appropriate solutions to leadership problems in the field of practice.

The eighth and final paper, **Management as an Academic Discipline: An Examination of Whether the Profile, Structures and Nomenclature of Programmes in the Caribbean Region Facilitate Workforce Mobility**, examined the differences (as well as the similarities) and illuminated the changes and the harmonization of the structures of degree programs that are needed to facilitate the mobility of graduates to work and make contributions throughout the Caribbean region.

Paul W. Ivey, PhD
Editor-in-Chief

Acknowledgement

The Editorial Board and Management Committee of the Journal of Arts, Science and Technology (JAST) express thanks to Professor Cynthia Onyefulu for her service as the Managing Editor from 2010 to 2019. Additionally, the Committee recalls with gratitude Professor Onyefulu's ready acceptance of the request of then President, Professor Stephen Vasciannie, to assume the position of Editor-in-Chief after Mr. Martin Henry's sudden passing. Professor Onyefulu was appointed Editor-in-Chief in 2019 and served until December 2021. During her tenure, she demonstrated dedication and meticulousness that ensured the continuity of the Journal at its customary high standard.

Paul W. Ivey, PhD
Editor-in-Chief

The Journal of Arts Science and Technology

The Potential of Systematic Land Registration as a Tool for Jamaica's Sustainable Development

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Abstract

Jamaica has made clear its intention to achieve a higher stage of development by 2030. To achieve this goal, it has adopted measures to better utilize its natural and other resources. Optimal utilization of land presents itself as a contributing factor to development. Land titling enables the registered proprietor of land to unlock the economic potential the land contains in the form of equity. This means that persons having a registered title in their name for the land they own may access money from lending institutions for business ventures or other economic pursuits, thus increasing the opportunities to improve their quality of life. So, the implementation of a system of land registration that facilitates increased levels of land registration is necessary for improving economic growth. Consequently, any State should pay attention to the method it employs to facilitate land registration. In Jamaica, there has been a move from sporadic registration (which is an ad hoc system of registration that requires persons to voluntarily approach the state to make an application for a certificate of title) to systematic registration (which is a systematic approach to surveying, adjudicating, and registering parcels of land on an area-by-area basis). Systematic registration has proven to be successful in other parts of the Caribbean. The sporadic approach was not as effective as was thought to be necessary so the Jamaican Government introduced what is expected to be a more effective form of accounting for the lands across the island, namely, systematic registration. Systematic registration is a more sensible

and beneficial approach than a voluntary, sporadic system. It promotes greater efficiency and improves the utility of land registries, expedites security of tenure and, ultimately, serves as a better enabler of economic growth and sustainable development and is indeed the right way to go for Jamaica.

Keywords: Land Titling, Land Registration, Systematic Registration, Sporadic Titling, Land Adjudication, Cadastre, Sustainable Development, Vision 2030

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Introduction

Jamaica, like other developing nations has embarked upon a journey to achieve economic growth and sustainable development. An undeniable feature of this journey is the recognition that the efficient use of land is inextricably linked to national development. Indeed, land is irreplaceable, ordinarily, it is finite yet valuable and versatile. This notion has not been lost on the Government of Jamaica (the 'Government') as it has sought to address the issue of land titling across the Island as land titling or land registration stands as an integration element in many socio-economic activities including the reduction of land disputes, poverty reduction, economic development, land use planning and land management. Ultimately, land registration and the efficient use of land are key factors in the equation to produce national development.[1]

If development is the objective and the optimal utilization of resources is a key input of development, then the idea to facilitate the best use of real property, land – a resource – is logical. Land titling makes it possible to account for parcels of land and account for their use to synchronize the 'best-use attribute' of a parcel of land with its actual and current use at any given point. Consequently, any State should pay attention to the method it employs to facilitate land registration. In Jamaica, traditionally, the Government has taken a sporadic approach to land titling. This approach has not proven to be as effective as is necessary, despite several initiatives that have been introduced to increase titling activity. Consequently, more recently, the Government introduced what is expected to be a more effective form of accounting for the lands across the Island, systematic registration. Systematic registration is a more sensible and beneficial approach than that of a voluntary sporadic system. It promotes

greater efficiency and improves the utility of land registries, expedites security of tenure and, ultimately, serves as a better enabler of economic growth and sustainable development and is indeed the right way to go for Jamaica.

This paper seeks to critically discuss the relatively new concept of systematic land registration in Jamaica. One of the main objectives of this piece is to magnify the benefits of systematic registration of lands and its inescapable connection with the achievement of development goals in Jamaica. It does so in four parts. Part 1 discusses further the importance of land titling and Part 2 details the operation of sporadic and systematic titling in Jamaica. In Part 3, there is an analysis of the apparent benefits of systematic registration vis-à-vis sporadic titling; and in Part 4, final recommendations and conclusions concerning land titling in Jamaica are made.

Methodology

A mixed method approach was used in this paper. Both primary and secondary sources were used. Primary data were obtained through an interview with the Chief Executive Officer of the National Land Agency who is also the Commissioner of Lands for Jamaica. Secondary data in the form of journal articles, research papers, other scholarly materials, policy papers, legislation as well as information obtained from the National Land Agency website were examined in the preparation of this research. A review of these materials formed the primary methodology employed in this research.

Part 1: Importance of Land Registration

Widespread holding of property rights can have positive consequences on society. Where landowners and other occupiers of land can acquire clear title to land that provides identification for the best use of said land, there is likely to be increased agricultural productivity, increased market activity and general improvement in the development of a society. The types of economic benefits that may be derived from increased land titling may be categorized in the following two ways: economic benefits for landowners and economic benefits for the State.

Economic growth for individual landowners

The fact is that being a registered title holder can open many windows of opportunity which redound to the economic benefit of title holders. One such way is the ability for title holders to access credit by creating collateral. Landowners can unlock the equity in their properties to access credit from financial institutions. This in turn may be used to: start businesses, finance higher education for themselves or family members, improve property or finance other investments.[2] Another benefit is the possibility for the title holder to increase the value of their property as titled properties generally attract higher sale prices than unregistered properties.

Economic growth for the State

The State also benefits from increased registration of land. Where new titles are created, income for the State naturally flows from land transactions such as transfers on sale, addition of names, notation of marriages and notation of deaths.[3] Additionally, increased titling is likely to attract greater investment in the country as international investors have a preference to deal with registered lands. The process of becoming the registered owner of unregistered lands can be cumbersome and includes the hassle and expense of investigating the 'root of title'.[4] When lands are registered, there is a guarantee by the State that the person registered as proprietor is the true owner of the land. An investor-purchaser, therefore, is not required to investigate the validity of a title registered to the vendor as he is assured that it would have been thoroughly investigated and approved before it was first registered.[5] Additionally, the fact that registered lands better and more clearly indicate the proper use of land signals to investors that they can engage with greater certainty and thereby increases the likelihood of actual investment.

Part 2: Sporadic Titling and Systematic Registration in Jamaica

Different countries have employed different strategies when it comes to land registration. In the Caribbean, for the most part, there seems to be a predominant inclination towards voluntary sporadic titling systems. However, over time there has been a degree of transition towards systematic land registration. Some Caribbean countries or territories that have transitioned to systematic land registration and achieved total parcel registration include Anguilla, Anti-

gua & Barbuda, British Virgin Islands, Cayman Islands, Montserrat, Turks & Caicos Islands and St. Lucia.[6] So, it appears that the systematic land registration approach has yielded much fruit. It seems clear that systematic registration has the potential to bring about universal land titling in the Caribbean. It would seem reasonable, then, that the Caribbean States that have been unsuccessful at achieving this level of success by using the sporadic registration system should set out on a path to gradually implement the successful, systematic system. This Jamaica has done.

Sporadic Titling

One key feature associated with sporadic titling is that it removes the burden and responsibility of land registration from the State and places it on the landowner who may or may not fully appreciate the value of this exercise. It treats registration of land on a case-by-case, voluntary and ad hoc basis as it is marked by a system of registration that requires individuals to voluntarily approach the State to make an application for a certificate of title. This highlights an inherent difficulty with this system as its success is heavily dependent on the good judgment and financial liquidity of individuals. Nonetheless, the process of sporadic registration is generally triggered by the need for property owners to register their parcels of land as part of the formal requirements to complete transactions, such as the sale of the property.[7] While there is some incentive for the landowner to register his land, he must take the initiative so to activate registration and bear the brunt of the cost, especially sometimes high survey-related costs.

Another feature of the sporadic titling system is that the issue of establishing root of title and evidencing claims to ownership is of high importance and priority. There is therefore heavy reliance on documentary evidence as proof of ownership.[8] The Referees of Titles or other named government official critically reviews applications for registration to ensure good root of title. This level of attention and scrutiny bodes well for any system. However, the necessity of heightened scrutiny, and the risk of inefficiency, may be a result of the increased possibility of the existence of fraud inherent in a system that is dependent on individual applications. By placing the obligation of registration on individuals, the natural human tendency to undermine and flout rules for selfish benefit is more likely to be awakened. Certainly, fraud can exist in any system but it is increasingly more difficulty to address, reduce, eliminate instances of fraud,

even in a properly-functioning system, when there exist multiple drivers and initiators of the system.

Certainly, from the state's perspective, sporadic registration is less expensive than systematic registration, at least in the short term.[9] This is so because the state is spared from the major portion of the cost of registration. However, the passing of the cost to the landowner has been shown to be a reason for the low participation of individuals in efforts to improve rates of land titling. Also, this passing-off highlights other socio-economic realities in the society, for example, the inequality of access to land titling facilities. Citizens with lower socio-economic statuses have limited access, and in some cases, are excluded by reason of their inability to afford the necessary services associated with land titling.

The case in Jamaica bears out a number of these features of the sporadic titling system since that system had been the primary mode of registration in Jamaica until 2020 when systematic titling was formally introduced as an additional mode of titling. Prior to 2020, the Government sought to increase the capacity of the sporadic titling regime by introducing a number of programmes, including the Land Settlement Project in the 1940s, Project Land Lease in the 1970s, Operation PRIDE in 1995 and Emancipation Lands in 1997.[10] More recently, the Government of Jamaica implemented, with a fair degree of success, the Land Administration and Management Programme (LAMP). LAMP's operations were eventually subsumed under the National Land Agency (NLA) to become The Land Administration and Management Division (LAMD) of NLA in 2018.[11] Another significant phase of improving the voluntary sporadic titling regime in Jamaica included the creation of the Land Access for National Development Programme (Project LAND) in September 2011. This was designed to help individuals occupying land for which they had no title obtain a Certificate of Compliance (COC) for their unregistered lands.[12] This initiative was grounded in the Facilities for Title Act (FTA) and the Registration of Titles Cadastral Mapping and Tenure Clarification (Special Provisions) Act, 2005 (the 'SPA 2005').

Despite the Government's efforts, there is still a large portion of unregistered land across the Island. It would appear, then, that a new strategy had to be deployed. Under LAMP, one of the more success initiatives, as of April 2014, some 20,315 applications for registration were received. Of that amount, only 4,590 new titles were produced.[13] Consequently, the Government proceeded on a phased-in approach to implementing the systematic registration system that is expected to yield better results.

Systematic Land Registration

Unlike the sporadic registration system, systematic registration is initiated by the titling agency on behalf of the State. Systematic registration presents, as the name suggests, a systematic approach to adjudicating, surveying and registering parcels of land on an area-by-area basis as distinct from an application-by-application basis. This approach is normally utilized in order to register whole districts or communities. Experts are engaged to 'survey land plots, measure boundaries, gather evidence and adjudicate ownership rights'[14] within a general area. A key feature of this kind of titling system is the deliberate action and commitment from the State. The International Federation of Surveyors has indicated that systematic adjudication and titling are the ideal methods for building a comprehensive cadastral component in a county's land administration since having a comprehensive cadastre, an up-to-date parcel-based land information system containing records of interests in land[15] is viewed as critical to the growth and invigoration of land markets and the reduction of conflicts over land.

In 2020, Jamaica introduced systematic registration through the enactment of the Registration of Titles (Amendment) Act 2020 (RTA) and the Registration of Titles Cadastral Mapping and Tenure Clarification (Special Provisions) (Amendment) Act 2020 (the 'SPA 2020'). This systematic registration system will operate concurrently with the existing sporadic system. Also, as a feature of systematic registration, the Jamaican system will be state-driven, state-organized and state-funded. The expectation is that with the introduction of the systematic registration system, there will be an increase in the levels of land registration in Jamaica. Specifically, the goal is to secure the registration of 20,000 parcels of land in three years, starting in 2020.[16] This process of implementing systematic registration involves the work of the recently-established Adjudication Services Division (ASD) of the NLA that has been mandated to also assist applicants who have been in open, undisturbed and undisputed possession of their land for twelve (12) years or more to claim ownership of said land.[17] Again, the objective is to achieve greater levels of land registration given, the marginal success that has been achieved in the past.

Worthy of repetition is the fact that only 4,590 titles were produced from 20,315 applications over fourteen years while Jamaica focused its efforts on sporadic registration. This is significant when compared to the numbers in St Lucia where that State was able to register all 33,287 parcels of land in its jurisdiction in only three years. The fact that there are still some 350,000[18]

unregistered parcels in Jamaica, the rate of registration of 4,590 parcels over 14 years seems painfully slow. Even though Saint Lucia is significantly smaller than Jamaica and its use of demarcation maps instead of cadastral maps is known to more quickly provide coverage for unregistered parcels, the 'time versus titles produced under the programme' disparity appears still to be very wide. Undoubtedly, though, the introduction of systematic land registration places Jamaica on the same path to success as its CARICOM[19] partner.

Part 3: Benefits of Systematic Land Registration

There is a great deal of confidence in this system of land registration and there exists a number of general benefits to society. Proponents of systematic land registration argue that 'once the benefits of using a register begin to outweigh the costs, there will be more public participation, [even though] encouragement is continually required.'[20] Also, the overarching benefits of systematic registration in some measure ignite debate and conversation about its possibility to allow for national economic development to impact members of society at all levels. Sean Johnson, Land Administration Specialist, explains that,

> by relaxing the surveying requirements [as is customarily done during systematic land registration], people, particularly the poor, are not denied the opportunity to register their land and gain from any benefit that may flow from formally held title. People may choose not to realize any benefit . . . but at least they have a choice.[21]

There are also more specific benefits that auger well for national development. Two specific areas in which systematic land registration serves as an enabler of economic growth and sustainable development, at least, when compared to sporadic registration, concern its ability to:

Promoting greater efficiency and utility of land registries

A 'land registry' is 'the institution or office responsible for land registration in a country'.[22] It may also be referred to as a cadastre, spatial cadastre or legal cadastre. Cadastres generally assist in land taxation, real estate conveyancing, and land redistribution as they provide relevant information to persons involved in land transactions such as attorneys, surveyors, dealers, valuators etc. They also provide users with complete inventories of land holdings which can support land development, urban and rural planning, land management,

and environmental monitoring.[23] It is reasonable, then, to conclude that given the nature of the role that cadastres play in land administration, their effective and efficient functioning is critical.

Griffith-Charles points out that social and economic benefits can be derived from the use of the systematic registration system as it provides for comprehensive cadastral coverage.[24] It better allows for a more complete cadastre and so produces a significant benefit to those who rely on the registry for information. Where there is an efficient use of the registry, there is an increased capacity of individuals to access more data, particularly data for parcels which may otherwise not be available. This administrative efficiency invariably will produce spill-overs and impact other systems and functions in society, ultimately creating a path to development. Even better, when the systematic registration system is in line with principles of 'fit-for-purpose-land-administration, or FFPLA, efficiency is more likely to be achieved.[25]

Expediting security of tenure

The lack of security of tenure creates significant instabilities and inequalities and limits citizens' ability to participate in economic development. It also undermines better environmental stewardship and deters responsible private investment due to the associated land risk.[26] This type of risk may include being excluded from participating in formal land administration systems and being denied the ability to safeguard certain land rights which may ultimately result in eviction, in the worst-case scenario. The poor and the most vulnerable are more likely at risk and they are constantly threatened by the possibility of eviction. High levels of insecurity of tenure can also result in conflict and land grabbing.[27] In the latter case, persons whose tenure is not secured may lose portions of their land holdings because of unregistered boundaries.

Jamaica is no stranger to property disputes and in many instances legitimate landowners are left with not much to defend against claims made by others seeking to either dispossess them or encroach on their property. Also, of significant impact, is the issue of not being able to exercise rights such as the right to be compensated if a property is being compulsorily acquired by the government pursuant to the Land Acquisition Act.

The risks associated with the insecurity of tenure may be mitigated by the clear demarcation of property boundaries. The International Federation of Surveyors suggests that systematic registration will give more people improved rights more quickly, thus supporting the general development impact of increased

security of ownership.[28] This is true as systematic titling produces titles at a greater rate than sporadic titling. Therefore, with security of tenure being a natural derivative of having a registered title it is reasonable to conclude that systematic titling will expedite security of tenure for the system's beneficiaries.

Possible obstacles to implementing systematic registration

The implementation of systematic registration as the new primary source for generating new land titles may present a few challenges. The foremost obstacle to the success of systematic registration is the high unit cost of obtaining a title that is placed on the Government.[29] However, this issue may be addressed by reducing survey costs by relying on less expensive methods such as drone and satellite aerial surveys. In some cases, where appropriate, there could also be the compiling of demarcation and index maps rather than traditional high-accuracy cadastral maps. In any event, the economic benefits of systematic registration may ultimately be realized in the form of achieving low-cost solutions to completing comprehensive land registration as well as the increased use of the completed cadastre itself. Consequently, the issue of cost to the Government should not serve as a deterrent to the continued implementation of systematic registration.

Another obstacle may be citizens' scepticism towards government-controlled systems. It is no secret that in some parts of the world, particularly in the Caribbean, there is a learned pessimism with respect to the government's ability to provide efficient services that are likely to feed a general rejection of any new system, including a new systematic registration system. To combat this issue there needs to be public education not only on the value of registration of land but also education on the general operation of the systematic titling system and its proven success elsewhere. In Jamaica, this type of public awareness may help to respond to scepticism and fear and allow for the anticipated success of the systematic registration system.

Finally, in the Caribbean, the concept of 'family land' operates as a 'cultural institution symbolising a social response to oppressive colonial land regimes and also, more mundanely, as co-ownership of land in undivided shares by the descendants of the original purchaser.'[30] The issues arising from the informal institution of family lands have been described as a pervasive undercurrent of non-participation in the formal land sector and informality of land transactions in the Caribbean[31] because family lands play an important social and symbolic role by preserving the cultural connection between this type of institution,

family relations and heritage. There, then, seems to be a conflict between the 'family lands' concept and the systematic land registration. At least two reasons appear to account for possible contention at this junction: 1. the model of systematic registration that is being implemented in Jamaica is expected to eventually lead to absolute title being vested in one or a number of individuals' names(s) and 2. the concept of 'family lands' that is commonly known in Jamaica does not contemplate absolute ownership of lands but rather that the lands remain for the perpetual use and occupation by members of a specific family. Notwithstanding the obstacles that may be presented, the systematic registration system remains a viable option for Jamaica to achieve greater levels of land registration.

Part 4: Observations, Conclusions and Recommendations for Jamaica

General observations and recommendations

The benefits of systematic land registration accrue to both the landowner and the State. These benefits rest at least in part on the anticipated increase in land market activity such as sales and mortgages. In Saint Lucia, there was an initial increase in land market activity immediately following the completion of systematic registration. While this was not sustained over the medium to long term, it highlights the possibility for Jamaica to gain the desired increase in registration immediately and signals the need for Jamaica to be careful to implement policies that are likely to produce sustained growth, for example, by embarking upon strategic planning and introducing a solid governance framework. It must be noted that Jamaica has a dedicated and robust economic growth mechanism steered by the Ministry of Economic Growth and Job Creation (MEGJC). This is significant as there are agencies and departments dedicated to stimulating investor interest in Jamaica as an ideal locale to do business. This ensures that there are adequate opportunities for investment in areas such as, for example, agriculture and logistics which demand significant land space and thereby give rise to the relevance of adequately titled lands. An example of one such agency is the Jamaica Special Economic Zone Authority (JSEZA) whose mandate is to, among other things, attract investments and regulate geographical spaces which have been designated as Special Economic Zones.[32]

It is apparent from a comparison of both sporadic and systematic registration systems that sporadic titling is not the best suited option in Jamaica where the objective of the registration system is to achieve complete or majority registration of all parcels. One reason for this concern is the cost associated with the sporadic titling system. Sporadic registration is less likely ultimately to be less costly when the unit cost of obtaining a survey plan for individual applicants as opposed to having a cadastral map prepared for an entire area containing several parcels – the wholesale effect – is considered. This is true even where the costs are absorbed by the State. It is questionable, however, as to whether the approach taken by Jamaica, that is, to bear the cost of the title only to recoup it subsequently over an unspecified timeframe rather than completely absorbing the cost of the application, will be eagerly welcomed by its citizens. Notwithstanding, systematic registration is demonstrably cheaper than sporadic titling for landowners.

An area that continues to present a particular challenge in Jamaica is the interaction of systematic registration and the existence of family lands. The objective of family ownership as distinct from individual ownership in land may be defeated in the current dispensation of systematic registration if family members to whom lands are registered, fail to put in place arrangements that would secure the occupation right of other family members who would take up occupancy after completion of registration. It is perhaps at this juncture that a form of cost-benefit analysis is to be undertaken to consider whether priority should be given to crafting a system which would accommodate preserving the core features of the traditional 'family land' concept or solely advance to a regime that encourages formality and proper estate planning together with the additional benefit of empowering persons by granting the ability to unlock the economic potential of property they occupy. It may appear that the latter has been the focus in Jamaica. It seems that the cost of the benefit of a formalized structure and increased access to capital may be the eventual loss of a traditional feature of our society. However, this is not necessarily the case. Perhaps there can or will be a reconsideration of any established focus or an attempt to reconcile the competing interests. It is possible to consider the introduction of systematic registration not as the death knell of the 'family land' feature but more of a modification of same, that is, if proper estate planning and the use of the creation of living trusts are effectively promoted. In the case of the latter, a transition to such a system in which persons practise proper estate planning and creating living trusts would positively impact the legal sphere in Jamaica as it would give rise to greater attorney intervention in assisting

with preparing wills and drafting trust deeds. This level of formality is likely to positively impact Jamaica's outward perception as a suitable country to do business, in keeping with corresponding national objectives under its Vision 2030 development plan.

Jamaica's Vision 2030

In assessing the possible outcomes of systematic titling, it is also important to consider how these will impact or be impacted by the National Development Plan for Jamaica's Vision 2030. Vision 2030 is a development plan that aims to make Jamaica the place of choice to live, work, raise families and do business.[33] This initiative contains the Jamaican Government's strategic road map to guide the country to achieve its goals of sustainable development and prosperity by 2030. The plan has been broken down into corresponding national strategies, national outcomes and national goals. While neither land administration reform nor systematic registration has been specifically identified as means of achieving any of the stated goals, outcomes or strategies, these ideas can easily be connected to said goals, outcomes and strategies. Table 1 below illustrates how systematic land registration corresponds to specific strategies, outcomes and goals of Vision 2030.

Table 1: Connection between Systematic Registration and Vision 2030

National Strategy	National Outcome	Goal	Proposed benefit of Systematic Registration
Expand opportunities for the poor to engage in sustainable livelihoods	**Outcome #3** – Effective Social Protection & **Outcome #8** – An enabling business environment	**Goal #1**- Jamaicans are empowered to achieve their fullest potential.	Allows for expedited security of tenure
Strengthen public institutions to deliver efficient public goods and services.	**Outcome #6** – Effective governance	**Goal #2** – Jamaica's society is secure, cohesive and just.	Promotes greater efficiency and improves the utility of land registries
Increase access to capital	**Outcome #8** – An enabling business environment	**Goal #3** – Jamaica's economy is prosperous	Provides for an accurate account of more lands

Other specific recommendations

If the destination is universal or majority titling, systematic registration is the recommended vehicle. However, as this system is implemented, especially in the Caribbean context, there are a number of issues that should be addressed to increase the likelihood of an improved rate of titling.

In the case of Jamaica, in light of the fact that the requisite resources already exist to conduct aerial and satellite imagery and other forms of survey, all of which have proven sufficient to identify parcels for annexation to titles, Jamaica should pursue legislative amendments to allow for such surveys to be used for land titling. Also, to ensure that the benefits to the registry are maximized and sustained, a number of indicators that include accessibility, cost and security should be used as measures of tracking the performance of the National Land Agency's registries periodically.[34]

Even short of a short-term goal of universal titling, the general objective to reap national economic benefits suggests that targeted registration exercises that view areas with more marketable properties as the focus of systematic registration projects[35] are sensible. In this vein, there should be a collaboration between the NLA and The Jamaica Special Economic Zone Authority to create a "Fit for SEZ purpose" land registry that potential investors may consider when identifying areas that may appropriately suit their proposed business ventures. This registry should not only be comprised of state-owned lands but allow for private landowners to register lands which are suitable for development or use in economic activities, for example, agriculture, fisheries, etc. This may also contribute to improving the economic status of private individuals by directing income from commercial lease arrangements to private individuals. This would also help to stimulate land market activity through registration of commercial leases on titles and perhaps even increasing mortgage applications for persons who seek to improve their properties in order to increase the value at which it may be leased.

A few contributing factors to the unsuccessful implementation of systematic registration have been: weak institutions, inappropriate laws and regulations, high costs, complexity, lack of capacity, inadequate maintenance, long implementation time frames and being inappropriate for the local context and conditions.[36] Consequently, there is a need for the Government to continue to implement strong institutions and enact appropriate laws, regulations and policies as well as continue the review of same in light of changes in the national

and global environments. This is to be done to ensure that the benefits of the systematic registration system are sustainable in the long-term.

Conclusion

Systematic registration is demonstrated to have greater benefits than sporadic titling in that it allows for promoting greater efficiency and improves the utility of land registries as well as expedites security of tenure. It provides for significantly increased rates of mapping and titling. While Jamaica actively pursues increased economic development, it stands to benefit from continued bolstering of the required social and legal framework for systematic registration. In doing this, Jamaica, and any other developing nation, positions itself to advance its economic status and moves closer to the goal of achieving sustainable development.

Notes

1. Oluwadare CO and Kufoniyi O, 'Comparative Study of Sporadic and Systematic Methods of Land Titling and Registration in Ondo State, Nigeria' in Dunu Williams, Albert Idowu, Dauda Dahiru (eds), 'Advances in Built Environment Research: The Proceedings of Environmental Design and Management International Conference (Obafemi Awolowo University 2017).
2. The Most Honourable Andrew Holness, (Land Titling Ceremony: Land Administration and Management Programme (LAMP) August 23, 2016) <https://opm.gov.jm/speech/lamp-land-titling-ceremony/> accessed 1 July 2021.
3. Charisse Griffith-Charles, 'Application of FFPLA to Achieve Economically Beneficial Outcomes Post Disaster in the Caribbean' (2021) 10 Land 475.
4. Gilbert Kodilinye, *Commonwealth Caribbean Property Law* (4th edn, Routledge 2014) 4.
5. Ibid.
6. St Lucia seems to be a pioneer with respect to land registration in the English-speaking Caribbean, having successfully completed its land titling project in the mid-1980s. See Greenville Barnes, David Stanfield, Kevin Barthel, 'Land Registration Modernization In Developing Economies: A Discussion Of The Main Problems In Latin America, Central/Eastern Europe, Latin America and the Caribbean' (2019) 12 URISA Journal 27.
7. Gérard Ciparisse, *Multilingual Thesaurus on Land Tenure* (Food and Agriculture Organization of the United Nations 2003).
8. In Jamaica, in cases where the applicant has no documentary proof of ownership showing title for himself and predecessor in title for 40 years, applicants have to

submit supporting statutory declarations to prove ownership rights by possession from two persons who have known the land for at least 30 years. See 'Land Titling' (National Land Agency) <https://www.nla.gov.jm/content/land-titling> accessed 10 May 2021.

9. 'FIG Statement on the Cadastre' (International Federation of Surveyors, FIG Publication No. 11, 1998) <https://www.fig.net/resources/publications/figpub/pub11/FIG%20Statement%200n%20the%20Cadastre.pdf> accessed 4 July 2021.
10. Munsung Koh and Garfield Knight, 'LAMP II: A Land Registration Project in Jamaica' (International Federation of Survyors 2014) <https://www.fig.net/resources/proceedings/fig_proceedings/fig2014/papers/ts01c/TS01C_koh_7075.pdf > Accessed 4 July 2021.
11. Charnele Henry, 'Two New Divisions at NLA' (*Jamaica Information Service*, 2 April 2019)<https://jis.gov.jm/two-new-divisions-at-nla/> accessed 10 May 2021.
12. Munsung Koh & Garfield Knight (n 10).
13. Athaliah Reynolds-Baker, '4,590 New Titles Produced Under LAMP Up To April 2014' (*Jamaica Information Service*, 4 June 2014) <https://jis.gov.jm/4590-new-titles-produced-lamp-april-2014/> accessed 10 May 2021.
14. Oluwadare CO and Kufoniyi O (n 1).
15. 'FIG Statement on the Cadastre' (n 9).
16. Henry (n 11).
17. 'Systematic Land Registration in Jamaica' (*National Land Agency*) <https://nla.gov.jm/system/files/Systematic%20Lan%20Registration%20Brochure%200utline%20_doc-reduced.pdf> accessed 10 May 2021.
18. Interview with Cheriese Walcott, Chief Executive Officer and Commissioner of Lands for Jamaica, National Land Agency (St. Andrew, 11 June 2021).
19. CARICOM or the Caribbean Community is a regional integration movement in the Caribbean. It was created by the Treaty of Chaguaramas in 1973. CARICOM Member States, with the exception of The Bahamas, now participate in a single market and economy that was established under the Revised Treaty of Chaguaramas in 2001.
20. Sean G. Johnson, 'Building the Cadastral Framework: Achievements and Challenges in the English-Speaking Caribbean' (The Tenth Annual Conference for Geospatial Data Infrastructure, 2008) <https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.504.4345&rep=rep1&type=pdf> accessed 23 May 2021.
21. Ibid.
22. Gérard Ciparisse (n 7).
23. 'FIG Statement on the Cadastre' (n 9).
24. Griffith-Charles (n 3).
25. FFPLA is a land administration concept which acts as an enabler for implementing global standards for land administration in developing countries. See Stig Enemark, Robin McLaren and Christiaan Lemmen, 'Fit-For-Purpose Land Administration: Guiding Principles For Country Implementation' (United Nations Human Settlements Programme UN-Habitat 2016) <https://gltn.net/download/fit-for-purpose-land-administration-guiding-principles-for-country-implementation/?wpdmdl=7979&ind=0> accessed 3 July 2021.
26. Ibid.

27. Ibid.
28. 'FIG Statement on the Cadastre' (n 9).
29. Johnson (n 20).
30. Johnson (n 20).
31. Ibid.
32. Special Economic Zones (SEZ) refers to designated geographical areas with special economic regulations that differ from general trade, tax and investment rules. Essentially, there are special incentives for businesses that operate within an SEZ.
33. 'Vision 2030 Jamaica: National Development Plan' (Planning Institute of Jamaica 2009) <http://www.vision2030.gov.jm/Portals/0/NDP/Vision%202030%20Jamaica%20NDP%20Full%20No%20Cover%20(web).pdf> accessed 31 May 2021.
34. The International Federation of Surveyors has identified seven (7) indicators to measure the success of an effective cadaster, namely:
    1. **Security**: financial institutions should be confident to rely on the system in granting mortgages and there should be certainty of ownership and parcel identification. The system should also have sufficient security and disaster mitigation controls;
    2. **Clarity and Simplicity**: the system should be clear and simple to understand and to use;
    3. **Timeliness**: up-to-date information should be available in a timely manner;
    4. **Fairness**: the system should be both fair and be perceived as being fair, separated from political processes and providing equitable access through simplified procedures, and reasonable fees;
    5. **Accessibility**: the system should be capable of providing efficient and effective access to all users;
    6. **Cost**: the system should be low cost or operated so that recovery of cost is fair and does not unduly burden users; and
    7. **Sustainability**: adequate mechanisms for maintaining the system. Including timely completion of the cadastre keeping records updated.
35. Griffith-Charles (n 3).
36. Enemark (n 25).

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A Perspective on Land Records and the Jamaica Cadastral System

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Abstract

To improve or reform a cadastral system, various assessments must first be done to ascertain the aspects that can be made more efficient or more effective. In this paper two such assessments, which were carried out on the Jamaican cadastral system are reported on: a status assessment to describe the extant state, strengths and weaknesses of the cadastral system, including all its components; and a user needs assessment to gain a subjective perspective on what users hold important for a satisfactory experience when interacting with the system. The paper discusses the history and current status of the cadastral system in Jamaica, against the background of the Cadastre 2014 vision and subsequent evolutionary cadastral theories. The findings demonstrate that the system falls short regarding its compliance with cadastre 2014. Additionally, the paper presents the results of the user needs study, which sought to ascertain: the routes most commonly used to access land records; sources of data most frequently utilised; level of user satisfaction; most important features of land records and suggested improvements. The results indicate that attorneys formed the largest group to access land records in Jamaica; eLandjamaica is the lead source for land information; the interactive map (iMap now eLandjamaica) is the most frequently used source; the Land Titles Division commands the highest level of customer satisfaction; accuracy of data is of the greatest importance and a lower cost for services is of least importance.

Keywords: Cadastral System, Cadastre, Land Records, Cadastre 2014, Jamaica

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Introduction

Jamaica is the third largest island in the Caribbean, with a land mass of 10,991km, spanning 235km in the east-west direction and 56km in the north-south direction. The island is primarily mountainous, rising to 2,256m in the east at the Blue Mountains (Black, Buisseret, Bryan and Ferguson, 2022). Several parts of the island can be characterized as unpopulated wilderness, being a road less jungle of limestone pinnacles and glades. This poses challenges for the surveying community, in terms of establishing and maintaining a dense enough network of ground control, or efficiently accessing the thirteen stations in the Virtual Reference System (VRS), for geo-referencing surveys.

According to the Worldometer elaboration of the latest United Nations Data, as of November 15, 2022, the island's population is 2,991,721 distributed over the estimated 869,138 parcels of land, recorded on the Land Valuation Roll of parcels in Jamaica, as of November 1, 2022 (National Land Agency, 2022). The efficient development and use of land in Jamaica are hampered by several factors related to a less than desirable cadastral system of capturing, storing and retrieving land parcel data. The World Bank Group's Doing Business Report (2022) ranks the process of registration of property in Jamaica as 85th out of more than 190 economies assessed in the world. Of immediate concern is the slow pace at which registered titles are produced and the attendant problem of dual registration of land. Only 62.06% of all the land parcels are registered under the island's voluntary system of land registration (National Land Agency, 2022). Currently, some 20% or 600,000 (200,000 households) of our citizens reside in more than 580 squatter settlements across the island, the majority (316) of which are in urban areas (Government of Jamaica, 2022). Furthermore, the development plan approval process is very slow, as a result of the lack of an up-to-date and readily accessible system of informing on the zoning of land and land use. Additionally, an inefficient system of storing land records creates difficulties for land surveyors to arrive at the most accurate and up-to-date information on their subject parcels and the adjoining parcels for surveying. The process is further complicated by the fact that the National Land Agency's checking of survey plans, conducted twice prior to land registration, can still miss important relevant information, resulting in erroneous plans being registered, which could also lead to dual registration of land.

Cadastral reform can provide some improvement to the problems of lack of currency, accuracy, and comprehensiveness of the system. This paper reviews

the current status of the cadastral system in Jamaica, against the background of the benchmark *Cadastre 2014* and demonstrates that the system falls short in its compliance with Cadastre 2014, and posits actions that need to be taken to achieve this *Cadastre 2014* compliance.

The paper then provides the results of a study conducted among users of land records. The study sought to ascertain sources mostly used to access land records; sources most frequently utilised; the level of user satisfaction; what was regarded as the most important features of land records; and suggested improvements. One of the key findings is that among a list of desired improvements, a possible reduction in the cost of accessing data ranks low in importance to customers.

Cadastral Systems

Cadastral systems record the relationships between humankind and land (van Oosterom, Lemmen, 2003 and Williamson, 2000). Therefore, cadastral systems should contain the historical and current status of each land parcel with respect to real property rights, mutation, land consolidation, cadastral mapping, registration of real properties, ownership and legal rights, as well as real property valuation and taxation as is the case in developed countries such as Finland and Sweden (United Nations 1996). The core components of a cadastral system, as shown in Figure 1, are a land registry and a cadastre (Cagdas and Stubkjaer, 2008, Silva and Stubkjær, 2002, Zevenbergen and Bogaerts, 2000, Larsson 1991), which result in a cadastral system comprising two (2) parts: a written record or register of the names and rights of owners in what is known as a land register which is supported by the juridical system of the country, the assessed value of the land; and a detailed boundary description, provided through maps depicting each parcel of land (UNCHS 1990). The core juridical aspect has been given a generic structure in the Land Administration Domain Model (LADM), which has been described in a formal International Standards Organisation (ISO) standard (ISO 19152:2012). Notwithstanding the significance of a cadastral system to a country's social and economic development (Ali and Shakir, 2012), there is still a low number (forty) of countries that have in place a robust cadastral system that conforms to the idealised standard. Attempts to introduce technology to modernize existing systems or develop new ones have failed in the absence of strong leadership to champion its proper implementation or in the absence of the large quantity of resources required to attain this goal (Reyes and Griffith-Charles, 2002, Jones and Land, 2012; Jones 2013).

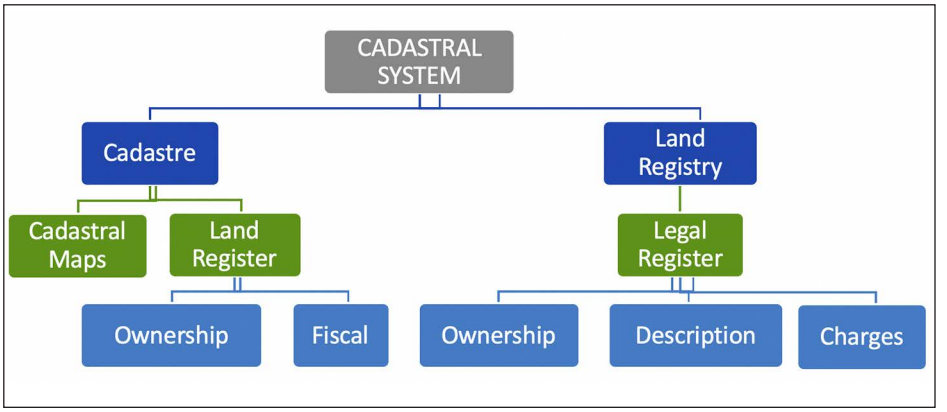

Figure 1: Cadastral System

The Cadastral System in Jamaica

The Cadastral System of Jamaica has its foundation in the Torren's System of land registration, introduced in 1869, and deeds registration, introduced in 1879, with a fiscal cadastre playing a supporting role since the 1970s. The system is voluntary and therefore sporadic in its approach to registering land. Transactions are effected on both registered and unregistered land through a system of deeds, of which only some are recorded at an Island Records Office, which is independent of the Land Registry, Cadastral surveys are done according to the fixed boundary system.

Prior to April 1, 2001, land records were dispersed across four (4) government departments – Office of Titles (since 1869), Lands Department (since 1930), Survey Department (since 1938), and Land Valuation Office (since 1970), each with their own 'silo' of land information. All these departments are now amalgamated under the umbrella of a National Land Agency (NLA), with the express aim of integrating and harmonizing these records towards improvement in quality, integrity and completeness. Notwithstanding the creation of the NLA, the land records are still fragmented and heterogeneous – with some records converted to digital form, while others remain in analogue form. Initiatives such as web-access have not yet eliminated the need for users to continue to traverse between these four divisions of the agency, in search of land information related to a single parcel of land. Substantial investment however has been made in ICT, including hardware and specialised software, for the respective divisions. This is used to support the business processes of not only their division but also those other divisions within the agency.

The NLA which employs almost 800 members of staff is the organization entrusted with the Cadastral System of Jamaica. Notwithstanding, transactions are allowed to continue under a deeds system operated by an Island Records Office (IRO), an arm of the Registrar General's Department (of Births, Deaths, Marriages, etc.), which operates under the aegis of Record of Deeds, Wills, Letters and Patent Act 1681; Probate Deeds Act 1863; Records Office Act 1879; and the Conveyancing Act 1889 (November 30). All except the latter preceded the Registration of Titles Act 1889 (October 1). At the IRO, land transaction deeds, prepared and submitted by, for example, parties to an indenture/conveyance, attorneys, The National Housing Trust and the Peoples' Cooperative Bank, are being recorded and stored since 1663, for safekeeping, in hard copy only. Prior to deeds being recorded, the requisite stamp duties must be paid at the Government Stamp Office. Storage of the documents is referenced by a Libre and Folio system.

The NLA which is headed by a Chief Executive Officer (CEO) comprises ten (10) Divisions: Land Titles, Land Valuation, Surveys & Mapping, Estate Management, Land Administration & Management, Adjudication Services, Information & Communication Technology, Corporate Services, Corporate Legal Services and Business Service, as depicted in Figure 2. Each division is headed by a Senior Director.

Given the genesis of the agency and notwithstanding its mantra, "One Agency, One Goal", the four (4) core land records divisions' (Land Titles, Land Valuation, Surveys & Mapping and Estate Management) are not fully integrated. The legal

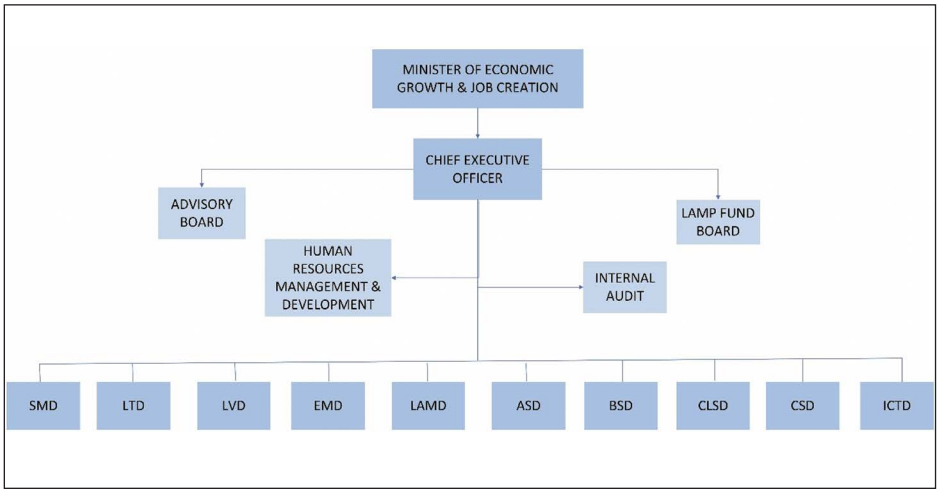

Figure 2: Institutional Framework of the National Land Agency, Jamaica
(Source: National Land Agency, Jamaica)

framework constituted by an Executive Agency Act has as its principal objects: the establishment of executive agencies and the promotion of their prudent, effective and efficient management; fostering proper management, accountability and transparency, through the provision of appropriate mechanisms; and the delivery of goods and services effectively and efficiently. The Agency is also governed by six (6) other pieces of legislation, namely: Registration of Titles Act 1889; Registration (Strata Titles) Act 1969; Land Valuation Act 1957; Land Surveyors Act 1944; Crown Property (Vesting) Act 1960; and Land Acquisition Act 1947, to which the land records divisions were subject, prior to becoming a part of the agency.

The Surveys & Mapping Division (SMD) is responsible for the provision and maintenance of a geodetic infrastructure is comprises of approximately 8,000 ground control points and thirteen virtual reference stations (VRS). The Division also performs surveys of state lands, checking and certification of survey plans submitted by both private and its own state surveyors, to be used in connection with applications for registered titles. It is in the process of building a cadastral map, which has its foundation in a land valuation cadastral index. This is the product of a Parcel Data Management System (PDMS) developed on an ArcGIS 9.3 platform, by International Land System (ILS) now Thompson Reuters. The Land Titles Division (LTD) provides state guaranteed land titles, under the Torrens system of land registration, as well as recording dealings (mortgages, transfers, leases, caveats, transmissions, and marriages) on the certificates of title.

The Land Valuation Division (LVD) assesses the unimproved value of all parcels of land for the imposition of property taxes, payable by the owners or occupiers of land. The Estate Management Division (EMD) is the property manager of all state-owned lands, with the ultimate objective of securing optimal use of the asset. The Division divests the state's real estate in accordance with a Land Divestment Policy which sets out the procedures to be followed for this activity. The Division leases and sells state property in single parcel blocks and lots from land subdivided into what is called land settlement schemes. There are currently hundreds of land settlement schemes in Jamaica, for which the Division applies for certificates of title, and then leases or sells the lots. The Division is also responsible for renting state property.

The NLA has a number of achievements, which enhance the quality of the cadastral system and land administration in Jamaica. These include *eLandjamaica*, through which property information (certificate of titles, valuation roll reports, caveat cards, deposited plans, strata plans, and enclosure maps), may

be accessed online. It also allows users to spatially identify land parcels online against the background of IKONOS imagery, and also obtain Certificates of Title reference numbers, Land Valuation Numbers, street addresses, scheme addresses and parcel areas. A document Tracking Facility, allows users to check the status of documents lodged with the agency; while Live Web Chat provides a forum for real-time text based communication between users and the agency's customer service agents. Also available are Application Notices for First Registration, which facilitates users' search for approved applications, and displays the application number, address, description of the property and the type of application; online requests for Search Certificates and certified copies of titles and documents. The system accepts requests for search certificates and certified copies of titles and other documents; Online Fee Calculator, for calculating fees for title registration, transfers, mortgages, applications to note death and transmission applications. A *Parcels Statistics* displays the number of registered and unregistered parcels of land, and transfers per parish. It also includes a Queue Management System, which is used to manage appointments for customers with officers of the LTD and the delivery of other services; and a Digital Submission of Survey Plans and Cadastral Maps Portal, to facilitate Surveyors' Digital Submission of Plans and Maps for Examination and Certification. Their next major undertaking will be the introduction of Electronic Titling.

Each division has core function software including:

- The Lands Registration System (LRS) in the LTD which is used to track all transactions that are effected on documents submitted for processing, is custom-built by International Land Systems now Thompson Reuters (Rabley and Falk, 2005, Samuels, 2008);
- The Parcel Data Management System (PDMS) in the SMD is a customized standardized application used by the division for the creation and maintenance of tabular parcel information, including the creation and assignment of a unique Parcel Identification (PiD) number for each parcel to be registered under the Registration of Titles Act (Samuels, 2008), and to create new parcels in a cadastral index map, that are to be added to the tax roll, which is the Land Valuation database;
- The Land Valuation System (LVS), the first computerized system for the government of Jamaica, which was developed by Fiscal Services Limited (FSL) of Jamaica, now eGovernmentJamaica (eGovJa), an entity within the Ministry of Science, Technology, Energy and Mining (MSTEM), is

responsible for the implementation of ICT projects within the Government service, is used by the LVD to maintain a valuation roll to support the taxation of all properties and appraise all privately owned properties in Jamaica for the purposes of property taxation, as well as properties owned, leased or to be acquired by the government, and record changes in property information;

- The Government Revenue Management (GRM) system called the Jamaica Estate Management System (Jamaica – EMS) was implemented under a contract awarded to Thompson Reuters and will be used to store and retrieve data held in the over 35,000 paper files being loaded into the system through a combination of keyboard entry (textual) and scanning (graphics and documents).

Another achievement of the agency is the establishment of the VRS network under a contract with Spatial Innovision Limited, which should play a major role in the Agency's drive to develop a survey accurate cadastral map of the island, by having surveyors geo-reference their surveys using VRS, or any of the approximately 8,000 ground control points, where the VRS is not available, as a result of limited data coverage in some parts of the island. To date, over 280,000 parcels have been compiled by the Agency in a survey accurate form, as it transitions out of a cadastral index map form, by pulling survey plans from the records, computing and digitising boundary lines and geo-referencing blocks of parcels using Global Navigation Satellite System (GNSS) surveying techniques, including VRS, as well as the Spatial Adjustment technique in ArcGIS Software.

Cadastral Reform

A cadastral system, in evidencing the acknowledged and accepted relationship between person and state in relation to land, may demonstrate this linkage with a deed or title form of land registration. The procedure of first registration may be performed in a systematic or sporadic manner, using a general or fixed boundary approach for making Cadastral Maps. It may have a fiscal background or a legal one and may operate in a centralized or decentralized framework (van Oosterom and Lemmen, 2003; Zevenbergen and Bogaerts, 2000). The combination of registry records (ownership, parcel numbers, area, land use and land values) and maps (physical location of parcels) in France is what laid the foundations for modern-day cadastral systems (Ting and Williamson,

1999b). Cadastral systems, driven by: computerized land title systems, digital cadastral databases, reforms in institutional and legal frameworks, reforms in cadastral practice by land surveyors, the advent of coordinated surveys and the introduction of systems to enhance cadastral information delivery, have progressed from being mainly fiscal to multi-purpose systems, as a direct consequence of increased complexity in the humankind-land relationship (Ting and Williamson, 1999a) and the attendant decision-making requirements that will impact sustainable development and social justice (Ting and Williamson, 1999b).

Technologies that can forge a synergy between the legal register and the cadastre have emerged in response to the FIG's 1994 twenty-year vision of the cadastre, as articulated in their Cadastre 2014 booklet (Kaufmann and Steudler 1998). One example is the International Land Systems, Swedesurvey's GIS integrated architecture of a Land Registration System (LRS) and Arc Cadastre (see Figure 3). The LRS is a computerized property title processing system, which features cashiering, document intake, document imaging, and indexing, while ArcCadastre, which is built on Environmental Systems Research Institute's (ESRI's) ArcGIS platform, is a parcel management system which includes ESRI's survey analysis for land surveying and mapping processes and Safe Software's Feature Manipulation Engine to convert file formats (Rabley and Falk, 2005).

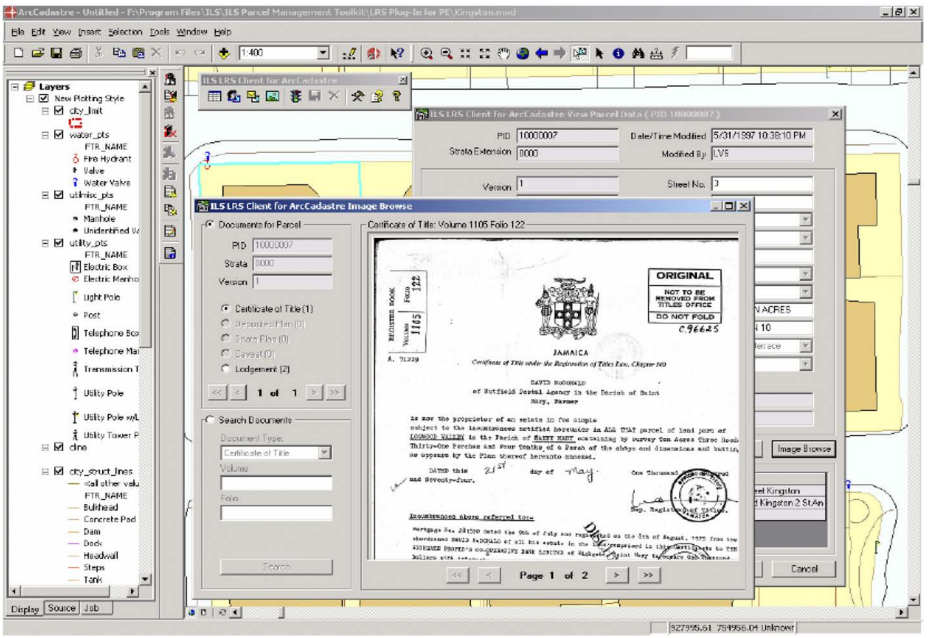

Figure 3: Example of LRS and ArcCadastre integration (Rabley and Falk, 2005)

The provinces of New Brunswick and Nova Scotia in Canada integrate their land registration and cadastre functions through software developed by CARIS Geospatial Software Solutions called CARIS LIN, which features: administrative control – archiving and auditing, cashiering, document storage, land information management, data integrity, increased internal efficiency and productivity, external access, systems integration, land registration (deeds and titles), and add-on modules for imaging, electronic submissions, land gazette for easements etc., internet browser, and cadastre maintenance through a Cadastre Production Database (CARIS CPD) (Mulholland & Pontes, 2005), pictured in Figure 4.

Given that several jurisdictions have already pursued similar transformations in their Cadastral Systems, from analogue to digital, integrating the legal register with the cadastre, and the likelihood of many more to follow, a standard structured format for storing data, one which will facilitate easy migration of data between systems and improve systems' communication, has been developed and reported on in the form of a Land Administration Data Model (LADM) (International Standards Organisation 2012; Van Oosterom; Lemmen and Uitermark, 2013) and its application (Tjia and Coetzee, 2012), includes a standard Social Tenure Domain Model (STDM) for peculiar circumstances to which the LADM could not strictly be applied, such as family

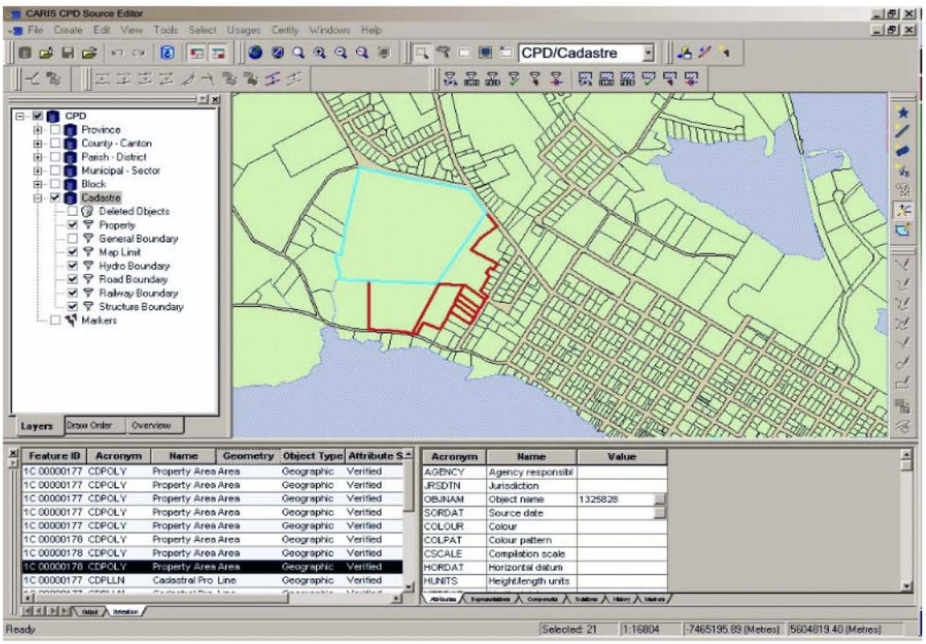

Figure 4: Cadastral Fabric Maintenance Interface (Mulholland and Pontes, 2005)

land and informal settlements (Griffith-Charles; Lalloo and Browne, 2013, Griffith-Charles, 2011), initiatives which are geared towards accomplishing the goals of Cadastre 2014.

Cadastre 2014

In 1994, the FIG Commission 7: Cadastre and Land Management, tasked the Working Group 7.1: Vision Cadastre, at the XX FIG Congress in Melbourne, Australia, with studying the trends and developing a vision of how Cadastral Systems should be functioning in twenty years (2014), proposing changes that need to be made, how these changes can be achieved, and to what extent technology may be incorporated to realize the goals. At the XXI FIG Congress in Brighton, UK, the FIG Commission 7 (1995) presented the results of the study in the form of a booklet entitled, "CADASTRE 2014 – A Vision for a Future Cadastral System". The report defines Cadastre 2014 as:

> a methodically arranged public inventory of data concerning all legal land objects in a certain country or district, based on a survey of their boundaries. Such legal land objects are systematically identified by means of some separate designation. They are defined either by private or public law. The outlines of the property, the identifier together with descriptive data, may show for each separate land object the nature, size, value and legal rights or restrictions associated with the land object . . . as well as the official record rights on the legal land objects . . . give the answers to the questions of where and how much and who and how (Kaufmann and Steudler, 1998, 15).

The report articulates six (6) statements that should guide the development of cadastres if full compliance with the standards were to be achieved by the year 2014. The statements can be analysed along with subsequent shifts in cadastral theories and technology.

Statement # 1: Cadastre 2014 will show the complete legal situation with land, including public rights and restrictions.

Full and transparent disclosure of all the facts concerning all land objects, including overlapping rights, is necessary for guaranteeing security of tenure and the sustainability of the use of land by a growing world population. The LADM specifies standards for the legal details of the cadastre making it simpler to structure but the STDM also includes extra-legal legitimate situations that need to be recorded in a modern cadastre.

Statement # 2: The separation between 'maps' and 'registers' will be abolished.

Technology can now replace analogue records and merge them to create "a one stop" for customers, facilitate easy updating of data, avoid data redundancy and errors, improve efficiency in the processes, and reduce costs and multiple fees to users (Krelle and Rajabifard, 2010). Technology provides faster interaction between datasets.

Statement # 3: Cadastral mapping will be dead, long live modelling.

Paper maps in their static content and fixed scale form did not offer flexibility in product delivery. Now it is possible to produce maps in digital form, with the ability to vary the product of map data stored according to a standardized model, with variables such as scale, format, and content. In digital form, it is easier to distribute and publish, replicate in various forms, and is not as vulnerable to destruction, as is the case with paper. Modelling 3D and 4D are being investigated to be mainstreamed into cadastres.

Statement # 4: 'Paper and pencil – cadastre' will have gone.

The application of modern technology, in the cadastral situation, is in Geomatics (GIS, CAD, GNSS, Satellite Imagery, LiDaR, Total Station), can accurately represent land objects to facilitate proper planning and efficient land use.

Statement # 5: Cadastre 2014 will be privatized. Public and private sectors are working closely together.

Both the public and private sectors need to be involved, the public sector for legal security necessary for any land registration system, and the private sector for an element of flexibility and customer friendliness. It is now advisable to have participation from the community. Participatory data acquisition processes speed up and make more effective the adjudication and titling necessary for comprehensive cadastres.

Statement # 6: Cadastre 2014 will be cost recovering.

Having considered the real costs and benefits of the Cadastre, taxes and fees (Government) (Private sector) are critical to the sustainability of the system.

Currently, a suggested fit-for-purpose process for constructing and maintaining the cadastre lowers the costs required to be recovered.

There is justification for the need for Cadastre 2014 against the background that a cadastre provides: good support for sustainable development. It is necessary for a vibrant and secure land market helps to avoid conflicts over diminishing resources, by supporting land use planning laws and with land transactions more secure and efficient, the economy will experience growth. The role of the surveyor in locating, adjudicating, defining and valuing legal land object, though to some extent under threat owing to greater ease in execution, using technology, remains unchanged. In essence, Cadastre 2014 as an inventory of rights, restrictions and responsibilities, is information technology driven, requires private-public partnership and should be cost effective.

Current Status

Since Jamaica operates a voluntary system of land registration, the cadastral system is not reflective of the true situation on the ground. The cadastre and the land registry data, are held separately in PDMS and LRS respectively, but are linked via a toolset developed as a plug-in for ArcMap, and bridges the gap between LRS and PDMS, as indicated in Figure 3. It is used by employees with the necessary privileges in LRS, to search, view, browse, edit, update, and exchange parcel information created in PDMS, and to browse the Certificate of Title, Deposited Plan, Strata Plan, Survey Plan, Caveat and Lodgements related to the parcel, allowing LRS users to seamlessly retrieve spatial parcel information, update parcel attributes, retrieve parcel features, retrieve and display parcel documents from DSS and creation and retrieve historical parcel data (Samuels, 2008). The PMS feature is not available to customers of the agency, and even within the agency, there is a restriction on its use. Even though this restriction provides security for the data, it can reduce the transparency and accessibility of the system, which can increase the possibility of fraud and reduce public support.

A cadastral index rather than a cadastral map, albeit digital, is what still obtains in Jamaica, so that parcels are not, in many instances, georeferenced. Parcel data models are not yet in use in the current architecture. The government has taken several steps to replace the paper and pencil cadastre with digital data, such as the cadastral index and parcel information (title reference, valuation number, street address, parcel area), which are available over the internet. Scanned images of registered titles and other documents are also

available via the internet. Although the private sector carries out most of the cadastral surveys in Jamaica, the certification of their plans, under regulation, is the responsibility of the Surveys & Mapping Division. However, the pace of implementing reforms to facilitate, for example, digital submission of plans, is being hampered by a less than desirable relationship between the agency and surveyors, a situation which is now showing signs of change. All services provided by the agency, except for the internet access to the digital cadastral index and parcel data, attract a user fee, which sees the Agency enjoying full cost recovery. If Jamaica is to achieve the ultimate goal of a fully operational and sustainable Cadastral System, one that is Cadastre 2014 compliant, it will need to implement a more expedient approach to the completion of an island wide cadastral model (Newsome and Opadeyi, 2012), institute systematic compulsory adjudication and registration, formalize alternative systems of registration (deeds, land), and improve its parcel mapping strategies, which are features of other Caribbean territories that boast more modern cadastral systems (Johnson, 2008).

User Needs Survey

As a means of ascertaining the level of usage and satisfaction of the Agency's customers, with the land records management system and also to obtain their suggestions for improvements, a six-question survey was administered via the online service "Survey Monkey®", to eight hundred and fifty-six (856) customers (attorneys, land surveyors, valuation surveyors, realtors, real estate developers and other miscellaneous users), and by telephone to one (1) user, a realtor. These are the only online customers of the agency. The six questions questionnaire was comprised of five (5) closed-ended/fixed format/quantitative and one (1) open-ended/free-format/qualitative question. A pre-test on the questionnaire was carried out using Survey Monkey © to send the questionnaire to potential respondents as a means of evaluating the transmission and receipt process and to obtain comments as to whether or not the questions were clear, and suggestions as to how to improve the outcome of the survey. After receiving comments and making the suggested changes deemed to be necessary, the questionnaire was administered over a four-month period, in batches based on the groups in Table 1, which indicates the levels of response by each group, to the survey.

A total of two hundred and three (203) responses were received. Fourteen (14) of these respondents identified themselves with more than one of the groupings, while nine (9) recipients opted out, and one hundred and twelve

Table 1: *Respondents to questionnaire*

Group	Total	Number of Respondents	Percentage Respondents
Attorneys	258	57	22%
Realtors	123	42	34%
Real Estate Developers	35	11	31%
Land Surveyors & Trainees	83	57	69%
Valuation Surveyors	68	30	44%
Others	289	19	7%
Total	**856**	**216**	**25%**

(112) email addresses bounced. Some of these were for persons who had more than one email address and were found to have responded to the questionnaire from another address. Most of the bounced email addresses were for those persons who fall outside of the five (5) established groups. Based on the answer to question 3 regarding (low frequency usage of land records) from those of this group who responded, it can be assumed that most recipients were one-time users, and were therefore not called for a new email address or administered the questionnaire by telephone. Fifty-one (51) telephone calls were made to the other recipients, mostly attorneys, reminding them to complete the survey, following the lack of response to two Survey Monkey® administered reminders. This effort substantially improved the response to the survey. Among those who were called, some of the telephone numbers were out of service, and the business name is not listed in the telephone directory.

Although the percentage of respondents among the lawyers was comparatively low, the number is considered to be an adequate reflection of the views of this sector, when qualitative question 6 is considered. This is because, responses were received from some very prominent members of that profession, who are very experienced in the use of land records, and therefore, qualitatively the level of response from this group is considered highly favourable.

Results

The responses to questions 1–5 are as presented in the pie charts in Figures 5 to 9. Figure 5 indicates that attorneys were the largest group to access the records, followed by land surveyors, realtors and valuation surveyors. Figure 6 indicates

that the most accessed database was that of the elandjamaica followed by the Land Titles Division, iMap, and the Land Valuation Division. However, Figure 7 indicates that iMap was used most frequently followed by elandjamaica and the Land Titles Division. Figure 8 indicates that more persons found the highest level of satisfaction with the service provided at the Land Titles Division followed by eLandjamaica and iMap. Figure 9 indicates that most persons found the accuracy of data to be the most important attribute of the service followed

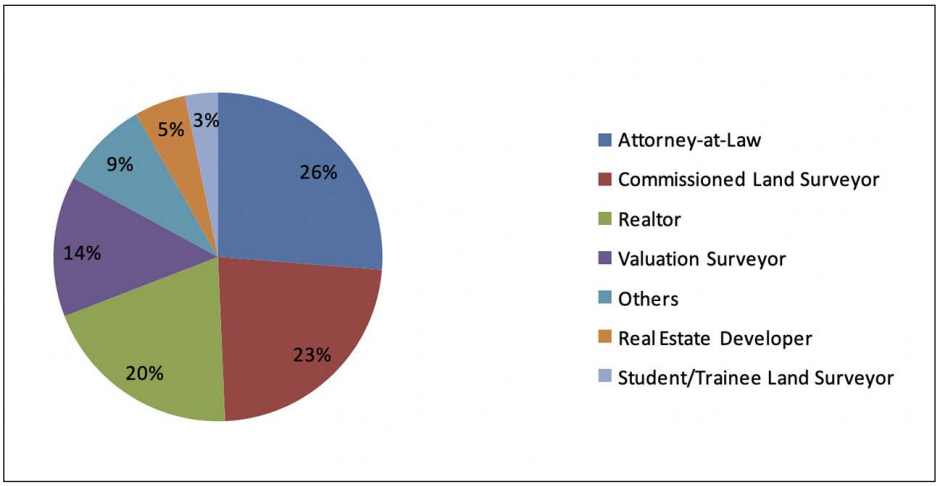

Figure 5: User profile

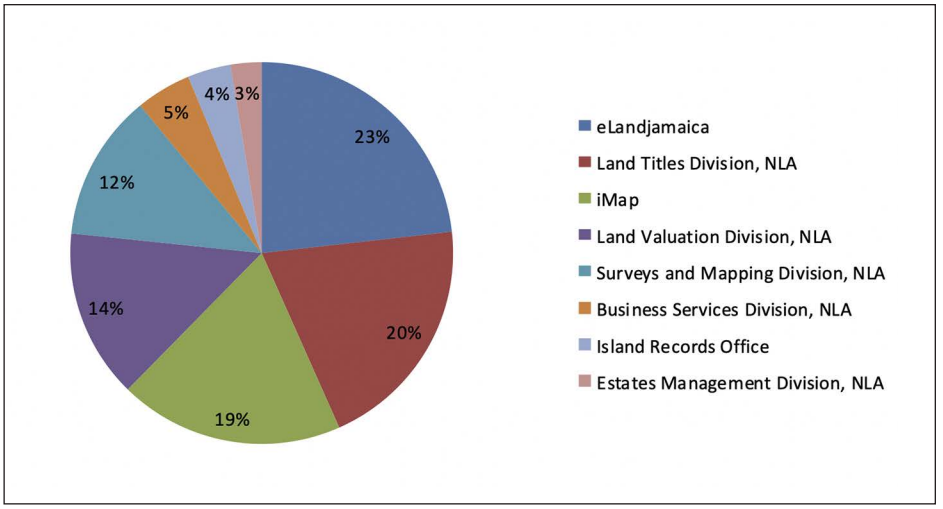

Figure 6: User sources

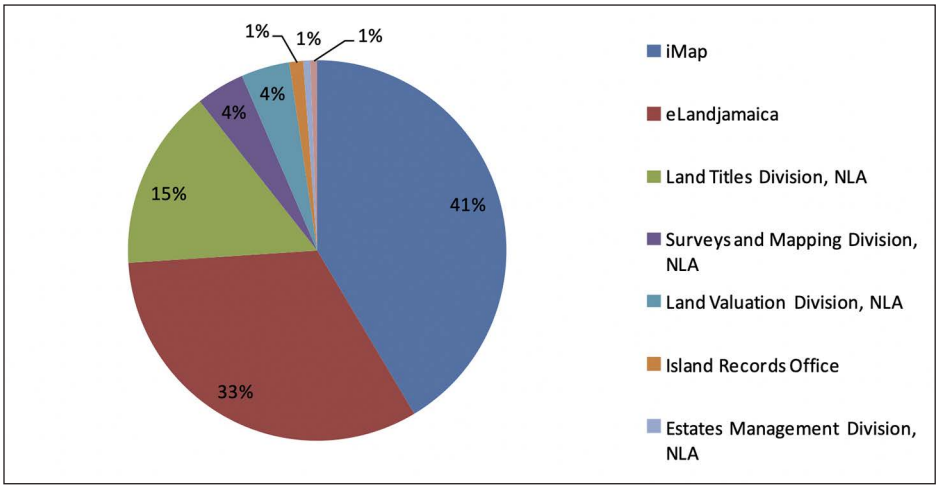

Figure 7: Frequency of use (more than thrice/week)

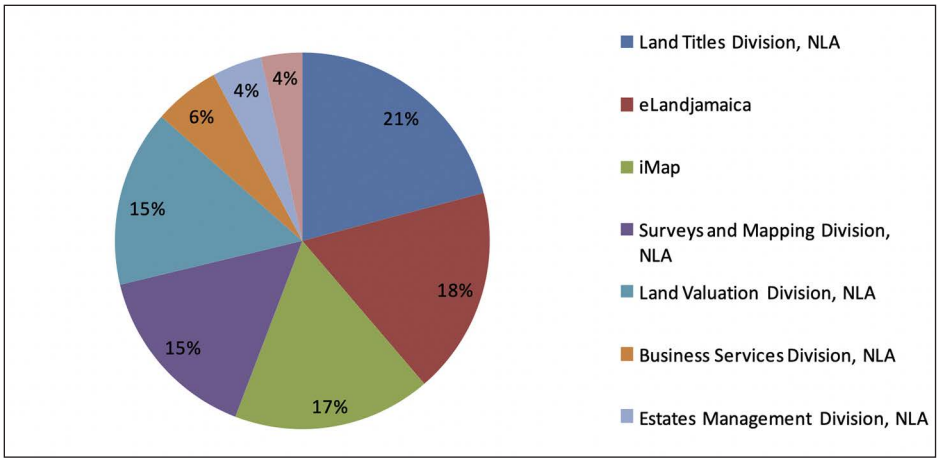

Figure 8: Level of satisfaction (satisfied)

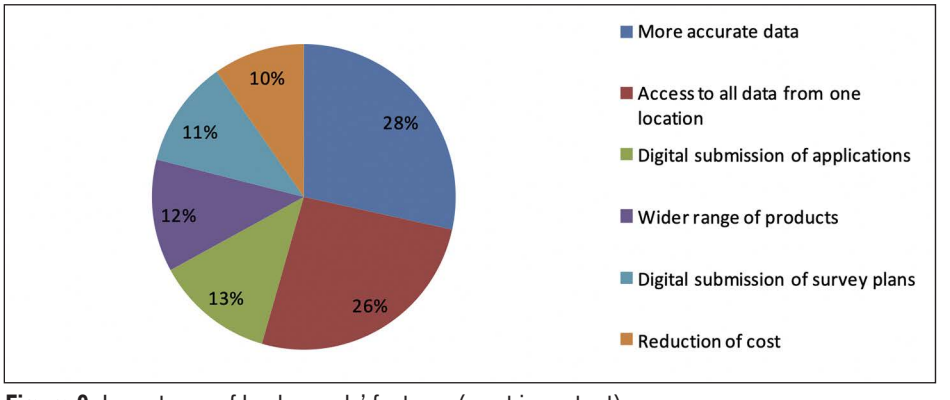

Figure 9: Importance of land records' features (most important)

by the ability to access all data from one point. Surprisingly, a lowered cost was the least important requirement of the service.

Question 6 attracted a wide variety of comments and suggestions. A total of four hundred and seventy-three (473) responses were received for this question, with a high level of correlation among the responses. These are summarized on a division-by-division basis, below:

Land Titles (90 responses)

Ninety (90) of the respondents expressed the desire to see a reduction in processing time on transactions as the overwhelming desirable feature of the Land Titles Division. Calls for a more detailed database, online access to all data, and the ability to search the database by name were among the suggestions of users of Land Titles data. Users would also like to see Land Titles' records cross-referenced with the examination and record index numbers of surveyors' plans and access to a digital map of all surveyed parcels provided. The elimination of the "save and except" clause on titles, i.e. part(s) of a titled parcel that was previously removed, and noted in a new title, which still bears the original plan of the parcel, is another demand of users. The separation of deposited plans from titles in the online access to a title is also a concern to users.

Surveys & Mapping (70 responses)

Seventy (70) of the respondents expressed the desire to see a reduction in processing time and the possibility of online tracking of plans submitted for pre-checking is high on Surveys & Mapping division users' wish list. Of major concern too, is the need for the Division to introduce technology, so that surveyors' plans can be stored electronically, which would make the retrieval of these plans more efficient. The databases should also link plan examination and record index numbers to title reference and valuation numbers. The users would also like deposited plan numbers and miscellaneous numbers to be displayed on the relevant parcel in iMap, by creating a more detailed database. This should ultimately allow online access to scanned surveyors' plans and linked these plans to registered titles. Digital submission of plans is being suggested to replace the existing analogue approach to submission and checking.

Land Valuation Division (59 responses)

Fifty-nine (59) users of these records would like the Cadastral Index to be

updated with pre-checked plans. They also desired more expedient processing, improved accuracy and currency of the records, allowing searches by name, and more data (sales data – size of building) to be made available in the database. A reduction in service cost is also suggested.

Estates Management Division (24 responses)

Twenty-four (24) respondents expressed the desire for the EMD to provide information on sales, leases, and available land for sale in electronic form. The respondents also expressed a desire for the digitisation of the EMD records of plans and maps to facilitate e-search and web access. Speedier processing is also demanded by this Division.

Business Services (26 responses)

Twenty-six respondents expressed a desire for the Business Services Division to improve its turnaround time for data delivery as well as the accuracy of its data, and to make more data available and accessible online.

Island Records Office (30 responses)

Thirty (30) users stated that deeds should be linked to land valuation and title reference numbers, in a database containing digitised records, which facilitates searches by party name or property name, and not just the date of recording of the deed. An improvement in the speed of processing deeds is also in demand.

eLandjamaica (82 responses)

eLandjamaica customers expressed the desire for all documents (e.g. caveats) to be accessible online; for a wider range of options for searches including the ability to search the records by name or keywords. The addition of property tax information; the linking of annexed, deposited and strata plans to titles; the flagging of titles in dispute; a link to iMap; online submission of applications; and more accurate data were also suggested.

iMap (93 responses)

The ninety-three (93) respondents expressed a desire for the display of geographic coordinates for use in Google Earth; hyperlink of photographs; more

accurate parcel representation and less cloud obstruction with updated satellite images. The addition of Thomas Harrison's and other cadastral maps with title reference numbers; search for parcels by name; tax roll data; display plan examination, record index and title reference numbers; and quicker updates, are features of iMap that users would like to see implemented.

Analysis

It is well acknowledged that not all recipients of questionnaires responded. According to a survey by Survey Monkey®, response rates are influenced by several factors: the researcher's relationship with recipients; the length and complexity of the questionnaire; incentives; and the subject of the survey. Their findings are that a response rate of 20%–30% for online surveys is highly successful and that a response rate of 10%–15% is about the norm. The response rate of this survey was 23.7%, and therefore the survey may be viewed as highly successful.

At the time of the survey, the Agency estimated its population of users to be approximately one thousand and ninety (1090), as their checks revealed that most of their customers, who are professionals, use eLandjamaica. Given that the sample size was two hundred and three (203), sample size calculations indicate that at the 95% confidence level, the responses to the questions on this survey are representative of the population within the confidence interval of ±6.25%.

The majority of the users of the NLA's land records are distributed around the four (4) groups of professionals involved in land transactions – Attorneys-at-Law, Commissioned Land Surveyors, Realtors and Valuation Surveyors. The users in the "others" category constitute the largest group of users, however, this group recorded the lowest response rate to the survey. This may be an indication of how much they know about the researcher and/or their lack of interest in the subject of the research, notwithstanding some of them being professionals in other aspects of the built environment. Most (11) of these respondents are low frequency users of land records, a possible explanation for why most recipients in this group did not respond, as they are quite likely to be one time users.

Users have a preference for online services, although a similar percentage of users attend the offices of the LTD to carry out their search of the records. LVD and SMD have the next highest numbers of users. As in the case of the LVD, many users need help from the staff, whereas, in the case of SMD, survey plans are not available in digital form online. The Business Services Division's

(BSD) figure is low, probably because most users of the SMD records are not aware that they are using the BSD records, as the records section where plan and map searches are carried out, is physically housed in the SMD, as they have always been, although it is now a part of the BSD. This is a change that most surveyors would not be aware of. Therefore, the vast majority of the responses to the question in favour of the BSD would be in relation to non-cadastral maps.

The high frequency of use (three times per week) of iMap and eLandjamaica by almost 75% of the users, underscores the fact that online sources are the favoured sources of land records for users.

Not many users are very satisfied with the services, with the highest percentages going to eLandjamaica (38%) and iMap (26%) in that category. The category of satisfied users found more favour with LTD than did the two online services. This demonstrates that the customer service at LTD finds favour with users, and continues to attract visitors to the office, even when the option of an online service is available.

There are not many surprises in the responses to the question of what feature of a land records system is most important. The majority are requesting more accurate data, supposedly against the background of having only a Cadastral Index rather than a Cadastral Map, at their disposal. There is also strong demand for access to data from one location. This is to be expected in light of the Agency being an amalgamation of four land records departments of government and a more aggressive approach to data integration, with a one stop location for delivery, whether online or a single physical location. This would have already been a part of the architecture of the institutional arrangement. Topping the list of suggestions from users in response to the sixth question is a reduction of processing time.

Solution/Recommendation

A Digital Land Records Management System (DLRMS), with the necessary technology (hardware and software) to accommodate data constituting the complete legal situation of all land parcels, by bringing together cadastre and legal registry data in one database. Employing data models such as the Land Administration Domain Mode is a solution to cadastral problems identified by users. A DLRMS can be designed to accommodate the digital submission of surveyors' plans to enhance the efficiency of the plan certification, storage and retrieval process. A DLRMS based on the LADM, will improve processing time within the respective divisions, given that it would be populated with

all land records in electronic form, as it was observed that much of the time spent in processing documents, is in accessing paper records. Users would like more accurate, more accessible records. To achieve higher accuracy in spatial position and attributes including all rights information, more of the existing data occurring outside of the cadastre needs to be captured and included. This includes information on unregistered land and informally occupied land.

Conclusion

Significant strides have been made in the development and nurturing of the Jamaica cadastral system. This is evidenced by major investments that have been made in ICT and human resources, which account for the progress to date. Also, the gap between 'map' and 'registers' is narrowing, given the close relationship between PDMS and LRS, while cadastral modelling is gaining attention through the building of a coordinate geometry fabric. The Agency subscribes to the concept of full cost recovery, in accordance with statement #6 of Cadastre 2014, although fees have not been increased since 2003. Paper and pencil maps have been replaced, and the Agency (public sector) and surveyors (private sector) are making strides in working harmoniously. It will take considerable time and effort for the land records of this cadastral system to reflect the complete legal situation on the ground unless a revolutionary approach to complete the island-wide cadastral modelling is pursued, systematic adjudication is expanded and less robust forms of recording land tenure are accepted as an interim step towards the established Torrens title. A fit-for-purpose initiative to improve the cadastre will therefore seek to target the positional and attribute accuracy of data in terms of its comprehensiveness, completeness and currency.

Glossary of Terms

CAD – Computer Aided Drafting/Design, which is software used to prepare digital drawings of land parcels and civil structures

FIG – Federation Internationale des Geometres of the International Federation of Surveyors.

GIS – Geographic Information System, which is used to manage land information

GNSS – Global Navigation Satellite System is a combination of several constellations of satellites, orbiting the earth and transmitting signals, which are logged by receivers, including mobile phones and used to determine the position of the device and its user.

IKONOS – a satellite source of high-resolution imagery. The imagery used in eLandjamaica is from IKONOS

LADM – Land Administration Data Model, used to model the framework of a formal system, which represents the relationship between people/organizations and land.

LiDaR – Light Detecting and Ranging technology which is used from an airborne platform to determine distances to objects on the surface of the earth.

STDM - Social Tenure Domain Model, a pro-poor land information tool, used to model the framework of an informal system, to represent the people–land relationship.

TOTAL STATION – An instrument used by Land Surveyors to electronically measure angles and distances.

VRS – Virtual Reference System which is a ground-based reference network of active Global Navigation Satellite System (GNSS) Receivers, which provides support to users of GNSS in determining their position.

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Establishing a Fuel Economy Database for Jamaica Under the Global Fuel Economy Initiative

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Abstract

The Global Fuel Economy Initiative (GFEI) was established to assist governments and their transportation stakeholders to realize improvements that can be made in the average fuel economy of new Light Duty Motor Vehicles (LDMV). The GFEI established a target of achieving fuel economy levels of 4.2 Lge/ 100km in new light duty vehicles by the year 2030 requires an in depth examination of the profiles of the local motor vehicle fleets. Motor cars make up large volumes of light duty vehicles which discharge harmful emissions which can be detrimental to public health and the environment on a whole. The World Health Organization estimates that every year, 2.4 million people die from causes associated with air pollution. The United Nations Environment through the GFEI has supported a project in Jamaica, a Small Island Developing state, whereby an established methodology was used to calculate the average fuel economy of new light duty imports. Currently, Jamaica has limited capacity to measure precisely, in real world conditions, vehicle environmental impact as field tested data such as grams of carbon dioxide per one hundred kilometres travelled (gCO_2/100 km) is unavailable. The GFEI guideline and methodology provide clear steps to developing research, which provides equivalent data. The primary activities were data processing (data collection, data delineation, sorting and analysis) for over 150,000 light weight duty vehicles and performing precise calculations based on the established fuel economy parameters. The results show that between 2005 and 2017 Jamaica's average fuel econ-

omy improved by 15.6 % with a calculated fuel economy of 7.11 lge/100km in 2017. With strong policy support, the improvements are expected to increase at a greater rate. This paper presents and discusses the rigors of establishing this database, and lessons learnt and challenges faced; the paper also demonstrates the application of output data for making policy recommendations.

Keywords: Global Fuel Economy Initiative (GFEI), Carbon Emissions, Light Duty Motor Vehicles (LDMV), Air pollution

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Introduction

The urgency of climate change requires equally swift, ingenious and deliberate action to adapt to present challenges and mitigate against future scenarios. Globally, a number of initiatives such as the Paris Climate Agreement – 2015 have been started to deescalate the dangerous levels of carbon emissions that threaten the environment. Fossil fuel dependent motor vehicles harm the environment by way of the emissions expelled throughout the lifetime of the vehicle. The mechanical functions of internal combustion engines (ICE) fuelled by gasoline and diesel lead to vehicle emissions which in large quantities contribute to air pollution and deterioration of air quality. The fuel economy indicates the vehicle's performance as it relates to the use of fossil based resources and the associated emissions According to Fulton (2014) fuel economy refers to the fuel used in relation to the distance travelled. Fuel economy estimates can provide a reliable basis for comparing vehicle energy performance and efficiency.

The Global Fuel Economy Initiative (GFEI), launched in early 2009, is a consortium formed by the United Nations Environment Program (UN Environment), the International Council on Clean Transport (ICCT), the Foundation for the Automobile and Society (FIA Foundation), the International Energy Agency (IEA), the International Transport Forum (ITF) and the University of California Davis (UC Davis). "In the ten years between 2005 and 2015, average vehicle fuel economy globally has improved by around 14% – the average amount of fuel needed to drive 100km has fallen from 8.8 litres of gasoline equivalent (lge) to 7.6 lge." (Global Fuel Economy Initiative Secretariat, 2018). The GFEI in particular has spearheaded exceptional work in the transpor-

tation – environment nexus with a primary goal to develop a fuel economy baseline to understand vehicle fleet, undertake a cost-benefit analysis/ impact assessment and modelling policy options that the Government of Jamaica can use to facilitate decision making and implementation.

The GFEI has supported 70 countries to develop their own policies to cut vehicle emissions. At the Paris Climate Change Conference in 2015, GFEI announced an ambitious goal aimed at increasing the number of participating countries to 100. The GFEI is working to meet GFEI's '50 by 50' goal of a 50% reduction [i.e. doubling] of average vehicle fuel economy by 2050. According to the GFEI (2018), achieving the GFEI target would save over one (1) Gt of CO2 a year by 2025 and over 2 Gt/year by 2050. This would result in savings in annual oil import bills alone worth over US $300 billion in 2025 and US$600 billion in 2050. Doubling fuel economy will have the correlating effect of significantly reducing the expected increases in carbon dioxide emissions from the transport sector.

Jamaica's natural resource limitations mean the importation of petroleum will remain main-stream until the local energy portfolio is fully developed to improve energy security through affordable diverse options. The research supports the draft National Transport Policy as one of its policy principles that highlight energy efficiency and includes a principal objective of ensuring all modes of transportation transition toward energy efficiency improvements.

Rationale

Taking action on the fuel economy within the transport sector will have two primary points of impact, the first being air quality and the second oil consumption. Local research regarding fuel economy was challenged by the data gaps which exist. These gaps exacerbate the limitations to performing accurate situational analysis and in-depth analysis of sector issues which are now heightened by the complexities associated with climate change impacts. Zermoglio and Scott (2018) noted that reducing transport sector risks will require modifying current policies and programs and implementing new ones to explicitly consider climate variability and change. The speed and will to act are often hampered by the need for decision makers to lead with evidence based research. With funding provided by the GEF to the tune of USD 200,000, this research is the first of its kind undertaken in Jamaica. While the primary use of the data is to address fuel economy concerns the information derived is useful to aid vulnerability scoping studies and contribute to risk management

strategies. Amidst the challenges of having reliable data, the use of that data has also come under scrutiny. A major benefit of this research is the capacity building that was offered to empower the local technical team to be competent in performing this type of research. "Where data do exist, many of the transport stakeholders involved in policy, planning and implementation do not have the sufficient in-house expertise to analyze the data and incorporate them in a meaningful way into decision making and design."(Zermoglio& Scott, 2018). This study has placed Jamaica closer to establishing a roadmap to sustainable transportation.

Purpose of the study

The study was spearheaded by a local working group with members from the University of Technology, Jamaica (UTech, Jamaica), the Ministry of Economic Growth and Job Creation (MEGJC), the Tax Administration of Jamaica (TAJ) and the Ministry of Science Energy and Technology (MSET). The group was tasked with establishing a fuel economy database to identify trends related to the light-duty vehicle fleet. The study was used to continue to build the case for urgent action on cleaner and more efficient fuel, nudging private and public sector stakeholders towards a more proactive approach.

Research objectives

The primary research objective was to conduct a scientifically-sound assessment of the fuel economy of light-duty vehicles that enter the national fleet. The weighted average fuel economy of newly registered cars was required for one historical year to be used as a reference point then subsequent years for comparative analysis. The calculated fuel economy data was used to evaluate the status quo, define future objectives of average fuel economy and measure the progress of the weighted average fuel economy of newly registered cars. The researchers, with the support of experts from the GFEI, took into account the current situation in the country and analyzed the results with the GFEI Fuel Economy Policies Impact tool (FEPIT).

Research questions

The study aimed to answer three main questions:

1. What are the weighted average fuel economy and average emissions expelled from the light duty vehicle fleet?
2. What are the trends that can be identified in the national light duty vehicle fleet across a number of years?
3. How would the composition of the light duty fleet change in response to policies that could encourage the use of more fuel efficient vehicles?

GFEI Methodology

This research uses the GFEI methodology as a basis for the collection and analysis of data concerning the fuel efficiency of light duty motor vehicles in Jamaica. The methodology used was developed by the International Energy Agency through the GFEI Secretariat. With participating countries following this methodology, results can be compared across various territories. The global fuel economy results are generally reported under two categories, OECD and Non-OECD countries. From the study, the authors were able to interpret detailed information about vehicle registrations and track annual progress in average fuel economy.

The reference year used was 2005 with additional data collected at specific intervals. In the first phase of the project, Jamaica collected data for 2005, 2008, 2010, 2012 and 2014. These were identified as the years that would offer the greatest insight based on the available data and project timeline. The study was concluded by including the years 2015, 2016 and 2017 in the second phase.

Steps to establish a database

The baseline establishment exercise included the following steps:

1. Establish the reference year (the GFEI base year being 2005)
2. Set the data points that are needed to calculate a robust baseline
3. Find and evaluate the available sources of LDV vehicle registration data and their quality
4. Calculate the average annual fuel economy of the baseline and other characteristics for newly registered vehicles for the particular year.

The GFEI prescribes the average harmonic fuel economy as the estimator of the entire fleet to characterize the fuel economy of new vehicles entering the market in the base year. This methodology has been adopted by other countries

such as Kenya, South Africa, Indonesia and Chile. Using the recommended base year Jamaica was able to make comparisons and identify best fit measures to help improve the country's situation. This is also in line with the GFEI point of reference for its long term target of improvements in the fuel economy of 50 %.

Data requirements

The fuel economy baseline includes only vehicles, which are registered for the first time by the Tax Administration of Jamaica (TAJ) in a given year. This set of vehicles includes new cars and pre-owned imported cars. The fuel economy baseline accuracy is accepted as sufficient if the fuel economy data can be applied to at least 85% of all new vehicles registered in a year. This condition was met for the years included in this study.

The absolute minimum information required for each vehicle included:

- Make and model of the vehicle
- Year of manufacture of the model
- Year of the first registration, if different from the year of the model
- Type of fuel (diesel vehicles emit more CO_2 per liter of fuel compared to gasoline)
- Engine size
- New or pre-owned import
- Fuel savings are calculated by model and base of the test cycle. This can be done either by obtaining data from the country of origin or the manufacturer.
- Number of sales per model

For advanced studies, there may be a need to add more parameters if the real world fuel economy is to be derived. These parameters would include, but would not be limited to, route, weather conditions, vehicle condition, and maintenance. Kravets, Musarsky and Tumasov (2015) summarized these conditional parameters under three main headings:

- Characteristics of the travel route;
- The aerodynamic characteristics of the vehicle;
- Fuel-saving characteristics of the vehicle (which take into consideration fuel quality).

The information for the new vehicle registrations Jamaica was provided by the Tax Administration of Jamaica and the Island Traffic Authority (ITA); the

TAJ provided the most complete datasets. A formal request was made to the TAJ which then extracted the required data using the categories provided. The speed at which the data are provided can fast track or set back the development of the baseline. The data extracted consisted of 150,070 Light Duty Vehicles (LDV) of less than 4,000 kg of gross weight; the datasets also provided details on descriptive variables that supported calculations.

Data cleaning

The data underwent a 'cleaning' process after it was received from the TAJ. The format of the data received was different from what was required and had to be reformatted to meet the GFEI spread sheet set up. There were also some duplications and inconsistencies in the names of makes and models. These errors were corrected. Searches were done to verify the names of the vehicle models which are sometimes marketed differently in specific locations and vehicle models were identified to improve data quality. Data cleaning is a time consuming and tedious exercise but is very important to ensure the integrity of information required for moving to the next stages.

Searching and inputting secondary fuel economy data

The most time-consuming step was sourcing the matching manufacturer emissions/fuel consumption data for each vehicle model to populate the Microsoft excel spread sheet. The collection of emissions data was done via web based platforms such as fueleconomy.gov and other relevant literature such as car manufacturers' user manuals. The main fields of data for the development of fuel economy databases for vehicles, namely fuel consumption in liters per 100 kilometers (L/100 km) and CO_2 emissions in grams per kilometer (g / km)), were obtained mainly from the USA, New Zealand ,Chilean, European and Japanese government websites (see Table 1). The test cycles (vehicle operation patterns) used in the USA, Europe and Japan are Corporate Average Fuel Economy (CAFE), New European Driving Cycle (NEDC) and Japanese Fuel Consumption Index (JC08), respectively. The methodology developed by the International Council on Clean Transportation (ICCT) was used to convert the values of the CAFE and JC08 test cycles to the corresponding values of the NEDC. All were standardized to reflect the NEDC test cycle. See Table 2.

Table 1: *Factors to convert fuel economy (Lge/100km) to carbon emissions (gCO2/km)*

Lge/100km to gCO2/km	Gasoline	*23.2
	Diesel	*24.8
	CNG	*18.8
	LPG	*21.1

Source: ICCT, 2014

Table 2: *Test cycle conversion factors*

Gasoline	Unit: gCO2 per km	NEDC to CAFE	CAFE	=	0.8658	*	NEDC	+	14.076
		CAFE to NEDC	NEDC	=	1.1325	*	CAFE	-	13.739
		JC08 to CAFE	CAFE	=	0.7212	*	JC08	+	36.736
		CAFE to JC08	JC08	=	1.2749	*	CAFE	-	38.423
		JC08 to NEDC	NEDC	=	0.8457	*	JC08	+	24.840
		NEDC to JC08	JC08	=	1.1430	*	NEDC	-	24.907
Diesel	Unit: gCO2 per km	NEDC to CAFE	CAFE	=	0.7683	*	NEDC	+	23.928
		CAFE to NEDC	NEDC	=	1.2209	*	CAFE	-	21.218
		JC08 to CAFE	CAFE	=	0.6050	*	JC08	+	44.338
		CAFE to JC08	JC08	=	1.3691	*	CAFE	-	38.393
		JC08 to NEDC	NEDC	=	0.8230	*	JC08	+	21.950
		NEDC to JC08	JC08	=	1.1720	*	NEDC	-	21.122

Source: ICCT, 2014

Calculation of the fuel economy baseline

Once the fuel economy data were available for at least 85% of newly registered vehicles, the weighted average fuel economy was calculated using the following equation prescribed by the GFEI:

$$FE = \frac{\sum_{1}^{n} Reg_i \times FE_i}{\sum_{1}^{n} Reg_i}$$

Con:

FE = weighted average fuel economy
Regi = number of newly registered vehicles of type i
FEi = fuel economy of type i vehicle

Application of the Fuel Economy Policies Impact tool – FEPIT

This FEPIT was used to estimate the current fuel and estimated fuel economy for the year 2020 with a business-as-usual scenario and a policy support scenario. These projections will serve as the basis for Jamaica's recommended fuel economy policy preferences. The projections highlighted an improved fuel economy (both potential and realized), highlighted national trends, identified beneficial policies and identified potential costs.

The GFEI FEPIT methodology is as follows:

1. The data on the LDV national fleet and tax systems are acquired from official sources.
2. The data is "cleaned" to be compatible with the data entry requirements of the tool.
3. The data is inserted into the tool and the projection algorithms are executed.
4. The projections and the recommended fuel saving policies are highlighted by algorithms and further developed by expert analysis.

Data limitations

The TAJ was the most reliable source of data for the GFEI database. The data were supplied on an as needed basis which sometimes affected the speed at which updates were made. To facilitate the smooth and continuous update of the GFEI database, a process must be developed to ensure that all stakeholders are aware of their role within the framework of the project and future work. Additionally, some datasets were incomplete and some assumptions were made and noted, for example in some instances the type of vehicle transmission which was not indicated.

The following steps were taken to identify and reduce limitations:

- A sample of the GFEI excel datasheet showing the final calculations was shared with the data providers.
- Assess the scope of the data, especially over time, to avoid seasonal changes for particular models.
- Check for missing values, identify them, and assess their impact on the overall analysis.
- Ensure *data type* (integers, decimal values, characters, and so forth) is correct
- Choose the right parameters for analysis.
- Correct any inconsistencies and/or errors existing in the data.

- Check for duplicates or outliers in the data.

Challenges

The absence of tail –pipe emissions testing is one priority area identified. Currently, there is no way to measure actual pollution from vehicles locally under local conditions. Relying on secondary data from the manufacturer sometimes affects the accuracy of the data, as standard test conditions are usually very different during the stages of the vehicles' life cycle. The processing of the data required sufficient human resource which was not always available. Securing the consistent support of stakeholders with varying personal interests may be challenging and will require packaging fuel economy improvements which are attractive and inclusive of all these groups.

Checking and Verification

The database was reviewed by experts from the International Energy Agency (IEA) and CEGESTI Desarrollo Sostenible. The verification of formulas and calculations was done. In some cases errors in the calculations were identified for correction by the researchers. Some of the errors corrected included improper vehicle referencing, incorrect selection of fuel data and spelling and grammatical errors that may impact the reports and queries generated. The database was presented at various stages to stakeholders in the transport sector who had the opportunity to seek clarifications and make recommendations to improve the database.

Results

Trends from fuel economy and vehicle registration data

National vehicle fleet

Data provided by the National Motor Vehicle Registry (NMVR) at the Tax Administration of Jamaica (TAJ) show rapid growth in the vehicle fleet in recent years. Between 2014 and 2017, the vehicle fleet increased significantly, i.e. by more than 100%. Any vehicle weighing 4000 kg or less was classified as a light duty vehicle (LDV). Motorcycles were not included in the light duty class. The total number of LDVs registered in 2017 was 724,035. This increase is attributed to an improvement in the economy and increased access to overseas vehicle

markets through various online platforms where customers can make direct purchases. High liquidity in the economy was also an important factor with all banks providing attractive deals for motor vehicle purchases. As commonly seen in most Caribbean countries the majority of these vehicles are motor cars that account for approximately 75% of the national fleet as illustrated by Figure 1. The focus on this segment of vehicles will result in the policy impact that is needed to improve the national fuel economy in the medium to long term. Motor cycle imports are growing rapidly with these purchases skyrocketing between 2015 and 2017. The unregistered fleet is estimated to be 15%.

Over the period 2005 to 2017, the average number of new registrations of light duty vehicles was approximately 18, 800. Figure 2 shows a decline in the growth of the national vehicle fleet between 2010 and 2011, as imports decreased marginally in the stated years. In this period, the Government of Jamaica moved the age limit on imported motor cars to 3 years. Currently, motor cars imported should have an age of no more than five years. This change was made in 2011. The main reason given by the government for reversing the decision was to make motor vehicles more affordable to lower income groups which cannot afford to purchase new cars as well as to boost activity in the used car sector. The extended age limit affected motor cars, sports utility vehicles, pick-ups and cargo vans. The main exporting countries to Jamaica included Japan, the United States, Thailand, the United Kingdom and Germany. The data shows

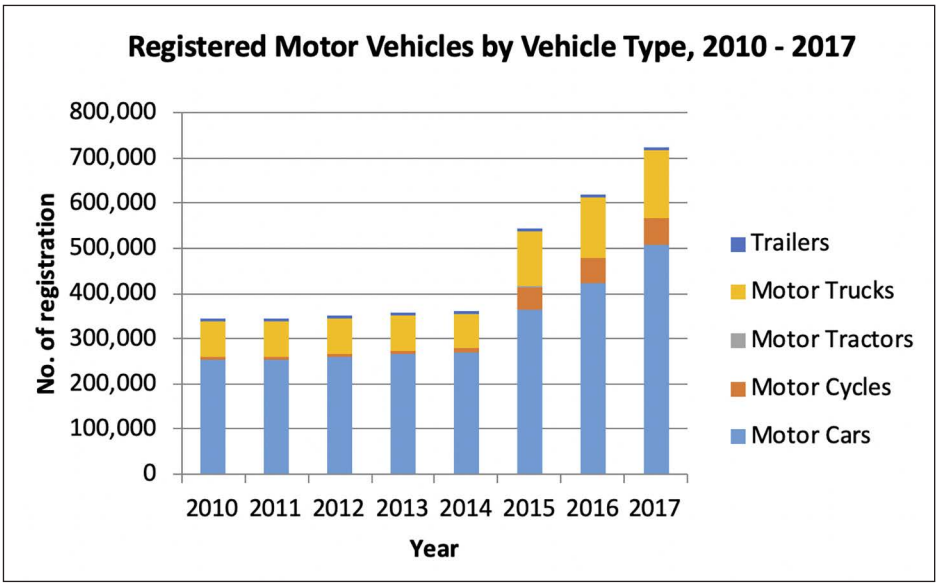

Figure 1: *Yearly registrations by vehicle type (Tax Administration of Jamaica, 2018)*

Figure 2: First registration of Light- Duty Vehicles (LDVs)

that in 2017 there were approximately 36,639 newly registered light duty vehicles; this is the highest seen for all the years considered and the upward trend is expected to continue. These variations in the registrations can be linked to the changes in the global and local economy.

The results show that the primary indicators, average fuel economy represented in Miles Per Gallon (MPG) and Fuel economy represented in litres per gallon equivalent per 100 km travelled (lge/100km) have been trending down. The average fuel economy fell over the 12 year period decreasing from 8.46 lge/100km to 7.11 lge/100km. A review of the average CO_2 emissions data in the base year (2005) and in the latest year available (2017), a 16% decrease in lge/100km underlines the fact that although the quantity of cars is increasing they are more efficient. Another indication of this is shown by the increased mileage per gallon of fuel having reached an average of 35.02 in 2017. The improvement in CO_2 emissions can be attributed to new vehicle technology developed through better engineering and design and improved road infrastructure.

The information in Table 3 provides an overview of the existing fuel economy of LDVs in Jamaica based on the results. The average fuel economy improved by 15.6 % between 2005 and 2017. Figure 3 highlights Jamaica's progress compared to other countries that have implemented measures to reduce their fuel economy. While Jamaica is behind on major solid initiatives to reduce CO_2 emissions and boost fuel economy, the country has benefited from global developments in technology as well as its own efforts to get cleaner fuels in circulation.

Table 3: Summary of findingsfrom GFEI fuel economy database

GFEI Jamaica				
Year	**Total registra-tions**	**g CO2/km**	**MPG**	**lge/100km**
2005	20837	200.57	30.30	8.46
2008	17337	220.75	26.57	9.27
2010	8830	191.2	31.54	7.99
2012	14763	174.48	33.39	7.37
2014	15748	168.05	35.01	7.13
2015	18923	172.45	33.87	7.35
2016	17493	164.24	35.29	7.03
2017	36639	167.25	35.02	7.11

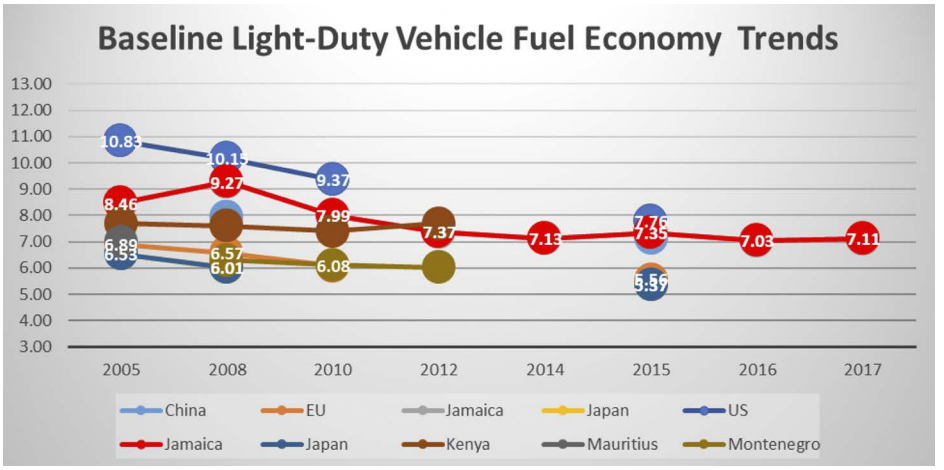

Figure 3: Comparing Jamaica's fuel economy progress with other countries

Average fuel economy projections

Assuming that the aforementioned policies are fully implemented, the FEPIT indicates that Jamaica can reach a fuel economy of 4.02 lge/100km by 2030. The global GFEI target is 4.2 lge/100km by 2030. For Jamaica, this is an ambitious target but it is not out of reach for a small island developing state relying on vehicle imports. There is the opportunity to dictate the types of vehicles that enter the country, as well as ensuring the right conditions are provided locally with a special focus on electric mobility, road infrastructure and fuel quality.

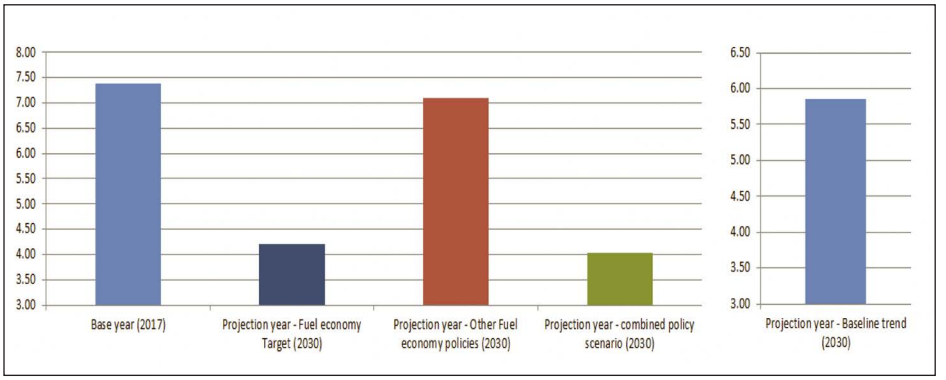

Figure 4: *Graph showing comparison of fuel economy results from different policy pathways compared to base year.*

The results show that if the current trend holds and no policies are implemented, Jamaica would not reach the GFEI fuel economy target and would have an average fuel economy of only 5.86 leg/100 km by 2030. See Figure 4.

Measure 1 – Fuel Economy Target

The first measure that Jamaica can adopt is setting a fuel economy target to work towards. This target should be in line with the GFEI global targets. The FEPIT using an average improvement rate of 3%, calculated the potential fuel economy by the year 2030. The results seen in Figure 5 shows that Jamaica can achieve an average fuel economy of 4.20 lge/100km should this minimum improvement rate be met by implementing necessary interventions on a year to year basis. This improvement rate is fairly aggressive but can be achieved if supported by Government and key stakeholders.

Scenario	Average fuel economy	
	lge/100 km	Var% base year
Base year (2017)	7.38	
Projection year - Fuel economy Target (2030)	4.20	-43.1%
Projection year - Other Fuel economy policies (2030)	7.09	-4.0%
Projection year - combined policy scenario (2030)	4.02	-45.5%
Projection year - Baseline trend (2030)	5.86	-20.7%

Figure 5: *Changes in fuel economy from different scenarios*

Measure 2 – CO_2-Based Vehicle registration tax/feebate scheme

This measure involves the creation of a feebate scheme where a one-time tax is charged depending on the vehicle's fuel economy at the point where the vehicle is registered for the first time. In this case, if the vehicle is hybrid electric a rebate[1] would be granted. In this simulation, the tax charges and rebates were estimated based on current registration fees. See Table 4 for charges used in the FEPIT simulation.

Table 4: Proposed tax on first time vehicle registration

Tax level by segment	(USD)
Battery electric	0.00
Hybrid Plug-in electric	0.00
Hybrid electric	-20.00
ICE <5 lge/100km	50.00
ICE 5-7 lge/100km	70.00
ICE 7-9 lge/100km	100.00
ICE 9-11 lge/100km	120.00
ICE >11 lge/100km	200.00

Measure 3 – CO_2-Based Vehicle circulation tax/feebate scheme

Another measure that can be implemented to encourage the use of more efficient vehicles is creating a feebate scheme based on a circulation tax. It is important to note that the success of these feebate schemes is dependent on a reliable tailpipe testing system. For this simulation, the tax and rebates were calculated using a percentage of the current circulation charges which are paid annually. Table 5 provides a breakdown of the proposed fees and how they were calculated.

Table 5: Proposed fees on annual circulation tax

Tax level by segment	Circulation tax (USD)	Proposed fees (USD/year)	% of circulation tax
Battery electric	71.07	0.00	nil
Hybrid Plug-in electric	71.07	0.00	nil
Hybrid electric	71.07	-7.11*	10%
ICE <5 lge/100km	71.07	7.11	10%
ICE 5–7 lge/100km	71.07	7.11	10%
ICE 7–9 lge/100km	71.07	8.53	12%
ICE 9–11 lge/100km	96.92	13.57	14%
ICE >11 lge/100km	96.92	15.51	16%

*negative value represents a rebate

Measure 4 – Fuel taxation

The final policy measure simulated in the tool is applying a tax on fuel. Implementing this measure will require careful planning as fuel is already heavily taxed in Jamaica. A fuel tax of 3% is proposed.

Average CO2 emissions projections

If the status quo remains, then the FEPIT predicts that the average carbon dioxide emissions of Jamaica of the new fleet will be 147.2g of CO_2 / km by 2030. A combination of the four policy measures outlined would see the average CO_2 emissions deceasing by 53% to 94.3 g CO_2/km in 2030. See Figure 6.

Scenario	Average CO_2 emissions per km
	g CO_2/km
Base year (2017)	172.1
Projection year - Fuel economy Target (2030)	97.9
Projection year - Other Fuel economy policies (2030)	166.1
Projection year - combined policy scenario (2030)	94.3
Projection year - Baseline trend (2030)	147.2

Figure 6: *Average CO2 emission scenarios based on policy impact.*

New registration fleet composition

Based on the policy measures applied, the composition of the new fleet is expected to change slightly. The introduction of more aggressive measures would result in a total transformation of the fleet where more efficient vehicles would dominate imports. The most significant changes predicted are a growth in share of hybrid plugin electric vehicles in the new fleet from 0.7 % in 2017 to 2.2 % in 2030. See Figure 7. Vehicles with a fuel economy of over 11 lge/100km will also fall significantly.

Summary of Results

The GFEI has set a target of 4.2 lge/100 km for new vehicle fuel economy in the year 2030. Given that the average global fuel economy in 2013 was 7.1 (litres per gallon equivalent [lge]) lge/100 km and data collected for Jamaica in 2017

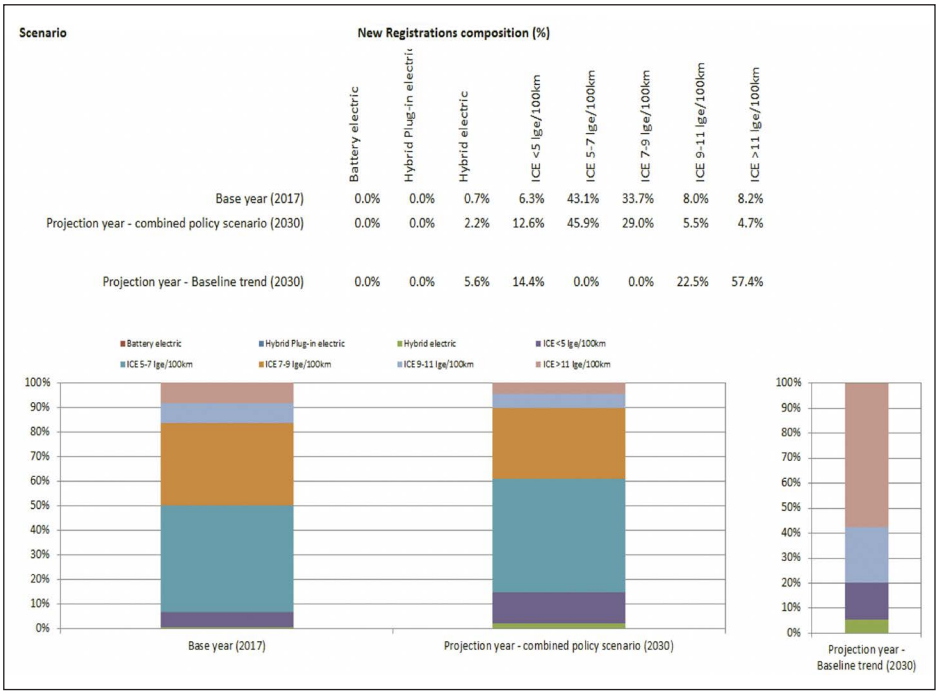

Figure 7: *Composition of new fleet with implementation of policy.*

showed a fuel economy of 7.11 lge/100km more work is needed to achieve the outlined targets as the country is lagging. The average fuel economy over a 9 year period (2005–2017) improved by 15.9% or by 1.35 lge/100km. The data shows an average first registration of 18, 800 per year. The lack of readily available emissions databases locally led to a reliance on external data sources to identify credible emissions data to populate the database and make final calculations. Having successfully established the CO_2 emissions and fuel economy baseline (2005) and additional years (2008, 2010, 2012, 2014, 2015, 2016 and 2017) the database was updated and revised as more information became available. With the average fuel economy of the LDV fleet improving at a rate of 1.5% / year, the anticipated average fuel economy is expected to reach 5.86 lge/100km by 2030, if current trends continue. According to Cuenot and Fulton (2011), the average annual improvement rate in fuel economy worldwide in the 2005–2008 period was about 1.7%. This is well below the rate needed to meet GFEI targets, which is 2.7% per year. Thus the rate of improvement globally needs to be accelerated to be on track to reach the GFEI 50% objective. The analysis of the situation using FEPIT has helped to identify four key strategies which the Government of Jamaica can implement to improve the fuel economy of its fleet of cars to

an estimate of 4.02 lge/100km by 2030, which would put Jamaica in line with international objectives.

Conclusion

Based on available data, the harmonic mean fuel economy of newly registered light-duty vehicles (LDVs) in Jamaica is decreasing. However, it is predominantly a result of exogenous activities in the motor vehicle markets on which local car dealers rely. The results show that while Jamaica is behind where annual improvement in the fuel economy is concerned, the country has a good foundation upon which to build its sustainable transportation future as a response to climate change challenges and economic resilience as a Small Island Developing State (SIDS). Following the completion of the study, the focus has shifted to securing a policy framework to maximize existing technologies that could bring about an improved fuel economy.

Note

1. Rebates are coded by negative values.

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Developing a GIS-Based Mobile Application for Heritage Education in Jamaica

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Abstract

Research shows gaps in knowledge of the tangible heritage sites that exist in Jamaican communities. In order to address these knowledge gaps, a Geographical Information System- based heritage education mobile application (app) has been developed. The aim of this research is twofold, seeking to determine: 1) if there is a demand for a heritage education mobile application (app) centred on tangible heritage sites in Jamaica, and 2) the ease of use of the prototype heritage education mobile app. The two research questions that guided the research were, 'Is there a demand for a G.I.S-based heritage education mobile application in Jamaica?' and 'Do the current features of the heritage education app provide ease of use to the potential user?' Based on the Buff Bay Valley of western Portland, Jamaica, a prototype app was developed and tested among attendees at the Research Technology and Innovation Day of the University of Technology, Jamaica, in March 2018. These attendees provided data on demand for such an app, the ease of use and quality of the information in the app and areas for its improvement. Results showed a desire for mobile apps to educate Jamaicans about their tangible heritage and that the design is user-friendly, although it can be improved.

Keywords: mLearning, Heritage Education, Tangible Heritage, Heritage Mapping, Geographical Information Systems

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Introduction

The development of a Geographical Information System (GIS)-based heritage education mobile app was motivated by a desire to address knowledge gaps about the presence, and potential use of tangible heritage sites located in Jamaica. The Government of Jamaica (GOJ), in its Vision 2030 national development plan, recognises that these knowledge gaps exist at the community and individual levels. It was stated that there is "limited awareness of cultural and heritage assets on the part of local people" (Planning Institute of Jamaica, 2009, p. 41). In addition, "some aspects of our heritage are being lost due to lack of interest by youth and inadequate transmission of knowledge/skills by adults…community members may not know how to capitalise on cultural heritage" (Planning Institute of Jamaica, 2009, p. 41).

Many of these tangible heritage sites are found in rural Jamaican communities, which are faced with socio-economic challenges, including poverty and the existence of a digital divide with regard to access to the internet via computers. Research undertaken among grade nine students at Buff Bay High School in the rural parish of Portland in northeast Jamaica showed that 54.5% of students do not have access to the internet at home, and 50.6% do not have access to the internet at school. However, this research also showed that 87% of these students owned smartphones (Smith, 2016).

The high prevalence of smartphone ownership led the researcher to examine whether developing an app for mobile devices was suitable for educating users about Jamaica's tangible heritage sites. This resulted in the development of a Geographic Information Systems (GIS)- based heritage education mobile app based on the Buff Bay Valley of Portland, Jamaica entitled *Sites to See: The Buff Bay Valley.* This app prototype was tested among users at the University of Technology Jamaica's Research, Technology and Innovation Day in March 2018. These users were then surveyed to determine the demand for such an app and to obtain feedback on the functionality and ease of use.

Research Questions

1. To what extent is there a demand for a G.I.S-based heritage education mobile application in Jamaica?
2. Do the current features of the heritage education app provide ease of use to the potential user?

Purpose of the Study

The aim of this research was twofold, seeking to determine: 1) if there is a demand for a heritage education mobile application (app) centred on tangible heritage sites in Jamaica, and 2) the ease of use of the prototype heritage education mobile app.

Literature Review

Mobile Learning

Over the past decade, there has been an increase in mobile devices such as tablets and smartphones across society. According to Vazquez-Cano (2014), "smartphones are increasingly becoming ever present, penetrating and transforming everyday social practices and space" (p. 1506), adding that they are "no longer only a tool for communication, but in many cases have become an instrument of people's social and work life, and possibly, a powerful instrument in academic life" (Vazquez-Cano, 2014, p. 1506).

This has resulted in a shift in how education takes place, with mobile learning (mLearning). According to United Nations Educational, Scientific and Cultural Organisation [UNESCO] (2013),

> Mobile learning involves the use of mobile technology, either alone or in combination with other information and communication technology (ICT), to enable learning anytime and anywhere. Learning can unfold in a variety of ways: people can use mobile devices to access educational resources, connect with others, or create content, both inside and outside classrooms. (p. 6).

UNESCO (2013) added that because mLearning "employs technology that is more affordable and more easily self-procured and managed than tethered computers, it requires reconceptualising traditional models of technology use and implementation" (p. 7). This was reinforced by Leinonen, Keune, Veermans, and Toikkanen (2016), who stated that "to respond to the changing ways of media use among young people, many progressive schools have aimed to integrate mobile devices into everyday study work" (p. 185).

Use of Geographic Information Systems by Heritage Professionals

Geographic Information Systems (GIS) refer to "suites of software implemented to manage and analyse geographic data, information correlated to a . . . specific

position on the earth's surface" (Ruoss et al., 2013, p. 42). GIS tools have been utilised in a variety of ways in the cultural heritage sector, as stated by Petrescu (2007). "GIS technology became a usual tool for heritage managers, conservators, restorers, architects, archaeologists, painters and all other categories of experts involved in cultural heritage activities" (p. 1).

GIS map applications have also been utilised for heritage tourism. Ruoss et al. (2014) observed that "maps and information on natural and cultural heritage connected to tourism application are an excellent contribution to capacity building and awareness-raising of visitors" (p. 44). In addition, GIS maps are beneficial to tourists as they provide information on "the cultural assets of the entire region and the proximity to other tourist attractions and can indicate the associated services" (Ruoss et al., 2013, p. 46). With the use of GIS mapping apps by heritage tourists, Ruoss et al. (2013) believed that these maps should be developed as mobile apps due to the size of the smartphone market (p. 42).

Methodology

Development of the Mobile App

The mobile app *Sites to See: Buff Bay Valley* was created using ESRI GIS mapping software as an online map tour, utilising the ArcGIS Online interactive map programme. The town of Buff Bay is located in the parish of Portland on Jamaica's northeast coast, where the Buff Bay River enters the Caribbean Sea. The source of Buff Bay River is located in the buffer zone of the Blue and John Crow Mountains UNESCO World Heritage Site, thus designated for its mixed natural and cultural heritage (UNESCO World Heritage Centre, 2015).

Tangible heritage sites in the town of Buff Bay and the Buff Bay Valley were initially identified from desk and field research. After the sites were identified, fieldwork commenced that involved the collection of the Global Positioning System (GPS) coordinates of the heritage sites. Still, photographs of all of the heritage sites were taken, and video clips of activities were also recorded. This information was combined using the ArcGIS programme to create a mobile application in the form of a story map. Funding support for the development of the *Sites to See: Buff Bay Valley* mobile app was received from the University of Technology, Jamaica through its Research Development Fund.

The app has three screens. The "List" screen lists all tangible heritage sites within the given location and includes thumbnail photos of the sites and descrip-

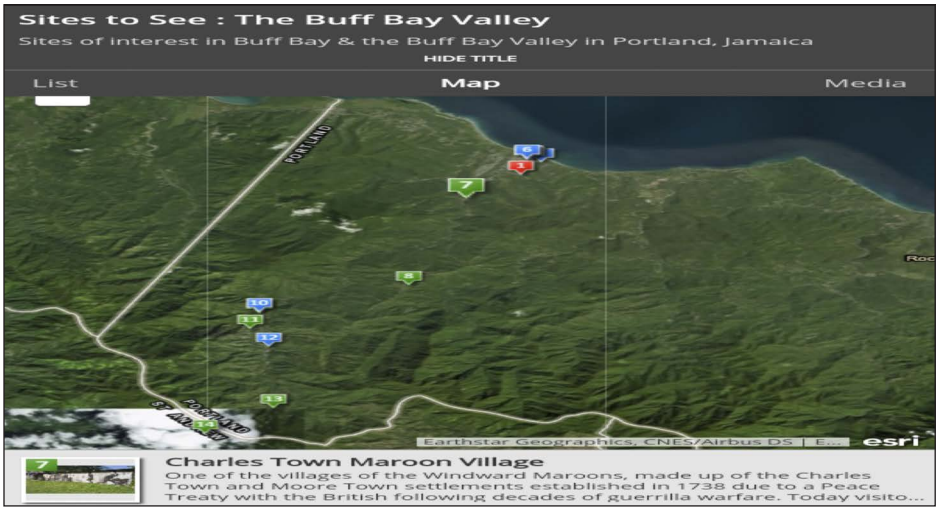

Figure 1: Wide view of the Map screen of the GIS Mobile App (Smith, 2018)

tions. The "Media" screen gives information about each site, along with either a video clip or a still image. The "Map" screen shows the exact location of each site (Figure 1), with a zoom function that gives the user directions to the site. The current version of the app can be viewed at: http://www.apsmithimages.com/sites-to-see-jamaica/sites-to-see-buff-bay-valley/.

Prototype Testing

A survey research design, using a one-page questionnaire (Appendix) was undertaken to answer the research questions, is 'Is there a demand for a GIS-based heritage education mobile application in Jamaica?' and 'Do the current features of the heritage education app provide ease of use to the potential user?' The research population were attendees of UTech Jamaica's Research Technology and Innovation Day which was held in March 2018, and participants were selected by inviting attendees to test a prototype of the *Sites to See: Buff Bay Valley* mobile app. An explanatory poster that gave users information on navigating the app was also present. A total of 32 participants tested the prototype and completed the questionnaire.

The app was installed on tablets provided to the users, after which users answered a 12 question survey (Appendix). The purpose of the questionnaire was to 1) collect data about participants' experience regarding the ease of use of the app and 2) determine if there is interest in similar heritage education apps for different locations. Responses regarding purpose 2 were used to answer the

research question 'Is there a demand for a GIS-based heritage education mobile application in Jamaica?' In order to answer the second research question, 'Do the current features of the heritage education app provide ease of use to the potential user?' users were asked to rate 1) the ease of use of the app, 2) the user's level of enjoyment and, 3) the quality of information of the heritage sites. This was done by responding to items in the Likert type format. Users were also asked to state if the information provided was useful, and which open-ended question was asked for suggestions to improve the app. The data was analysed using descriptive statistics.

Results

Biographical data and details of smartphone ownership of the participants were collected. Thirty-two participants tested the app, of which 69% were students and 31% were professionals, 66% of these were female, and 34% were male. The majority (63%) were aged 15 to 19 years old, 16% were over 30 years old, 9% were aged 20 to 24, 3% were aged 25 to 29, and 9% of the users did not give their age. Regarding smartphone ownership, 97% of the users stated that they own a smartphone, with 97% owning Android-based phones and 9% using Apple iPhones. The total is 106% because two users possessed Android phones and iPhones.

Interest in Heritage Education Mobile Apps

To answer the research question: Is there a demand for a GIS-based heritage education mobile application in Jamaica? The users of the *Sites to See: Buff Bay Valley* mobile app were questioned to determine if there was interest in mobile apps for heritage sites in other locations in Jamaica. Ninety-four percent indicated that they would be interested in mobile apps of other locations in Jamaica, with Table 1 showing the suggested locations according to the parish. Users indicated that there was a great interest in apps for heritage sites in the parishes of St. Ann, St. Catherine and Portland. The 32 users gave 60 responses because they were each asked to give up to three suggested locations.

Table 1: Suggested Locations for Future Editions of the Mobile Apps according to Parish

Parish	Frequency	Percentage
St. Ann	16	27
St. Catherine	11	18
Portland	9	15
St. Andrew	5	8
St. Thomas	4	7
St. James	3	5
St. Elizabeth	3	5
Westmoreland	2	3
Kingston	2	3
St. Mary	1	2
Clarendon	1	2
Trelawny	1	2
Hanover	1	2
Manchester	1	2
Total	**60**	**100**

Ease of Use of the Mobile App Prototype

In order to answer the research question 'Do the current features of the heritage education app provide ease of use to the potential user?' users were asked to rate the app in terms of ease of use, enjoyment level and quality of information, with '5' representing the highest level of satisfaction, and '1' the lowest. The results are presented in Table 2. The users were also questioned on how useful they found the information and were asked to make suggestions for improving the app.

Table 2: Feedback on Mobile App Usage

Rating of App	1	2	3	4	5	Total
Ease of Use	9%	3%	13%	31%	44%	**100%**
Enjoyment Level	9%	6%	16%	47%	22%	**100%**
Quality of Information	6%	6%	28%	22%	34%	**96%**

This information shows that the mobile app prototype received a favourability rating of 75% for ease of use (44%, very high satisfaction & 31% high satisfaction). The favourability rating for the level of enjoyment was 69% (22% very high level of enjoyment & 47% a high level of enjoyment). These results show that the current design is user-friendly and suitable for a heritage education mobile application.

Regarding the quality of the information provided about the heritage sites, the scores showed room for improvement, with 28% rating the information as medial and 56% rating the information as favourably (34% very high quality & 22% high quality of information). In response to the question regarding the usefulness of the information on each heritage site, 97% of the users stated that they found the heritage sites useful.

Suggestions for improving the app were sought to improve the ease of use and functionality of the app, with the results shown in Table 3. The result showed that the area identified for the greatest improvement is the need for additional information on the heritage sites, with 25% of users making this suggestion. This corroborates the results presented in Table 2. Other suggestions for improvement concerned the design of the app. Eleven percent of users requested a clearer zoom, 11% requested the inclusion of additional heritage sites, and 8% requested additional photographs. Three percent suggested that a search bar be provided, 3% requested a GPS traffic assist, and 3% requested that a virtual tour of the location be included in the app.

Table 3: Suggestions for Improving the Sites to See: Buff Bay Valley Mobile App

Suggestions	Frequency	Percentage
Provide additional information on the sites	9	25
No response	7	19
No suggestions for improvement	4	11
Provide a clearer zoom	4	11
Include additional sites	4	11
Include additional photographs	3	8
Provide information about where the App can be accessed	2	6
Provide a GPS Traffic Assistant	1	3
Provide a search bar	1	3
Include virtual tours, using contemporary costumes of the period	1	3
Total	**36**	**100**

Conclusion

This research was undertaken to answer two research questions. In answering the first research question, the suggestions of locations that the users would like featured in similar mobile apps showed demand for such an app. Concerning the second research question, users agreed that the overall design of the *Sites to See: Buff Bay Valley* mobile app is easy and enjoyable to use. Although the information provided was deemed useful, improvements are required regarding the quality of the information provided for each cultural heritage site.

The results also showed the prevalence of smartphones among potential users, confirming ready platforms for mLearning in Jamaica. This will make the delivery and use of the G.I.S.- based heritage education mobile app relatively easy once it is made available for potential users. The suggestions that were made for the improvement of the app will be incorporated. Afterwards, an application for a patent for the *Sites to See* mobile app will be sought from the Jamaica Intellectual Property Office (JIPO). Plans are advanced to develop the app for the Android platform and developing the *Sites to See* apps for other locations in Jamaica.

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The Perceptions of Jamaican Pharmacists on the Introduction of Pharmacist Prescribing to Jamaica

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Abstract

The scope of practice of pharmacists in other jurisdictions is expanding and there are emerging opportunities for the utilisation of the skills of Jamaican pharmacists beyond the traditional roles. This study aimed to investigate the perceptions of Jamaican pharmacists toward pharmacist prescribing, the training required and the identification of the barriers they perceived to the expanding scope of the profession. Between November 2016 and January 2017, 324 pharmacists who were registered with the Pharmacy Council of Jamaica were surveyed using a convenience sampling technique. Most of the participants (78%) wanted to be prescribers, but preferred the supplementary model (132/145: 91%), compared with the independent model (56%). Concerning training needs for this expanded role, anticoagulation, pain management, and infection control received unanimous responses (100%). The major barrier that pharmacists perceived to prescribing in Jamaica was the reluctance of physicians to facilitate such a partnership.

Keywords: Prescribing Pharmacist, Models of Prescribing, Pharmacy Profession, Jamaican Pharmacist

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Introduction

Background

Internationally, eight models of pharmacist prescribing have been identified by Emmerton et al. [1] and are practised based on the legal regulations in the territory, their dependency on protocols, formularies, and the extent of collaboration with physicians [1–6]. The models include those that adhere to strict protocols such as collaborative prescribing, protocol prescribing and supplementary prescribing. There are those models whose protocol is a little more relaxed, such as patient group prescribing and repeat prescribing. Some of the models have no protocols, such as independent prescribing, which may be practised from a broad or limited formulary and may also include referral to a pharmacist practice [1].

What is prescribing?

Prescribing is discussed according to Barber [7] as involving three aspects as it relates to the drugs chosen for a patient. They are:

1. Recommendation of a particular clinical act based on the clinician's judgment.
2. A health professional process based on the way the non-medical practitioner or physician chooses a drug treatment plan for a patient due to his/her knowledge, education belief system and past experience and is due to ongoing communication and treatment process.
3. Policy decision where drug choice is determined at the institutional level.

This study will discuss the supplementary [4, 6, 8, 9] and the independent models [4, 6, 9-11] of prescribing for pharmacists which are both practised in the United Kingdom since 2003 [1, 4] and 2006 [1,4] respectively and have experienced excellent reviews and success rates. In the independent model [4, 6, 9-11] the pharmacist is responsible for assessing, and clinically managing the patient with or without a diagnosis and then a prescription is written for the patient. In the supplementary model[4, 6, 8, 9] there is a partnership between the independent prescriber (physician) and the supplementary prescriber (pharmacist) and the patient. A prescription is then given according to an accepted pre-approved clinical plan to which the patient agrees [4, 6, 8, 9].

Rationale for this Study

Due to the changing scope of practice of pharmacists overseas and the gradual developments within the Jamaican setting, new opportunities are emerging for the skills of pharmacists to be utilised. Therefore, an investigation was necessary to determine the Jamaican pharmacists' perceptions towards pharmacist prescribing, the training required, and the identification of the barriers they perceived to the expanding scope of the profession.

Purpose of Study

To investigate the pharmacists' perceptions about the changing role of pharmacists in other jurisdictions, including that of a prescriber and to investigate if they would want to embrace this role.

Research Questions

To investigate Jamaican pharmacists' perceptions about pharmacist prescribing.

1. To determine the perceived education and training requirements of Jamaican pharmacists for the role of prescribing pharmacist.
2. To identify barriers to pharmacist prescribing as perceived by Jamaican pharmacists.

Review of Jamaica's Healthcare System and Pharmacy practices Locally and Internationally

In the Jamaican private sector, pharmacists routinely dispense, in addition to acting as independent prescribers, from free-sale non-prescription medicines (List/Schedule 1 medicines also available from other localities such as supermarkets and service stations) to pharmacy only non-prescription medicines (List/Schedule 2 and List/Schedule 2A medicines) [12].

In the public sector, the healthcare system consists of hospitals and health centres (Clinics) which are classified based on the population served, specialists available, and the services offered [13, 14]. Type A hospitals [13, 14] provide highly specialized multidisciplinary comprehensive services. Type B [13, 14] located in urban centers provide primary and secondary healthcare services. Type C [13, 14]: provide primary care services and basic secondary care services and are

district hospitals providing general medicine, surgery, child health and maternity care services.

The Health Centres are classified as Types 1 to 5 [13, 14] and they are community based and deliver high quality primary healthcare services to patients. They are classified based on the size of the population served and the services offered. [12]

Type A hospitals in the public sector, such as The Cornwall Regional Hospital, Montego Bay, Kingston Public Hospital and The University Hospital of the West Indies, St. Andrew have pharmacists acting as supplementary [4, 6, 8, 9] prescribers due to special arrangements with the Administration of those Institutions.

Jamaican pharmacists have received clinical specialised training in contraceptive provision [15], HIV medicines management [16], as diabetic educators and asthma care, while some are practising Medicines Treatment Management Services (MTMs) [17] throughout the island. There are two Universities that offer Pharmacy Degree programmes to the Doctoral Degree of Pharmacy (Pharm D) and the entry level of pharmacy practice in Jamaica is a Baccalaureate degree. Currently, a pharmacist-led (Pharmaceutical Society of Jamaica) and a government-led (The National Health Fund) initiative will be implementing a Medicines Treatment Management (MTM) [17], protocol as a new service nationally, where pharmacists will be recognised as medical providers and will be re-imbursed for these clinical services by insurance companies in Jamaica [16, 17]. This will be the first credentialed practice for Jamaican pharmacists [17].

The following will be an expose` of the developments and existing pharmacy practices internationally.

Prior to 2003 [1, 4, 6,] in the U K, before the law governing non- medical prescribers was established, dentists and medical doctors in the United Kingdom were considered the only principal medical prescribers. After 2006, pharmacists and nurses had about the same prescribing rights as physicians when prescribing from a specialised formulary [8-10].

In subsequent years, training was provided for optometrists, and other allied health professionals such as physiotherapists, podiatrists, chiropodists and radiographers to engage in supplementary prescribing [9]. So currently, pharmacists in the UK practise supplementary [4, 6, 8, 9] and independent prescribing [4, 6, 8, 9-11].

In the USA, pharmacists are now investigating how they can be granted Medical Provider status [18] with insurance companies for their clinical roles in addition to their function as Medicines Treatment Management specialists and also in collaborative prescribing functions in at least 48 states [5, 18, 19].

In New Zealand, pharmacists practise independent prescribing [4] including controlled substances in association with a healthcare team [4].

In Australia [4,19] pharmacists currently prescribe medications based on four different models which are variations of the supplementary model. They are The Medicine Maintenance Model [4], Advanced Practitioner Model [4], The Protocol Management Model [4] and The Formulary Prescribing Model [4].

In Canada, The Royal College of Pharmacy [20-22] identifies two models of prescribing. The first is "adapting a prescription" [20-22], where a pharmacist receives a prescription from a physician or other healthcare professional based on the patient's assessment and is able to adjust it with informed consent from the patient. The second type of prescribing is called "initiating/managing drug therapy" [20-22] (limited to those pharmacists who are credentialed and are on the "Clinical Register of the Alberta College of Pharmacists") [20].

With all these different practice developments internationally, it will be interesting and important to see whether Jamaican pharmacists are ready to embrace this prescribing role as it evolves, as well as to examine what barriers they perceive would arise with respect to this new role.

Ethical Approval

The study was approved by The Advisory Panel on Ethics and Medico-Legal Affairs in the Ministry of Health and Wellness, Jamaica (Approval #2015/61) and The Tasmanian Health and Medical Human Research Ethics Committee (Approval #H0016165).

All ethical principles and standards stipulated by these two bodies were adhered to including proper considerations of the rights of individuals. All participants were informed in writing regarding confidentiality, privacy and their freedom to withdraw if they so desired at any stage of the survey without penalty.

Informed Consent

Informed consent was obtained by way of implied consent. Once the information sheet was read and the questionnaire attempted. A statement indicating consent was included in the introduction of the online questionnaire.

Methodology

Study Design

This research employed a cross-sectional design. These types of designs are carried out when prevalent information needs to be gathered on a sample of a population at a single point in time [22].

Inclusion criteria

All pharmacists who were registered in Jamaica with the Pharmacy Council of Jamaica for the current period of study and who had provided active email addresses were eligible for inclusion in the study.

Exclusion

Pharmacists who were not registered with the Pharmacy Council of Jamaica for the period under study, all pharmacy students, interns and other medical professionals.

Sampling methods

Convenience sampling [23] was the method used to select participants for the survey. This was done by sending out invitation emails of the pre-tested questionnaire to the email addresses provided by the Pharmacy Council of Jamaica, the official licensing body of pharmacists in Jamaica.

Data Collection

The self-completion questionnaire was used as the data collection instrument and Lime Survey® was the online web-based platform.

The participants were invited to participate via emails sent out electronically to all pharmacists who were registered with the Pharmacy Council of Jamaica at that time, using the approved email addresses furnished by that body. The survey was available to the participants for three months between November 2016 and January 2017. After the initial invitation emails, as well as interim announcements which were made at pharmacy seminars, bi-weekly email reminders were sent out four times to the participants.

Data Analysis

The questions of the instrument were arranged with 5-point Likert scale responses and re-scaled to responses of agree and disagree to assist in simplifying the interpretation of the results. The statistics and results that were automatically generated from the Lime survey® Tool were imported and analysed by the IBM Statistical Package for the Social Sciences (SPSS), [24, 25]. Data from the participants' responses were analysed, using descriptive and inferential statistics, averages, frequencies and standard deviations, for comparisons and contrasts to ascertain the relationship between variables and the percentage of each response. Pearson's Chi-squared test [23] was used to see if there was a difference in the perceptions of the participants to the aims of the study based on their training levels, their qualifications, or practice setting. A P-value of ≤ 0.05 was statistically significant.

Questionnaire Development

Internal Validity

The questionnaire was anonymous, adapted and modified to suit this research based on questions and terminologies from other studies which assessed pharmacists' perceptions of the changing pharmacy practice roles [24-28]. The questionnaire was pretested among 10 pharmacists who were not included in the main study. It was refined with the aid of the external pharmacy practice research supervisors, through a review process, as well as modified after assessing the results from the pilot study which had a response rate of 100%. The responses of the pilot study were not included in the principal study.

The Cronbach Alpha [23] for the questionnaire was 0.72 which confirmed the instrument's reliability [23, 29].

The instrument consisted of 43 items arranged in six domains with questions related to the pharmacists' demographics, perceptions of prescribing, comfort level with different practice models for the prescribing pharmacists, perceived training and educational requirements for the role, pharmacy infrastructure required for the prescribing role and the perceived barriers that might exist in relationship to this increased role. The domains chosen ensured that the responses provided an accurate assessment of the perceptions of the participants with respect to the study questions being investigated and also to achieve the objectives of the study. New terms such as the types of models of prescribing

were explained at the beginning of the relevant questions. The design and pre-testing ensured that the results obtained from the responses would be reliable and could be reproduced under similar circumstances [29].

Ethical considerations

A document which served as the information and consent sheet appeared at the beginning of the survey which explained all the details of the survey to the participants as well as provide an option to the participants to withdraw from the survey at any time without any penalty. There were no incentives offered to the participants and their participation was voluntary. Implied consent was obtained once the participant attempted the survey.

Limitations

Only those persons with active email addresses were contacted by the investigators (324). This resulted in a smaller number of respondents participating in the study (198/324) resulting in a response rate of 61.1%, which is less than that required to make a research generalisable to the population of registered Jamaican pharmacists (972) at that time.

Also, this would result in the characteristics of the participants being unevenly distributed and not representative of the population under discussion, for example, the male to female ratio, those who were more technologically competent versus those who were not [30].

Despite this, a wide cross-section of pharmacists participated from across all fourteen parishes of Jamaica and from wide areas of pharmacy practice making it unique for the Jamaican pharmacists surveyed and can be the basis upon which other research may be conducted.

De-limitations

The study was conducted using a unimodal means of distribution (online) and paper-based versions were not included. The inclusion of paper-based versions would have increased the costs (traveling, stationery and other unforeseen expenses) to conduct the survey. This unimodal way (online) of collecting the data, may have reduced the number of eligible participants who may not have been computer literate at the time, who did not have computer access, as well as those whose email addresses were incorrect and would have been omitted. These factors would have impacted the response rate negatively. Possibly, in the future multimodal means of distribution can be used to increase the response rate.

Results

Of the 324 emails sent out to participating pharmacists registered with the Pharmacy Council of Jamaica at that time, 198 pharmacists attempted the survey yielding a response rate of 61.1 % (198/324). The results of the responses varied throughout the study at different points because not all participants answered all questions; there were 53 incomplete responses. The average age of the pharmacists surveyed was 40 years with a Standard Deviation (S.D.) of 11.92. The pharmacists had practised on average for 14 years (S.D.12). The majority (85/198–43%) were practising in privately owned pharmacies. Thirty-eight respondents (38/198–19%) worked in the public sector, twenty-two (22/198–11%) worked in the Regulatory sector, Research, Education, Industrial sector (Manufacturing), as Medical Representatives, and Clinical Pharmacists. Those surveyed in the public sector had a heavier workload (400 scripts daily) than the private pharmacies (300 scripts daily)

Fulltime dispensing pharmacists (64/145–44%), practised in a wide cross-section of the pharmacy field. The respondents also had varying levels of qualifications, ranging from the entry level Bachelor's degree (88/198–44%) to Doctoral degrees (11/198–5.5%) and PhD (1/198–0.5%). The respondent's level of qualification did not affect their awareness of the pharmacist's changing role overseas to that of a prescriber. (P=0.719). (Table 1, 2)

Table 1: Demographic and practice characteristics

Demographics and practice characteristics, (N=198)	Pharmacists, N (%)
Gender	
Male	38(19)
Female	107 (54)
In complete responses	53(27)
Total	198(100)
Trained in Jamaica	
Yes	121(61)
No	24(12)
Incomplete responses	53(27)

Table 1 continues on next page

Table 1: Demographic and practice characteristics *(cont'd)*

Demographics and practice characteristics, (N=198)	Pharmacists, N (%)
Education level	
Bachelor	88(44)
Masters	14 (7)
Doctoral	11(5.5)
Professional	8(4)
PhD	1(0.5)
Other[1]	23(12)
Incomplete responses	53(27)
Practice setting	
Public	38(19)
Private	85(43)
Other[2]	22(11)
Incomplete responses	53(27)

Other[1]: Cuba, Ohio U.S. and the United Kingdom.
Other[2]: Regulatory sector, Research, Education, Industrial sector (Manufacturing), as Medical Representatives, and Clinical Pharmacists

Table 2: Practice characteristics of Fulltime Pharmacists

Practice characteristics of fulltime pharmacists, (n=64)	Pharmacists, n(%)
Practice role: Chief pharmacist	15(23)
Practice Role: Owner	8(13)
Practice Role: Relief pharmacist	10(16)
Practice Role: Consultant Pharmacist	31(48)
Total	**64(100)**

Jamaican Pharmacists, Perceptions on Pharmacist Prescribing

Most pharmacists (113/145- 78%) wanted to expand their role to include more functions which were not stated. Pharmacists in the private sector were twice as likely to be in favour of adopting the prescribing role compared to their public counter parts (49/145- 34% vs. 25/145- 17%). The qualifications or the practice setting did not produce statistically significant differences. (P=0.800). See Figure. 1

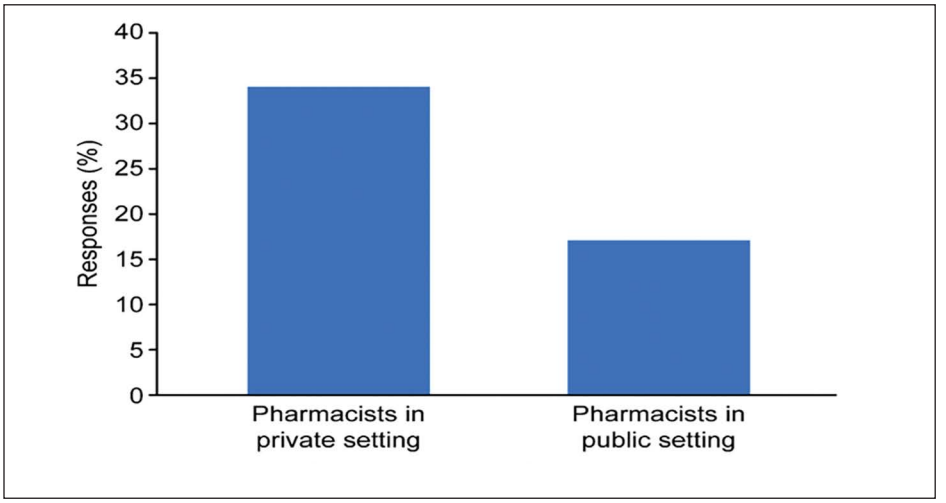

Figure 1: Views on scope of practice

Preferred Model

Pharmacists were more comfortable with and preferred the supplementary model of prescribing (132/145- 91%) compared to the independent model of prescribing (81/145- 56%) (Figure 2). Pharmacists from the public and private sectors did not differ in their views on their comfort level with the independent prescribing model (p=0.872). Pharmacists who had a Master's, PhD and other professional degrees were more likely to favour an independent model of prescribing, (P=0.09).

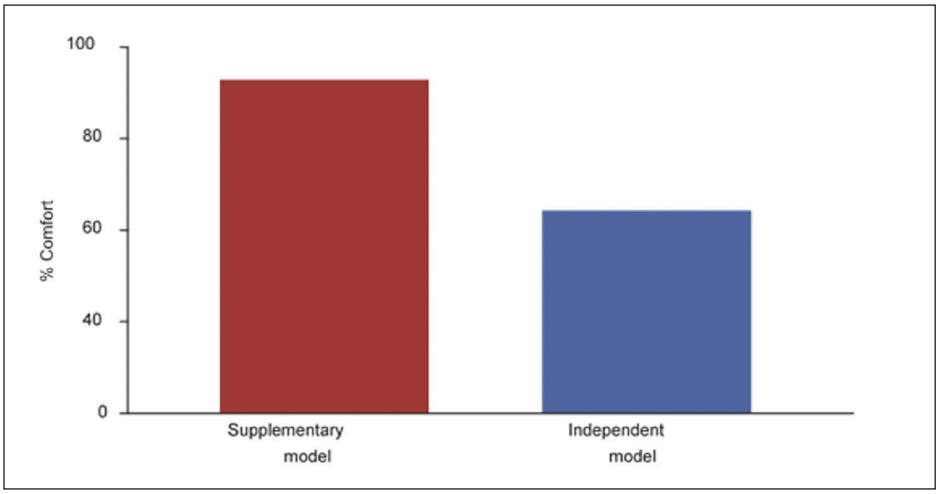

Figure 2: Comfort with different models for the prescribing pharmacist

Educational and Training Needs of the Prescribing Pharmacist

Pharmacists wanted more education in the areas of clinical pharmacology, drug interactions and adverse effects of medication (96/145- 66%), legal aspects of prescribing (99/145- 68%), public health issues not specified (93/145- 64%), pathophysiology of disease (91/145; 63%) training as specialists to facilitate the role, followed by registration as a prescribing pharmacist, a period of supervision by a medical practitioner (73/145- 50%), training in patient consultation, the interview process and consultation (94/145- 64.8%). The perception that anticoagulation, pain management and infections training, were important to the role of a prescribing pharmacist was unanimous (145- 100%). (Table 3)

Pharmacy Infrastructure Identified as Essential to the Prescribing Role

The pharmacists all thought that the need for software to assist with this prescribing role was important (62%). Separation of the roles of dispensing and prescribing were important for the prescribing pharmacist (68%). Most Pharmacists (72%) thought that charges should be assigned for this additional role.

Table 3: Training needs of Pharmacists for prescribing role.

Areas of training needed (n=145)	n=% in favour of training
Specialist registration	91(63)
Continuing education	91(63)
Period of supervision by a medical practitioner	73(50)
Public Health Issues	93(64)
Legal Aspects of prescribing	99(68)
Communication skills	94(64)
Patient Consultation and the interview process	94(64)
Pathophysiology of diseases	92(63)
Drug Interactions and adverse reactions	96(66)
Clinical Pharmacology	96(66)
Anticoagulation, pain management and infections	145(100)

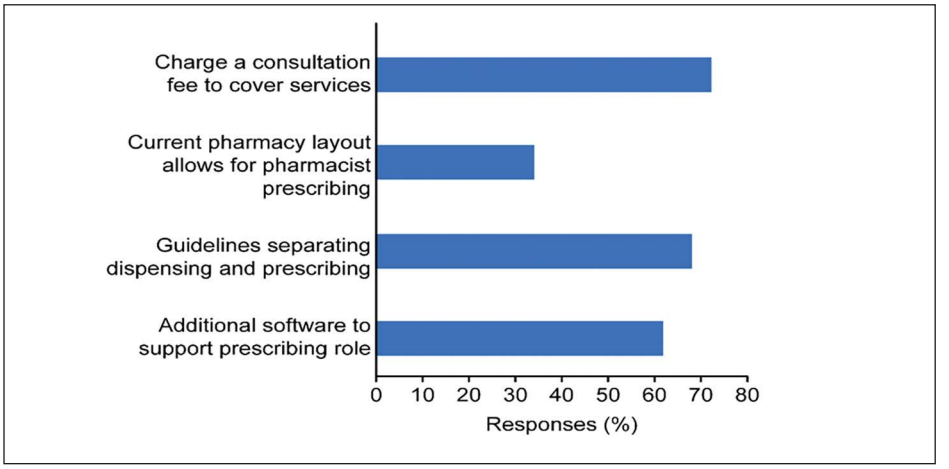

Figure 3: Pharmacy infrastructure identified as essential

This ranged from $1000 JMD to $2000 JMD. The pharmacists believed that a set time allocated to this prescribing should range from 5 minutes to half an hour.

There was no unanimous decision on changing the present infrastructure as half of the respondents did not want any change and half wanted adjustments in the current layout to facilitate this new role (Figure 3).

The Perceived Barriers to the Role of Prescribing Pharmacists

The perceived barriers identified by these surveyed pharmacists for implementation of this role were the reluctance of medical doctors to partner with pharmacists as prescribers (59/71- 83%), the fear of the increased responsibility that could result in lawsuits (61/120- 51%;) and the increased costs to the patient (69/120- 57%). There was no unanimous decision that pharmacists would lack the time to execute this function (56/119- 48% vs. 63/119- 52%).

Discussion

Jamaican Pharmacists, Perceptions on Pharmacist Prescribing

Most of the Jamaican pharmacists surveyed wanted to increase their role from just dispensing to the role of a prescriber. The place of work did not impact the decision to increase the pharmacist's role to that of a prescriber in a negative way despite the workload. The results obtained for the adoption of prescribing models such as the supplementary [9, 30, 31] or independent model [10, 30-32,] did not

Table 4: Perceived Barriers to the Role of Prescribing Pharmacists.

Perceived barriers to the role of prescribing pharmacists	Responses agreeing with identified barriers $n^1/(n^1+n^2)$ (%)	Responses Disagreeing with perceived barriers n^2 (n^1+n^2) (%)	Total Responses (n^1+n^2)
Legislation	49(32)	102(68)	151
Reluctance of medical doctors to partner with pharmacists	59(83)	12(17)	71
Customers not wanting to utilize the service	54(46)	64(54)	118
Pharmacists will not have time	56(48)	63(52)	119
Afraid of increased responsibility and legal risks	61(51)	59(49)	120
Patients will have decreased quality of care	16(13)	110(87)	126
Increased cost of healthcare	69(57)	51(43)	120

produce differences in responses based on qualifications or place of work. This could be due to the fact that all pharmacists surveyed wanted to increase their role to that of a prescribing pharmacist irrespective of practice setting [11, 33], or that level of qualification did not affect that decision. This was similar to their colleagues in Australia and Nigeria [5, 27]. These findings emphasise the point that Jamaican pharmacists have the same mindset as their overseas colleagues especially as it relates to expanding their role from just dispensing to include prescribing. This means that discussions can be started within the profession and also amongst the policy makers and educators to see how this type of practice can become a reality.

Educational and Training Needs of the Prescribing Pharmacist

There was an overwhelming response to the need for training in the areas of anticoagulation and pain management. The respondents also identified drug interactions, adverse effects of medication, the legal aspects of prescribing, public health issues, the pathophysiology of disease as well as credentialing and a period of supervision by a physician as other important training areas. These findings were similar to those in other territories where training in the areas of differential diagnosis (81.4%) [28], the pathophysiology of disease (74%) [28] and

interpretation of laboratory results (68.1%) [28] were also identified as necessary in territories such as Australia, Nigeria and the U.S. (respectively) [28, 34-36].

Preferred Model

The majority of pharmacists surveyed were more comfortable with the supplementary model of prescribing [4, 6, 8, 9], compared to the independent model [4, 6, 9-11]. This could be due to the fact that the supplementary model [4, 6, 8, 9] involved a sharing of the decision process and the responsibilities to the patient, hence, their present level of training would suit this scope of practice. In the independent model [4, 6, 9-11], the pharmacist would be solely responsible for the diagnosis, design of the treatment plan, initiation of the plan, monitoring and discontinuing of therapy if needed. The Pharmacists with higher qualifications surveyed were the ones who favoured the independent model of prescribing [4, 6, 9-11]. Their advanced training would allow them to feel more comfortable applying themselves in these advanced clinical capacities since their training involved more critical thinking, problem solving and direct patient care approaches, which would satisfy the prescribing function [7].

Only two main models of prescribing were presented to the pharmacists in this research. Other models could be investigated to see which might appeal to Jamaican pharmacists. In Australia and Canada [4, 5, 21, 22], there were other practice models available which were slight variations of the supplementary [4, 6, 8, 9] and independent models [4, 6, 9-11]. Emmerton et al. [1] identified eight different models of pharmacist prescribing worldwide, as mentioned before; they are slight variations of the independent and supplementary models.

The Perceived Barriers to the Role of Prescribing Pharmacists

The most important barrier identified to the prescribing role being implemented in Jamaica was cooperation from physicians to carry out this function. In other territories despite the changed role of pharmacists from just dispensing to more clinical roles, doctors in Pakistan [36] for example recognised that pharmacists were drug information specialists, educators, and counsellors. However, out of 483 respondents 84.9% disagreed with the idea that pharmacists should be prescribing medicines for patients ($p<0.05$) but they could monitor patient's response to drug therapy (87.6%) [36]. In another study conducted in the UK [37], the pharmacists were accepted by a few physicians as referral for prescribing services. The reason put forth by these researchers was that the physicians had re-defined their boundary of practice and with some reluctance accepted

pharmacist prescribers as part of the team [37]. The perception that the reluctance of the physicians to participate would be a barrier to the role was not an overwhelming response in this research compared to other territories [4, 5, 24, 27]. In Nigeria [28], 94.7% of the respondents thought that opposition from doctors would be one of the barriers to them carrying out their role as prescribers. Our research yielded an 83% response to this perceived barrier.

Unlike their colleagues in Australia, Nigeria, the U.K., and Canada [4, 5, 24, 28, 33, 37] the Jamaican pharmacists did not think that the development of legislation would be a barrier to them wanting to adopt this new role. This could be due to the fact that they were aware of legislative changes occurring to facilitate other new practice roles such as MTM [18, 19]. There was no overwhelming response to suggest that pharmacists thought customers would not utilise this service as was the case with Scottish pharmacists [24, 25]. Despite the fact that the Jamaican pharmacists thought that its implementation might result in increased costs to the patient, it was felt that the pharmacist professional body, could approach insurance companies both private and government to have these services included along with other recognised clinical services offered by pharmacists as medical providers. The insurance schemes would therefore assist in keeping down the increased costs, while at the same time ensuring patients could still gain access to high quality healthcare. Unlike U.K. pharmacists, they also did not think patients would receive a decreased quality of healthcare due to this new role [3, 22, 26]. Most of the pharmacists were positive about the introduction of the prescribing role, so their attitude to the changed role would not be an obstacle, which was initially the case in Australia, the U.K. and Canada [4, 5, 33, 37].

Limitations

There were extreme internet availability issues which may have caused the response rate to be low, 61.1%, which would mean there may also be a situation of non-response bias (36, 38). It is generally preferred to have response rates of at least 80% for surveys but authors note [38, 39] that over the years response rates, especially for surveys, have been decreasing and the response rates are even lower for online surveys. These discrepancies have even been assessed from behavioural theories [38, 39]. These authors [38, 39] have found that society as a whole is becoming more individualistic and are less cooperative with investigations especially if there are no immediate benefits to self [38, 39].

The response rate may have been improved if paper-based survey material were included along with electronic submissions making the distribution method

a bimodal one [30, 37, 38]. There also were no incentives offered to the pharmacists to complete the questionnaires and if done, this may have strengthened the effect of the bi-weekly reminders and influenced the response rate positively [38, 39]. The researches were conscious of the fact that there could have been the possibility of the introduction of bias and supported the decision not to offer incentives.

Although there were quite a few statistically non-significant findings this research is still important [39, 40], to the practice of pharmacy in Jamaica as it highlights the need for improved pharmacist services in line with international developments. The study may not be generalisable to the Jamaican pharmacist population surveyed, due to the low response rate, but geographically a wide cross-section of the pharmacist population was covered since responses came from pharmacists in all parishes of Jamaica and also from varied practice settings.

Conclusion

Most pharmacists surveyed were in favour of expanding their role to be prescribers using the supplementary model. They expressed that they would need additional training, especially in the practice of anticoagulation, pain management and infection control.

The major barrier perceived for pharmacist prescribing in Jamaica was the reluctance of physicians to facilitate this partnership.

This study revealed the necessity for a suitable model for the Jamaican pharmacist to practice as prescribers, also there was the need for the development of legislation and policies to facilitate this new pharmacist role. Pharmacy schools would also need to develop credentialed programmes to ensure that pharmacists are adequately trained as prescribers.

Recommendations

1. Jamaican pharmacists already practice limited prescribing from selected non-prescription and pharmacy specific medicines. Discussions should be started among the academics and policy makers to see how further developments in the pharmacy profession in Jamaica can be done to facilitate the inclusion of new pharmacist services such as pharmacist prescribing.
2. Pharmacy schools in Jamaica need to develop credentialed programmes to support this practice.

3. A suitable model needs to be developed for Jamaican pharmacists to practise as prescribers.
4. This study can be used as a basis to investigate how prescribing functions can be implemented within the scope of pharmacist services.

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School Leadership Response to External Evaluation Conducted by Jamaica's National Education Inspectorate

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Abstract

Leadership response to external evaluation is a critical component of the literature on educational leadership. However, this area of research is still in its embryonic stages in the Caribbean. This study was conducted using a qualitative case study design to examine the perceptions and responses of leadership to the National Education Inspectorate (NEI) inspection process in a selected high school in central Jamaica. The school had been operating at an unsatisfactory level from March 2011, to when the research was conducted in 2014. The study was done using data collected through various methods including structured and semi-structured interviews with the leadership of the school, class observations, and analysis of school documents. The impact of the NEI on the progress of the institution was evaluated using the results. It was found that the leaders at the school were disappointed about the low grade given to them by the NEI and attributed this to the lack of preparation on their part for inspection. Nevertheless, the principal has implemented training interventions for his team to improve performance in their roles and the school is now reporting positive results. From the results, recommendations have been made relating to practice, policy, and further research.

Keywords: National Education Inspectorate, Secondary School; Leadership; Case Study; Evaluation

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Introduction

The monitoring of school performance is a critical educational priority across the world since there is a recognition and appreciation of the important role schools play in the development of any nation. In Jamaica, the National Education Inspectorate (NEI) established in 2008 has the responsibility for monitoring the overall performance of primary and secondary public schools. The NEI is mandated to submit reports, which include findings and recommendations for improvement to the leadership of the schools inspected, to the Ministry of Education and the Parliament of Jamaica.

This qualitative study was intended to provide insights into how the work of the NEI has impacted the performance of one high school in central Jamaica by ascertaining the school leadership's perspectives on and response to, the inspection process. In addition, the study sought to evaluate how the NEI's findings and recommendations have influenced leadership responsibilities and roles in relation to teaching and learning.

Statement of the Problem

Despite universal access to education at the early childhood, primary, and secondary levels in Jamaica, students' performance remains below acceptable standards. According to Davis (2004), data from the Ministry of Education in 2003 showed that less than one third of the students in grade one was ready for the primary level and that some 30% of primary school leavers were illiterate. Those from the secondary level followed the same pattern with approximately 20% of high school graduates leaving with the skills needed for employment or with qualifications to enter the tertiary level of the education system. The data from the Ministry of Education in 2013 regarding the Caribbean Secondary Education Certificate (CSEC) analysis of the public schools' performance indicated that the trend of poor performance has continued. Of the 35,278 students who sat the CSEC examinations, 4,971 attained no subject, 16,195 attained 1–4 subjects and 14,112 (40%) passed 5-15 subjects. Mathematics and English Language had the largest number of entries with percentage passes of 34.1 and 56.6 respectively. Based on these data, it can be concluded that more than 50% of students leaving the secondary system do not have the minimum entry requirements for post-secondary education. This level of underperformance is cause for concern and the problem appears to be that of school leadership.

Dwyer (2013) concluded that, based on the inspections of 50% of the country's 955 public educational institutions, the quality of school leadership was an important factor in determining the overall effectiveness of schools in achieving good educational outcomes. Dwyer (2013) also lamented that the number of schools that had been rated as having good leadership was low. Tyson (2012), in an analysis of NEI reports noted that governance and leadership were deemed "satisfactory to good" and that both strong principals and supportive boards existed in only 10 of the institutions inspected. Based on this unsatisfactory situation, Tyson (2012) made a passionate plea to halt the appointments of untrained board members. Fullan (2003) stated that leading schools require principals with the courage and capacity to build new cultures based on trusting relationships and a culture of disciplined inquiry and action. He also noted that school leaders with these characteristics were in short supply.

Given the importance of accountability at all levels of the education system, an in-depth assessment should be undertaken, using the reports of the NEI. This study, conducted in one school, was undertaken to provide some insights into the impact of the NEI and focused on how effective the advice provided by the NEI was, by canvassing the views of key school leaders. To date, no study has been conducted since the NEI was established to evaluate the impact of a negative report on the overall performance and progress afterwards of any institution it has inspected.

Purpose of the Study

The purpose of the study was to investigate the impact of the National Education Inspectorate on the operations of a selected high school in central Jamaica. The study also sought to evaluate the extent to which the NEI influenced the perspectives of the senior managers of their functions and roles. The research questions that guided the study were:

1. What are the impacts of the National Education Inspectorate on the operations of the selected high school?
2. How does the NEI influence the perspectives of the senior managers of their functions?

Limitations of the Study

The chief limitation of the study is that the research findings cannot be extrapolated and generalized to other schools as this was a case study of just one

school. Nevertheless, the insights gained have the potential to shed new light on the subject.

Delimitations of the Study

This study was limited to the perspectives of the leaders of the institution. The perspectives of other stakeholders were not included. This was a single-unit case study; therefore, no other institution was included.

Role of the Researcher

The author is currently a male principal at a teacher-training institution who earned a Doctorate in Educational Leadership almost six years ago. His foundation of leadership has its roots in leading a rural secondary school for a few years, which made room for his experiential knowledge of the evaluation processes that secondary schools undergo. He thought that a study of this nature would be timely and significant because little information exists on the response of school leadership to external evaluation, even though such feedback has implications for the directions of the school. The data from this study can be used by planning and policy-making stakeholders in the education sector. Additionally, the results from this study may be used as a source of secondary information for other research with similar topics. The main assumption that the researcher had at the start of the study was that all interviewees would be open and honest in their responses. Also, they would share a similar sentiment as the researcher, that information on this topic is needed by the relevant stakeholders. Further, the researcher assumed that he would be treated as an 'insider' since he is also a school leader.

Literature Review

The literature confirms that most education systems around the world utilize school inspection as a means of ensuring quality assurance. It also confirms that it is the norm for school leaders to promote changes that are geared towards improvements in the schools based on the results of the inspection. Gustafsson et al. (2015) for instance, completed a survey of six European schools, where they found that school inspection culminated in positive changes across the board. The study was on the school leaders' response to the inspectors' reports.

In common with this research, is that of Ehren et al. (2015). They found that the Dutch principals generally feel pressured to make prompt improvements to their schools in response to the feedback provided by the school inspectors. A prominent thread in the related discourse on school inspection is that most of the studies are Euro-centric, with a meagre focus on the education systems in the developing world, let alone the islands of the Caribbean.

School inspection has had a long history in the Jamaican education system, having been influenced by the British education model for centuries. Chief Education Officer, Wesley Barrett (2003), in affirming this position, observed that the long and robust history of the school/panel inspection has served the country well as a major tool in advancing learning achievement and school accountability, despite the changes that have taken place during the 1960s and 1990s in structure and modalities. Although these changes have taken place over almost 200 years, the focus has not been shifted and the objectives for all the different forms of inspection bear strong similarities. Despite this well-developed system of school inspection, significant improvement in students' achievement has remained elusive and has become of deep concern to stakeholders. School inspection is, therefore, not the single bullet that can bring about the revolution that is needed to continue the process of transformation of education to meet the demands of the twenty-first century.

Jamaica gained political independence on August 6, 1962. This was a time of great national pride for the masses. However, the people of Jamaica started the process of taking full control of their educational fortunes in 1953 with the establishment of a Ministry of Education under the leadership of an elected Representative Government. The formation of this Ministry replaced the then Director of Education who administered an education system that reported to the British Government and not the people of Jamaica. Noted Educator, Errol Miller (n.d.), in a paper titled *"Education Reform in Independent Jamaica", indicated that 1953 was a significant period that marked major reforms in education in Jamaica".* Miller identified some of the significant reform themes to be: nation building, school-based management, legal framework, expansion of access, tertiary education and special education. These reforms were also accompanied by extensive curriculum changes over many decades. Whyte (1983) has outlined the changes that have taken place in the curriculum from the 1700s, moving away from merely the teaching of scripture, reading, singing of hymns and knowledge of Biblical Geography to history, general science, music, Spanish and a number of other disciplines. The curriculum expansion was propelled by the growth in secondary schools which started in 1694. These

schools were established to provide education for the white population and as such the curriculum was similar to that of Britain.

Over the last five years, several Caribbean countries have undertaken reforms of their education systems. Hutton (2008) noted that countries such as Guyana, the Cayman Islands, and Trinidad and Tobago have all engaged in some degree of education reform. These educational reforms are usually associated with the development of goals and are part of a broader frame of public sector transformation. Information gathered from the Ministry of Education Strategic Plan, Trinidad and Tobago (2002) highlighted some main reasons for the education reform the country undertook to include the need for the development of the national human resources which is translated in a focus on access, quality and sustainable policy development. These reforms are similar to those of countries such as Guyana and Jamaica.

In 2004, the Government of Jamaica, under the leadership of the then Prime Minister, the Honourable P. J. Patterson, appointed a task force to evaluate the current state of the education system. Resulting from this study was an action plan to create a world-class education system that would prepare Jamaican citizens to compete in the global economy. The driving force behind this undertaking was the deep concern at all levels of the society about the performance of students, at all levels. The dismal failure of a significant number of schools in recent times has been noted and publicly discussed despite high enrolment rates and significant curriculum reforms.

The UNESCO 2000 report on the World Conference on Education for all (EFA) held in Jomtien in the year 1990, indicated that Jamaica had committed itself to the universal Declaration of Human Rights and the Convention on the Rights of the Child, which declared that all children, young people and adults have the right to benefit from an education that will meet their basic learning needs in the best and fullest sense of the term, an education that includes learning to know, to do, to live together and to be.

The vision articulated at the Jomtien world conference was re-affirmed in the Dakar Framework for Action (UNESCO, 2000), which represented the support and commitment of the global community to pursue strategies that will cater to the basic learning needs of every child, youth and adult in the present and future generation. The framework stipulated that starting from early childhood, students would require access to high quality educational opportunities that are responsive to their needs and are equitable and gender neutral. The right to education imposes an obligation upon states to ensure that all citizens have the opportunity to meet their basic learning needs.

According to data from the Ministry of Education's Task Force Report on Educational Reform (Davis, 2004), the Jamaican education system caters to approximately 800,000 students in public and private institutions, from early childhood to the tertiary level. In addition to the Ministry of Finance, the Ministry of Education had the largest expenditure in the island's annual budget of approximately 30 billion dollars. Despite this injection of capital into the education system, students' performance in national and regional assessment continued to be far from satisfactory.

The report made several recommendations, one of which was the establishment of a national quality assurance authority to address the issues of performance and accountability across the education system. As a result, the National Education Inspectorate (NEI) was established as an independent agency of the Ministry of Education in 2008 and reports directly to Parliament through the Chief Executive Officer. Its core functions are to provide regular assessment of students' performance as they progress through primary and secondary schools. In addition, recommendations are to be made in order to improve provisions made for students' learning and development. As such, the role of the NEI can be summarized as aiming to provide "good education" as envisioned by the country through capacity building and collaboration. Capacity building is the ability of educational institutions to enhance the professional learning of teachers and transform reform into a system of accountability that is student oriented. Information from the 2013 report of the NEI indicated that the entity had completed an inspection for approximately 600 schools of the 911 public educational institutions. Since the establishment of the Inspectorate in 2008, no study has been done with regards to its impact on the education system in relation to its mandate.

Methodology

This is a qualitative single case study with the broad objective of investigating the impact of the National Education Inspectorate on the operations of the selected high school. The high school is in rural Jamaica and has a population of 950. The study also investigated how the NEI influences the perspectives of the senior managers of their functions. The data presented are part of a larger doctoral study. The overarching aim of the study was to examine the perceptions and responses of the leadership of the school to the NEI report and inspection process both initially and five years later. To achieve these objectives, data were collected from multiple sources using different data collection techniques. The

Table 1: Demographic Characteristics of Subjects

	Senior Managers	Principal
Education		
Bachelors	7	–
Masters	1	1
Gender		
Males	2	1
Female	6	–

characteristics of the sample of 17 involved in the investigation are shown in Table 1.

The principal who has been leading the school since 2012 was interviewed using structured and semi-structured interview schedules. In addition, a total of eight senior managers, five females and three males, were also interviewed using structured and semi-structured schedules. These middle managers had various responsibilities ranging from heads of department for mathematics, English Language, and science to grade supervision and cafeteria operations. Five of the senior managers had been carrying out their duties for more than a decade except for the heads of department for science, mathematics and science, who were in their positions for five years or less. In addition, they were also somewhat younger than their counterparts being aged between 30–45. The other members who were of the senior core were in their fifties and one would have been retiring in a few months at the time of the interview. The instrument used was organized into six categories, which sought to solicit the senior managers' reactions and responses to the NEI report. The instrument had four categories of questions, designed to primarily get the leaders' initial response to the inspection and how it affected their teaching and curriculum management. The education officer supervising the school for the past two years was also interviewed using an instrument that had questions divided into five categories, aimed at gaging the level of monitoring and support the Ministry of Education has been providing to the school.

As part of the data collection process, school records and documents such as board minutes, staff meeting minutes, lesson plans, students' notebooks and the strategic plan were carefully examined. A total of 21 class observations were also conducted to ascertain the teaching methodologies being used primarily in mathematics and English Language. These were the areas that were singled out for close examination by the NEI. Of the twenty-one class observations

completed, eight were in mathematics, five in english and the other eight were spread across the science and technical subjects. The observations were done for all subjects, from grades seven to eleven. This was important to identify whether there were differences in how teaching and curriculum management were done based on grade levels.

Various strategies were employed to secure the validity and reliability of the data used in this study. A journal was used throughout the data collection process for reflection purposes. It was important for the researcher to distance his personal beliefs, preferences and emotions from the data collection process and the journal was instrumental in achieving this (McGarth, 2021). The researcher also triangulated the methods that were used to collect data. Although still within the qualitative framework, observations, interviews and document analysis were used. The key advantage of triangulation is that the findings identified via one method could be verified using another.

All ethical considerations were upheld before, during and post data collection. Firstly, the researcher did not commence the research until he received clearance from the Internal Review Board at his institution of study. Also, permission was sought from the selected school before the start of data collection. Next, interviewees were thoroughly informed of the purpose of the study to ensure transparency. They were also informed that they could withdraw from the study at any point. Every effort was made to protect the identity of the school, principal and staff where the data was collected. Furthermore, to ensure confidentiality, the data was stored where no one could randomly access it.

Research Question – How did the Principal of the School Perceive the Inspection Process Initially and Five Years After?

At the time of the inspection, the researcher was the Dean of Discipline and so worked closely with the then principal, staff, parents and students. Consequently, he was a part of the inspection experience and vividly explained the denial and shock that enveloped the administration and staff after receiving the report. There was an ethos of dejection, failure, and division among staff and administrators concerning the findings and conclusions of the report. As Dean of Discipline at the time, he was devastated by the results. He did not believe the school's performance had been fairly represented in the report a sentiment shared with other members of staff. He felt at the time that much had been done in the area of discipline at the school under his watch. In his own words:

> I was rated the best Dean of Discipline in the Ministry of Education, region 5 and saw where discipline failed and I know there were other schools that were coming to me for help and when their school was inspected, discipline was up there, so for me, it was a bit disappointing, but it was a wake-up call for me.

The objectivity of the inspection report came under scrutiny, particularly in relation to the satisfactory grade given to leadership and management while the school was designated overall to be unsatisfactory. The senior members of staff saw this as a contradiction since it is leadership and management that drive the school's success. They further expressed feelings of dejection, anger, despondency and denial not only among themselves they expressed them to members of the board and the principal at the time. In the Principal's own words:

> It was a wake-up call for senior management and others. It became a demotivation to teachers who were working hard over the years, putting in the effort, however, the inspection report gave them a different perspective. They felt the school did better than what the report said. The senior management team was split down the middle, some became motivated as a result of the inspection. You saw them with a new zeal, they had a new interest where students' academic performances were concerned. Others were demotivated, basically gave up they were just willing to do enough to go by.

The principal took a business-like approach to improve the overall standard of performance of the school. He was determined to ensure that the school made improvements based on the recommendations in the NEI report. As such, time was spent looking at the inputs, processes and output of the school's operation. The principal outlined:

> I took a business-like approach to the whole leadership, so I was always the first one in and the last one out in the evenings. I was always the principal who would be talking to teachers in an informal and formal settings, trying to find out from them how things are going and how I can assist.

This zeal to ensure improvement in the school prompted the principal to accept responsibility for the school's reported failures as the accountable officer. As such, there was a commitment to implement the recommendations of the NEI. To achieve this objective, he had to work hard to make a psychological shift in his own mind and the minds of members of staff. It was critical if the school was going to move forward that as principal he led from the front.

The principal and his team started the process of transformation with the development of a strategic plan in 2012. The process of strategizing based on the

findings of the report helped to move the school community out of the doom and gloom mourning phase. It allowed members of staff to examine the report and the evidence supporting the findings. This period of thorough examination was important as not many of the staff members had taken the time to look at the evidence provided by inspectors in arriving at the findings. From a close examination of the strategic plan, it was determined that the school was about mid-way through meeting its operational objectives. The plan outlined their strengths, weakness, and strategies to improve the operation of the institution within a specified time frame. The principal shared that since his appointment, he has taken note that the NEI report has impacted the overall management of the school. In addition, staff recognized that there was a change in the leadership and leadership style. They noticed that there was a new leader who was prepared to listen to their concerns and work with the team for greater efficiency in the best interest of the students and the school. It was evident from my interaction with staff that they had not been satisfied with the leadership provided at the time of inspection. It appeared to be "top down" and so lacked inclusivity while alienating a significant number of staff members.

The perspectives of key stakeholders had dramatically shifted at the time of data collection five years later from a state of gloom and questioning of the accuracy of the report to a position of exuding confidence and support for the work of the NEI. The principal felt ecstatic at the strides the school has made over the years. While not the only reason, it was felt by the principal that the NEI has significantly improved the fortunes of the institution. The principal, in affirming the importance of the NEI stated:

> The NEI is extremely important and I will tell you why. No organization, no institution whatsoever can function without analysis, without evaluation, without scrutiny and that is what the NEI is all about. I think the NEI's report and NEI's intervention in schools can only grow schools from strength to strength, so we need that school evaluation in order to move forward.

The principal, when pressed about the initial reaction of disappointment and questioning of the accuracy of the report, now lauds the importance of the NEI. The initial negative perception of the NEI is not entirely surprising. A close examination of inspection across the world has revealed that principals tend to react in disbelief and are even sometimes dismissive of inspection reports that do not present their schools in a positive light. Bitan, Haep, and Steins (2013) noted in a study that negative perspectives were voiced by principals who had a positive attitude toward external inspection of schools. This seems to be

the case with the principal of this school who initially had a negative attitude towards the report but in the end still affirmed the importance of having this external review. As principal of the institution, if he remained in despair and denial of the report, it would have been difficult to get his senior staff and other stakeholders on board to rise above the adverse findings of the NEI report and together implement measures to improve the school's performance.

Research Question 2: How did the Inspection Process Influence the Senior Managers' Perspectives of Their Supervisory Functions Initially and Five Years After?

The senior managers all felt that the reason the school received the unsatisfactory grade was largely due to the lack of preparation for the inspection. They indicated that they were unaware of the eight areas that the inspection would be focused on. They were all afraid of the inspectors and as such were not operating in their normal mode. This fear translated into almost false pretense on the part of some teachers as they attempted to integrate technology into their teaching, something they had not been doing and as a result were unable to do so effectively during the inspection. One senior member echoed: "We were told by management not to talk to the inspectors. It made us nervous and apprehensive. It was an unpleasant situation and very stressful as we did not know what to expect." (Table 2.)

In all, thirty-five percent of the teachers indicated that they had made special arrangements in teaching at the time of the inspection, while fifty-seven percent conducted their teaching as usual. It is also important to note that forty-nine percent of the teachers noted that they were unaware of the expectations of the inspection team.

Table 2: Preparation for Inspection

Question	Respondents' Response				
	Strongly Agree	Disagree	Strongly Disagree	No Opinion	Total Agree
1 .I made special arrangement in teaching for the Inspection.	2 (14%)	3 (21%)	7 (50%)	1(7%)	1 (7%) 14
2. I was aware of what the inspection team was looking for.	1 (7%)	3 (21%)	5 (35%)	2 (14%)	3 (21%) 14

Source: Interview Schedule

The matter of what should be included in the evaluation also came up for scrutiny by senior managers. They felt that too much emphasis was placed on mathematics and English Language, almost to the exclusion of other subject areas. They concluded that if equal emphasis was given to all subjects, the school would have fared better in the report as it relates to students' achievement. They were also concerned that no consideration was given to the low performing students they got in grade seven and the value added to them after five years. Many of the students who were placed at the school were reading far below their grade levels. In effect, this seems to be a real concern of theirs as the inspection process paid little or no attention to the value-added education provided by the school. As such, this is one of the reasons they cast doubt concerning the objectivity of the report in representing an accurate picture of the school. Consequently, members of the senior management team were among those who expressed serious reservation to accepting the report. They saw the report as casting judgement on their stewardship over the many years of service to the school and the teaching profession. On the other hand, the younger members of the senior management team were more open to taking an objective look at the report. As such, while acknowledging concerns about the inspection process and findings, they felt the report should also be used as a tool to evaluate the quality of service that the school was providing and use the results to plan for greater improvement. All the senior members expressed concerns about the short notice they had been given to prepare and present documents to the inspectors. They felt it was time-consuming and took away time they should be spending with students in the classroom.

According to the principal and staff members, the members of the Board of Management were also unhappy with the results and the report took center stage at the first board meeting after its publication. The then principal, who was also a trained school inspector, sought to provide reasons for the results of the inspection. These reasons all aimed at blaming the teachers for not professionally carrying out their duties. What was clear was that the Board had concluded that since the management got a passing grade it was the teachers who had failed and in effect cast the principal's leadership into question. One senior staff noted that the Chairman was angry and chastised them for not doing well and for failing the principal.

The report led to significant changes in the middle management structure of the school. Two members of the senior management lost their jobs as heads of departments. The principal indicated that the Board of Management decided to change the head of departments for English Language and mathematics,

the two subjects that were closely scrutinized in the inspection and found to be falling far below expected standards. There was also redeployment of staff members teaching upper school (grades 10 & 11) and lower school (grades 7–9) in the areas of mathematics and English Language. The deployment saw persons with a Bachelor of Education degrees in mathematics and English Language taking on leadership in teaching and leadership of the departments. Senior staff indicated that the inspection process had positively affected how they now approached their responsibilities. They are keener on the supervision of the teaching staff to ensure that the different learning needs of students are being addressed in the classrooms. In addition, they have all taken the necessary steps to enhance data gathering and improve their documentation systems. It was quite a pleasing task for them to talk about the clinical approach they are now taking to the job. They do not want a repeat of the same results when next they are inspected. It was heartening to see and experience the level of confidence they exuded. They no doubt felt empowered about what is expected of them as senior managers. This included greater understanding and appreciation from more involvement in the management of the school through increased ownership of their different responsibilities than initially and the investment the school has been making in the provision of professional workshops. Senior members indicated that the work of the NEI is vital as an external quality assurance body. They felt that the inspection process has allowed the entire school to look inwards and take important steps to improve its services to students. One senior member stated that *"Accountability is important in our education system and even though I may not agree with everything done by the NEI, we cannot discount its importance."*

The transformation in the perspectives of the senior managers was remarkable and so positively affected how they viewed and approached their responsibilities. The shift from dejection and feelings of disappoint to acceptance and purposeful resolve to change the course of the school has contributed to a vibrant future for the institution. Senior managers, through the positive leadership of the principal, took an in-depth assessment of the report and sought to build on its strengths and worked to address areas of concern. The leadership provided by the principal is best defined by Guthrie and Schuermann (2010) who postulated that transformational leaders create an environment in which persons feel empowered to fulfil their needs and to become productive individuals in the organization. This was not an easy task, but it certainly has assisted in improvements in the academic performance of the students, the supervisory competency of the senior managers and created a teaching and

working environment focused on students' achievement. It was clear that these changes, while they may be occasioned by the findings of the NEI report, were also made possible by teachers and a leadership team who were committed to erasing the negative press and perception that has haunted the school since the publication of the report.

The results showed that over time, the principal's perspective has shifted from a position of skepticism, doubt, and denial to a state of purposeful resolve to objectively interrogate the findings and recommendations of the report. It was also important that the principal, as the chief executive officer of the school, took charge of the process of reflection and indeed responsibility for the findings of the report. His action demonstrated a high level of professional maturity and great understanding of the purpose of inspection in accordance with MacBeath and McGlynn (2002) who expressed the view that school inspection, as an external evaluation mechanism, should complement the school's internal assessment and evaluation to maintain quality educational standards. This approach of the principal to examine the report within the context of finding new measures to improve and maintain quality educational standards has led to a revival of hope in the middle managers and other members of staff. The principal did not just revive hope in the stakeholders but embarked on a journey that saw the development of a strategic plan that came out of the reflection on the strengths and weaknesses of the institution. He took an appreciative approach that did not only focus on what was wrong at the school but also on those things that were going well. The inspection report spurred the principal into action which was not an unusual reaction. Figlio and Rouse (2006) in a study of principals whose schools were "under threat" found that they took steps to increase planning and instructional time and instituted targeted professional development activities to improve the instructional competence of teachers. These initiatives were all aimed at increasing students' performance.

The principal and the team went through Cooperrider and Whitney's (2005) four steps in the appreciative inquiry process to include discovery, dream, design, and destiny. The discovery stage involves participants focusing on the processes in the organization that have been working and identifying what the vision of the organization is. In the dream phase, employees are engaged in a visioning process where they seek to envision the efficient optimal performance organization. The design component seeks to assimilate the ideas of the team through planning and prioritizing to create the optimal performance organization they envision. The final stage is destiny. This focuses on where the organization will go and the path it will travel. As such, this is the point

at which the plan of action is implemented and requires the support of all to build optimal performance so that organizational goals can be realized. This process of visioning has certainly resulted in positive results on the morale of staff, on improved understanding of the requirements of the staff, and on students' achievement.

The senior managers also went through a process of conversion moving from dejection to conditional acceptance of the report. Thrupp (1998) explained that the naming and shaming of schools doing poorly can prevent acceptance and implementation of feedback. This naming and shaming of the school did, in fact, affect the acceptance of the report by stakeholders. As such, senior managers struggled with the fact that the inspectors did not place enough emphasis on other subject areas outside of mathematics and English such as vocational and technical subjects where performance was commendable. It was felt that if such consideration was taken then the school would have fared much better. Nevo (2002) in supporting the perception of key stakeholders noted that inspection can be very narrow in scope and may focus on similarities at the expense of taking note of the specific local needs and unique features of individual schools. School inspection has the potential to put administrators and teachers under pressure, as they can fear sanctions and public vilifications if it is shown that their schools fail to meet established standards. Despite this initial reservation, the senior managers, guided by the principal, changed their approach to their responsibilities and became more clinical about the way they supervised their staff and carried out other administrative duties. The senior managers became more appreciative of Bennett's (1995) views on their roles "middle management [is the] tier of authority which tries to coordinate the day-to-day work of teachers in the various sub-units and integrate them into the overall totality of the school" (p. 104).

The use of data became critical in making and assessing decisions the senior managers made about various aspects of their job. This new approach to work came through organized education and training workshops and support by the principal in providing the necessary moral and material support. The senior managers, with new tactical skills and a greater understanding of their complex role, have assisted greatly in the management of the curriculum, instruction and teacher development. Neagley and Evans (1980) argued that this approach by these senior managers is best described as modern supervision that is democratic.

A very fundamental aspect of the revolution that took place within the ranks of the senior staff was that of feeling empowered to carry out their duties.

This empowerment came through the education and training they received concerning their job function and the latitude the principal allowed for in the execution of their duties. The improved educational standards of the school have much to do with the work of the middle managers. These middle managers aptly represented Bell's (1992) views that middle managers need to work strategically on ensuring the team functions to effectively contribute to the institution. This strategic alliance and teamwork were evident in the learning community the senior managers developed among themselves to share ideas and best practices.

Conclusion

From a social and psychological perspective, studies have found that people are generally not accepting of negative feedback on their performance (Sukhera et al., 2018). This was the case with the leadership of the school under review. However, their attitude subsequently changed. According to Miron and Brehm (2006), the issue of subjectivity is a contributing factor to this reaction to negative reports. Along with other issues, subjectivity was a deep concern to the principal and other school leaders. They, however, with the leadership of the principal, looked inwards and, using the report as a guide, took the necessary steps to make the school better. What has been made clear concerning the response of the school, therefore, is the important role of transformative and appreciative enquiry approaches to leadership and ultimately producing positive results.

The results of this study will contribute to the discussions in the field and has the potential to guide policy at the levels of schools and the Ministry of Education. Eight recommendations are derived from the results of this research. First, principals whose schools have been inspected must take a lead role in charting the change process. Thus, principals need to appreciate the enormous impact that their leadership and attitudes toward the inspection process can have on the response and perceptions of other stakeholders. Second, all principals should get formal training in appreciative inquiry as a change management initiative; this will assist the school community in better affirming its strengths and build on identifying the school's strengths rather than dwelling exclusively on the negatives.

Third, individuals who are being promoted to senior management positions must first receive training in their roles and responsibilities. This is necessary if they are to effectively carry out their duties. Fourth, parents who have

children enrolled in schools being inspected must be included in the process, especially during the pre and post inspection phases. Thus, they will have a better understanding of what the process involves and how they can make their voices heard. Fifth, the Ministry of Education should consider expanding the role of the NEI to include the responsibility of supporting targeted interventions in schools based on inspection findings, especially the development of a strategic plan to respond to the recommendations contained in the report. Six, education officers must be mandated to monitor the implementation of the plan and give feedback yearly to the Chief Inspector of Schools via the Regional Director of each educational region. This would mean that consideration must be given to the number of schools assigned to education officers. Seven, the Ministry of Education must consider providing the necessary monetary and other support to schools as suggested by the inspection report. Lastly, The NEI must ensure that there are no inconsistencies in their overall rating of schools and individual inspection indicators.

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Health Information Management Leadership Through The Triple Lens of People, Policy and Practice

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Abstract

Effective leadership in Health Information Management (HIM) could help to enhance the practice and build capacities to meet the future needs of the profession. However, there are concerns regarding perceived deficiencies in HIM leadership in Jamaica, and these are compounded by challenges identifying leadership potentials and harnessing leadership skills in HIM practitioners. A convergent-parallel mixed-methods study was done using a survey and semi-structured interviews to examine participants' perspectives of leadership in HIM and to identify appropriate solutions to leadership problems in the field of practice. The results revealed the existence of multiple leadership practices in HIM in Jamaica - fragmented leadership, inadequate leadership grooming, and other issues regarding leadership. The interview results corroborated those of the survey. The author recommends a triple leadership framework that would synergistically combine efforts of people leadership, practice leadership, and policy leadership for more effective HIM leadership. There is a need for more in-depth studies into HIM practices through the perspective of leadership and the introduction of leadership and professional development programmes for leadership capacity building among HIM practitioners and to enhance the provision of quality healthcare by ensuring the availability of the information required to support decision-making.

Keywords: Leadership, Health Information Management, Leadership Framework, Jamaica, Policy

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Introduction

Health information management (HIM) functions should be effectively executed to enhance the provision of quality healthcare by ensuring the availability of the information required to support decision-making (AHIMA, 2021). Thus, HIM requires effective leadership. Leadership, as described by Daft and Marcic (2012) is "the ability to influence people toward the attainment of goals" (p. 12); and is a people-oriented activity that is shared. Fuller (2002), described leadership as the "motivation and inspiration of the organisation's managers and staff to achieve its mission and strategic goals and fulfil its ethical principles and moral philosophy" (p. 727). Notwithstanding the numerous other definitions, it is reasonable to agree with Miller (2013) that leadership is a contested issue.

Leadership, according to Fuller (2002), involves inspiring and motivating individuals to model leadership behaviours. While some people have innate leadership qualities which are easily cultivated; others must learn and adopt these qualities. Also, while not all managers are leaders, all leaders are managers and leaders are present and can function at every level within an organisation. However, for an organisation to benefit from leadership, the process must be effective. Effective leadership is visionary leadership. It helps to strengthen relationships, build trust, foster innovativeness, encourage commitment, challenge the status quo, and build competencies (Fuller, 2002).

According to Sheridan et al., (2016) leadership training in the HIM profession is a serious matter, and this training should assume formal and informal approaches. HIM leadership training should address practitioners' perception of themselves as leaders, how leaders within the discipline develop, their deportment during work, and the way they manage and lead. In addition, leadership development initiatives should be designed to help individuals develop personally, and should also allow for the provision of the right tools and strategies to address any barriers to leadership (Johns, 2013).

HIM practices should be periodically assessed for enhanced execution of processes. These reviews require the expertise of HIM leadership and other stakeholders, but it seems HIM leadership is deficient in Jamaica. Although leadership skills are found in every individual, there are challenges in identifying potential and harnessing those skills. Two main challenges are fear that leadership merely resides in a few and that those in leadership positions often abuse their power. Unfortunately, the current system appears to foster the continuation of such challenges, but such nurturing could only hinder growth and negatively affect relationship building, capacity development and

succession planning which are vital activities impacting leadership in HIM organisations. Hence, this study was warranted to examine leadership among HIM practitioners in Jamaica.

The Study

This convergent-parallel mixed-methods study examined leadership from three perspectives - people leadership, practice leadership, and policy leadership (Hill-Berry, 2020; Miller, 2018) – and focused on HIM practice leaders, academic leaders, and policy leaders. The main purposes of this study were: to identify leadership models/practices that can be adopted for more effective HIM practice and to identify solutions to leadership problems in HIM organisations in Jamaica. The objectives were to (i) determine current leadership practices in Jamaican organisations involved in the leadership and management of HIM practitioners, and (ii) identify appropriate solutions to the problems of leadership in HIM in Jamaica. This study was guided by two questions: (1) What leadership practices currently exist in Jamaican organisations involved in the leadership and management of HIM? (2) What can academic and policy leaders do to address HIM leadership challenges identified in Jamaica? The significance of the study is its potential to encourage the practice of effective leadership among HIM practitioners and stakeholders.

Literature Review

Leadership practices should guide individuals to desired outcomes, set directions for individuals, groups and organisations, and influence them to follow pathways that lead to desired outcomes (Miller, 2013). In today's environment, in the Jamaican HIM sector, there is somewhat of a constriction in the market for leaders and leadership seems to be a position and a possession for senior managers only (Heritage, 2011). Although desirous of instantaneous knowledge, people are at times deprived of practical leadership experiences and in some instances, very few people are aspiring for leadership (Rubenstein, 2014). Further, individuals appear more focused on their organisation's purpose and mission and seem to embrace the view of the chaos theory that "long-term success is not ensured by the plan, but by sticking to the purpose and core values of the organisation" (Burns, 2002, p. 50).

Leadership experiences can be attained through involvement. If HIM leaders embrace the mentoring and practical experience, they could involve their staff in

leadership activities to advance efficacy and build competencies (Laverty, 2016). As Abrams et al. (2014) proposed, "through mentoring and train-the-trainer approach, HIM professionals can practice leadership skills by helping entry level staff gain competencies" (pp. 37–38). Further, "the most memorable way to learn is through experience: learning by doing" (Schank et al., 2013, p. 172). Through learning by doing, people engage in experiences that help to broaden their awareness and association by engaging with objects, people, and practices (Laverty, 2016). This is not a new approach as Keeton (1983) suggested that through practical experiences, learners are directly engaging and interacting with the phenomenon and those practical experiences result in more effective learning. As a result, the best learning is buttressed by experiential learning.

Leadership is often seen as an important characteristic of management that involves wielding power and influencing others to achieve established goals. Effective leadership, therefore, involves a balance of interests – in both employees and organisational outcomes (Huffman, 1994). Leadership requires incorporating leadership styles from various sources and developing minds while sharing the weight that is placed on one or a few individuals (Daft & Marcic, 2012), as well as assuming varied roles and responsibilities that could bud into system-wide improvements through efforts to develop other leaders (Hopkins & Higham, 2007). Thereafter, all levels of leadership are actively engaged, and since "current and future leaders learn in context . . ., shared ideas and commitment are simultaneously being cultivated" (Fullan, 2004, p. 15).

Leadership training may also require shared leadership, using a collaborative approach and recognizing individuals for their efforts (Harris & Spillane, 2008). Distributed leadership creates opportunities for anyone in the organisation to lead and manage (Spillane, 2009). With transactional leadership, the cooperation of followers is encouraged through both rewards and punishments; and it focuses on getting tasks done and improving performance levels (Odumeru & Ogbonna, 2013). There is also, transformational leadership in which the leader identifies energies in followers, seeks to satisfy followers' needs, and fully engages them, while gradually transforming followers into leaders and leaders into agents for capacity building (Guay, 2011). This creates a climate of trust and openness where change and development are encouraged (Basham, 2012); in addition, people are more committed to their work, more highly engaged and more satisfied (Arnold & Loughlin, 2013).

Increasingly, there are discussions around the issue of HIM leadership to produce changes and improvements in the quality of health service outcomes. In like manner, there is a growing need for HIM leadership, and these positions

are best led by HIM practitioners (Hunt, 2014). However, if certified HIM practitioners do not grasp these leadership opportunities, then practitioners in other disciplines will do so and the results will not be as effective.

Methodology

Analytical approach

This study was conducted using a convergent-parallel mixed methods approach – collecting, analysing, and mixing both quantitative and qualitative data in a single study. Quantitative and qualitative data were collected and analysed using one method to complement the other (Creswell, 2014). The study sought to answer two research questions by administering a cross-sectional survey and conducting semi-structured interviews. The quantitative data were computed using SPSS 22. Reliability analysis was computed using Cronbach Alpha which returned a value of $\alpha = 0.90$. The qualitative data were analysed according to themes using Taylor-Powell and Renner's (2003) recommended steps for analysing qualitative data.

Participants

This study focused on HIM practitioners in public health institutions in Jamaica, policy leaders, and HIM academic leaders. Participants were selected from the four health regions (North-East, South-East, Southern, and Western) to ensure a wide cross section of HIM practitioners for greater representativeness. For this study, HIM practitioners are those working in public health facilities and practising HIM, and stakeholders are other groups associated with the Ministry of Health and Wellness with special interests in HIM, such as academic leaders and representatives from other health disciplines, regional health offices, and health-related agencies. Participation in this study was delimited to those who were practising and leading HIM as part of their job role and those whose job role required them to have frequent relations with HIM practitioners. Of the targeted 230 participants, 212 completed the survey and returned the questionnaires (a response rate of 88%). Of the 14 targeted semi-structured interviews, 13 were completed (a 93% response rate).

Results

The results of the study showed a predominantly female HIM profession in Jamaica. Participants in the survey were 84% females and 16% males. The distribution of participants showed a majority (40%) in the South-East – the largest health region with the largest health facilities, hence the highest HIM staff complement.

Existing Leadership practices

The first set of items on the questionnaire captured leadership practices that existed in Jamaican organisations where participants worked (Figure 1). Over 68% of participants agreed that leadership in their department demonstrated commitment to professional development, and about 55% agreed that leadership in their institution creates opportunities for personal and professional development. Similarly, just over 51% of participants agreed that leadership in their department inspired and motivated the staff.

As the first five items in Figure 1 shows, between 52% and 69% of participants responded in the affirmative about leadership and professional development in their department. For the next three items which expanded on leadership and professional development, the affirmative responses fell to between 40 and 49%, while the levels of disagreement for these items were relatively high and ranged from 33%–44%. Undecided responses ranged from a low of 13% to a high of 26%, indicating that for some items, over 25% of the participants

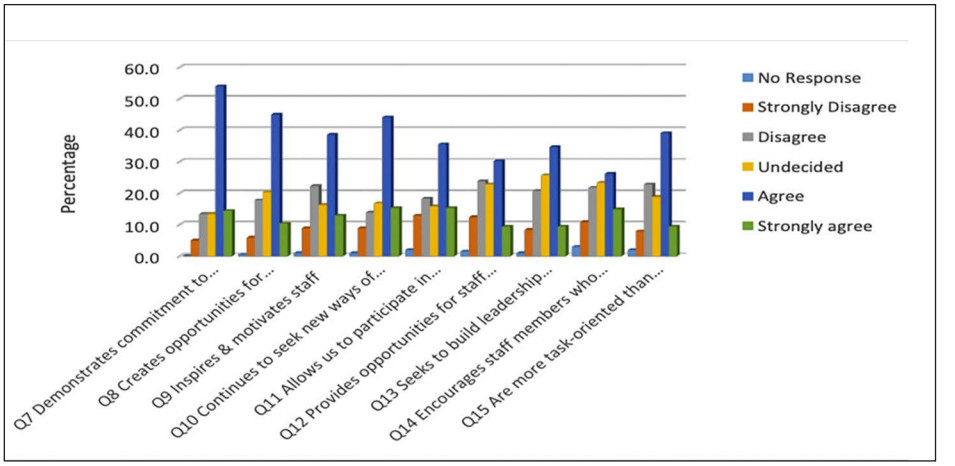

Figure 1: Participants 'perception of leadership practices in their institutions

expressed some amount of uncertainly regarding how leadership was practised in their departments.

Responses to the last item showed that over 40 % of participants agreed that leadership in their department was more task-oriented than people-oriented. These responses indicated that a transactional type of leadership was being practised in those institutions; while the previous items described other types of leadership that were being practised. For each leadership type described, affirmative responses ranged from 40% to 68% and the levels of disagreement ranged from 18% to 36%. These results showed that no dominant type of leadership was being practised. In some instances, the prevailing leadership practices were not easily described, and participants returned 'undecided' responses.

Leadership styles in HIM

Interviewees reported that several leadership styles were practised in HIM in Jamaica. These included participatory, autocratic, and authoritative, but the most dominant was democratic, and in some instances, an amalgam of democratic with elements of other leadership styles. In one instance, leadership in HIM was nebulously described:

> *They don't communicate well but they are trying to get the work done. Not excellent but it's satisfactory.* (Practice Leader 1, female)

While it was felt that HIM leadership practices mirrored no particular leadership style, nor described any one particular type, leadership in HIM was:

> *Leading by example and just being a good mentor to your team* (Practice Leader 3, female)

However, a differing view was:

> *Leadership based on goal-oriented tasks. Less emphasis is placed on the staff… so it is more like getting the job done than looking out for the staff* (Practice Leader 2, male)

These views were somewhat like those expressed by academic leaders who stated that leadership in HIM was:

> *Democratic with autocratic involved in some aspects along with some dictatorship involved* (Academic Leader 4, male)

And that in the HIM practice:

> *Leadership is weak. They do what they feel like. It's laissez faire* (Academic Leader 2, female)

Policy leaders shared similar views that current leadership practices in HIM were mainly democratic but:

> *Some of it may be laid-back, and laissez-faire. I would say democratic and laissez-faire. Maybe it's 50:50.* (Policy leader 2, male)

To summarise this aspect, although people leadership and practice leadership were examined, it was challenging to describe leadership in HIM institutions in Jamaica, as a hybrid of leadership types were being practised and it appears that leadership was fragmented.

Participants' perception of leadership in their department

The next set of items were related mainly to HIM practice leadership and policy leadership during departmental interactions. Just under 50% of responses regarding participants' level of confidence in their supervisors was positive (Figure 2) and about 55% of participants agreed that the HIM staff was willing to take on leadership roles. Regarding whether HIM supervisors displayed confidence in leading others, 60% were in agreement.

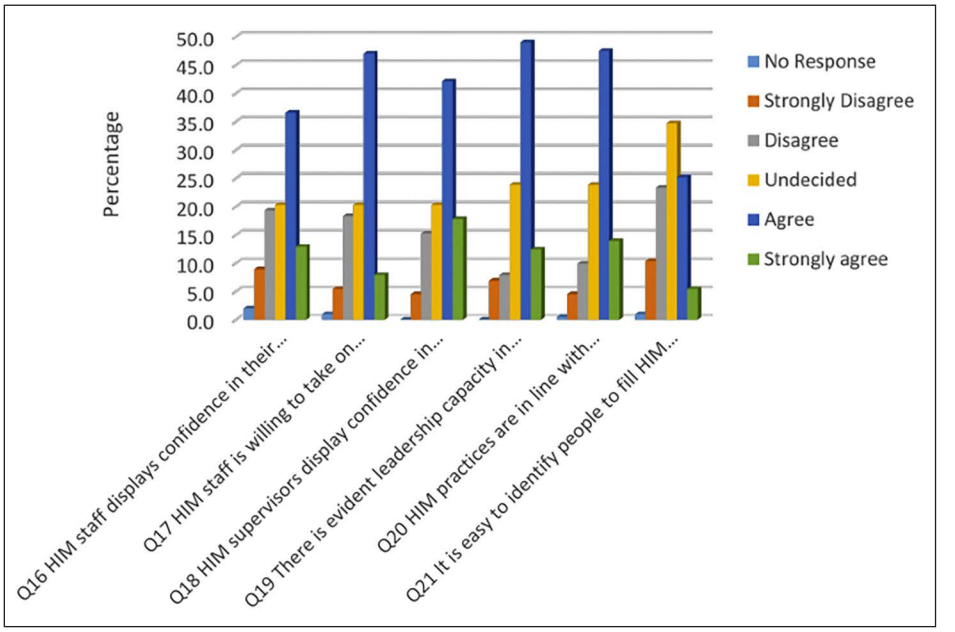

Figure 2: Participants, perception of HIM leadership in their department

In this section, affirmative responses for the first five items ranged from 50% - 61%. Responses to the fifth item showed over 60% of participants in agreement that HIM practices accorded with established procedures and guidelines. There was a marked decline in the affirmative responses to the last item that addressed identifying people to fill HIM leadership positions. Responses to this item were almost evenly distributed with 31% in agreement, 34% in disagreement, and 35% undecided about the ease with which people could be identified to fill HIM leadership roles. This high percentage of undecided responses was difficult to unravel but it indicated a challenge in this area. Overall, undecided responses were high, ranging between 20% and 35%. Again, these results were unexpected as the items here were specific to HIM practice leadership. This appears to be an area of concern for HIM leadership.

Strategies to address challenges

Interviewees proposed several people leadership, practice leadership, and policy leadership strategies that could be explored to address the various challenges identified among HIM in Jamaica. Practice leaders felt that policy leaders should change the recruitment requirements for entry into the HIM profession and implement policies to make the associate degree the mandatory entry level requirement. Since policies drive compliance, along with the need for this policy leadership intervention, interviewees suggested that considering the nonchalance of some HIM practitioners, related measures should be established to ensure compliance at the operational level.

Interviewees suggested an automatic transition into leadership and management positions after a specified period.

> *Policy leaders could put a system in place where persons who are in the service for a period, like 10 years, and are qualified, would be automatically given certain positions, if they have the qualifications and meet the requirements. That would help to address some of the biases.* (Practice Leader 2, male)

However, that suggestion could threaten policy leadership, could prove challenging, and could disenfranchise those who may be seeking employment with similar or better qualifications and experiences, and may have more to contribute. Thus, for another interviewee the focus was on mandatory formal training for HIM practitioners.

> *Even if people are employed without the required academic training, policy leaders need to make training mandatory after a certain period of employment.* (Practice Leader 5, female)

Continuing, she underscored the promotion of formal HIM education and other measures for continuing education.

> *Academic leaders should partner with HIM practitioners to promote the courses of study. Put in place activities for continuing education. Academic leaders can also provide consultation or advisory to the HIM Administrators.* (Practice Leader 5, female)

Additionally, there is a need for more:

> *Communication and collaboration between policy leaders and academic leaders. From [the academic leaders'] level, communicate with the policy leaders to help them bridge the gap . . . possibly scholarships to make it more attractive to study in the field. Policy leaders need to buy into [the training institution's] offering and possibly get more [financial] support from [external stakeholders] . . . Also, policy leaders should develop a policy for the standardisation of study leave offerings.* (Practice Leader 6, female)

Academic leaders echoed similar sentiments and suggested additional strategies to bolster the points made. For example,

> *We can contribute by doing the necessary research that would provide evidence to senior administrators that having HIM professionals at a certain level can enhance the efficiency and quality of service delivery and save the institutions money. We can also join advocacy with professional groups to provide training in continuing education to enhance professional development . . . Policy leaders can be more creative in terms of remuneration, such as short-term training, on-the-job training, and conference attendance. Basically, creating more incentives to keep HIM practitioners motivated through externship, fellowships, exchange programmes with international organisations, and other capacity building activities.* (Academic Leader 1, female)

Another response was related to people leadership, practice leadership and policy leadership; and suggested introducing leadership and management training and related policies.

> *Maybe put in place some management and leadership training like introduction to leadership and how to manage persons. . . . to identify potential leaders and train them to become leaders especially with the people skills needed to manage people – the most important resources. Policy leaders need to ensure that HR knows . . . the policies of the department. HIM pactitioners need to work with HR and [develop] their policies.* (Academic Leader 2, female)

There was a related proposal for policy leaders to work in unison with academic leaders to revise HIM formal curricula to ensure currency and relevance, and to meet national and global demands.

> *Policy leaders should ensure policies of parity and equality among the professions and ensure that recognition is given to the importance of HIM in the delivery of health care. Academic leaders should ensure that they continue to train at optimum standard . . . As part of maintaining that quality, ensure that our training modules are revised and reflect trends not only in Jamaica, but also globally. Perhaps the institution needs to be looking at a system of continuing education and professional development and make these continuing education opportunities available outside of the formal training and perhaps . . . training for persons who are aspiring managers in HIM. Both could enter into some Memorandum of Understanding (MOU). Perhaps also, specific training for persons who are aspiring to HIM leadership positions.* (Academic Leader 4, male)

Other responses somehow matched the previous views with some expansions such as:

> *The development of a comprehensive manpower plan with emphasis on groups like the HIM professionals should go some way to addressing the issues faced.* (Policy leader 1, male)

The need to fill resource gaps was also emphasized.

> *For succession planning, academic leaders could recommend a pool from which the Ministry could select through a competitive process. Policy leaders could address the issues of untrained staff by providing scholarships . . . and address the working conditions especially at the operational level. Provide the necessary resources . . . ICT type systems to make the work a little easier.* (Policy leader 2, male)

Additionally, important for policy leaders was addressing issues related to the working conditions and the health information system, while the HIM practitioners put more worth into their work.

> *Policy leaders need to look at computerising the system . . . to help to address problems such as working conditions. HIM individuals need to put a little more [meaning] in their work; and see themselves as a critical part of the health team.* (Policy leader 3, female)

Summary of Results

To summarise these results, academic and practice leaders can pursue more accessible means for training, capacity building, and professional development among HIM practitioners particularly for aspiring HIM leaders and managers. Both academic and policy leaders can communicate, collaborate, and interact more to identify strategies to harness the skills and competencies of the HIM staff. Careful assessment of these responses demonstrates several expectations that interviewees have of HIM practice leaders, policy leaders, and academic leaders regarding what can be done to address the leadership challenges among HIM practitioners; and it requires joint efforts from these groups of stakeholders to address these challenges.

Discussion

Just as there is no one fixed type or style of leadership that is suitable for any organisation, when leading HIM there is no one-size-fits-all type or style of leadership (Miller, 2013). Several factors must be considered which include leadership preferences, the situation at hand, the culture of the people being led, and the context in which they are being led (Daft, 2010; Miller, 2018). One must carefully note these factors and always be cognisant that context shapes leadership and leadership shapes context (Miller, 2018). Furthermore, the context influences which style might be most suitable, and what types of leaders are most desired (Daft, 2010). The results of the survey exposed that in Jamaica, HIM leadership is executed using a hybrid of approaches. Although this blend of leadership practices and styles allows for creativity and flexibility leadership is fragmented.

Responses showed that elements of different types of leadership were being practised; and in some instances, a hybrid of leadership styles. In other instances, apparently, prevailing leadership practices were not easily identifiable as several "undecided" responses were returned. It appeared individuals in the HIM organisations were focused on their purpose and functions rather than trying to explain leadership. This is akin to an aspect of the chaos theory and consistent with the literature where Burns (2002) argued that leadership that is done along with the chaos theory is easier to practice than it is to understand. However, results of the interview confirmed that leadership was rived.

As highlighted above, for questions that were aligned to professional development and capacity building, the responses aligned with the interview responses

in terms of how leadership practices in HIM in Jamaica were described. More than half of the participants who expressed willingness to take on leadership roles suggested an air of systems leadership (Hopkins & Higham, 2007). However, in this setting, more HIM practitioners were willing to, than those who were allowed to, participate in leadership. Again, this may have been attributed to the different types of leadership styles that were reportedly being practised. Could this also mean sparse opportunities for the HIM staff to participate in leadership?

From the qualitative data, some leadership practices and styles were recurring more often, signifying an amalgamation of leadership practices in HIM in Jamaica. This aligns with Daft and Marcic's (2012) position that successful leaders engage in multiple leadership practices and styles from various sources to effectively execute their roles. An interview response substantiated the over 40% of survey participants who reported that leadership focused on the work more than people, gave little attention to the staff, and was more task and goal-oriented with emphasis primarily on getting the job done. A transactional type of leadership was also being practised with more focus on tasks, job functions and requirements for the job than on staff welfare (Odumeru & Ogbonna, 2013).

While it is important to achieve organisational goals, HIM practitioners are vital to such achievements and should not be slighted so they think that the sole focus of leadership and management is the job. Rather, it would be more beneficial and mutually rewarding for HIM leaders and managers to share the burden of leadership (Smith, 2013), adopt more communal types of leadership (Fullan, 2004), identify energies in their staff, seek to satisfy their needs, and fully engage them (Guay, 2011) while allowing them to hone specific qualities and merge those talents to provide leadership within their department or organisation (Harris, 2008).

Sheridan et al. (2016) emphasised the importance of purposefully grooming and training leaders in the HIM profession. While 55% of survey participants reported evident leadership capacities in the staff and willingness to take on leadership roles, the majority of the interviewees reported challenges identifying people to fill HIM leadership positions. These findings provided evidence that grooming and training of HIM leaders was lacking in the Jamaican setting and opposed Sheridan et al.'s endorsements to groom and train.

Although HIM practitioners were reportedly deprived of practical leadership experiences and were not aspiring for leadership (Rubenstein, 2014) as they should have, strategies to resolve these issues were not far-fetched. Aspects of

strategies and proven practices could be applied such as learning leadership by doing leadership (Keeton, 1983; Schank et al., 2013), learning with and from one another (Fullan, 2004), and distributing leadership (Harris & Spillane, 2008). Additionally, there can be more engagement of practitioners through transformational leadership (Arnold & Loughlin, 2013; Basham, 2012), more focused policy leadership (Hill-Berry, 2020), people leadership, and practise leadership (Miller, 2018).

The majority of HIM staff were reportedly not academically trained while others, although trained, lacked leadership skills and were not equipped to assume leadership roles. In other instances, although both academically trained and possessing leadership capabilities, they were reluctant to assume leadership roles. It is an interesting paradox that people do not want to lead or manage. Again, this is an area where effective people leadership (Miller, 2018) is warranted and where more investigations should be done. Meanwhile, HIM leaders and managers must strategise to develop leadership capacities and willingness to lead; and create opportunities for others to take responsibility for leading and managing (Spillane, 2009). Thus, HIM practitioners would be interacting, sharing expertise, and learning while building capacity (Greenfield et al., 2009), and organisations would continue building leadership competencies (Hill-Berry, 2015); this is a path that HIM leaders and managers need to tread.

To create opportunities for HIM practitioners to gain meaningful insights from the more experienced and develop leadership skills, HIM leadership gaps can be filled through mentoring (Abrams et al., 2014) and practising leadership (Schank et al., 2013) while engaging and building capacities (Laverty, 2016). All three aspects of leadership (people leadership, practice leadership, and policy leadership) can be improved with these interventions. By extension, the organisations would be equipped with the needed skills and competencies to function effectively. Thus, there is a triple lock of benefits to be derived from organisational mentoring. Effective HIM leadership, therefore, requires a synergy of people leadership, practice leadership, and policy leadership through a triumvirate of HIM policy leaders, practice leaders, and academic leaders (Figure 3). This synergy is needed to ensure that all stakeholders are appropriately informed of HIM procedures and policies; that there is compliance with these policies for standardisation and clarity in the HIM practice, and that they are properly equipped through engagement with leadership theory and practice. This synergy in HIM leadership requires pooling resources to successfully lead, manage and teach HIM in Jamaica, and to address the issue of fragmented leadership.

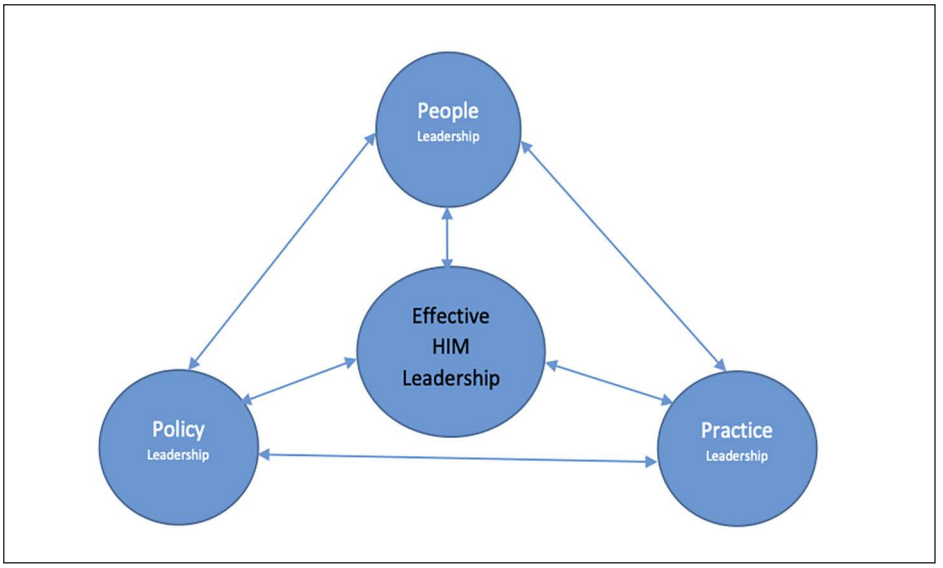

Figure 3: Framework for effective HIM leadership

The issues raised by the results regarding lack of recognition of the work and worth of HIM, lack of understanding of the profession and its importance, and HIM practitioners not placing value on their work, are issues that should be addressed using a triple leadership framework (Figure 3). This requires united efforts to educate people about HIM and the importance of the profession, train and equip HIM practitioners to function effectively, and appropriately lead and manage HIM. This also necessitates stakeholders engaging in meaningful research to inform HIM education, leadership, management, and practice.

If HIM stakeholders do not synergise to address the prevailing issues, professional growth and development will continuously be hindered. Additionally, unless there is a fusion of practice leadership, policy leadership, and people leadership to catalyse the required processes, the desired changes will not occur. The absence of this kind of synergy in leadership will not augur well for the profession of HIM in Jamaica.

Limitation

One limitation of the study was the paucity of prior research specific to the (Jamaican) context in which it was conducted. Hence, not much literature was found to underpin the topic that was being investigated. Notwithstanding this limitation, this study furthers the researcher's understanding of leadership in HIM and suggests several directions for future research into HIM leadership.

Recommendations

HIM practitioners must commit to learning from and with one another and serving with a moral purpose which could result in increased worth within their organisations and the wider practice (Fullan, 2004). This could be achieved through the adoption of an effective HIM leadership framework (Figure 3), a result of which could be more involvement of HIM leaders in setting directions for organisations, managing the talents within organisations, teaching and developing others, building capacities for leadership in the wider system and ultimately synergising people leadership, practice leadership, and policy leadership toward transforming their organisations. HIM leaders need to embrace different types of shared leadership that will have them involving others in leadership development activities and purposefully engaging as they also develop into [more] effective leaders. HIM policy, academic, and practice leaders need to share the burden of leadership (Smith, 2013) to help HIM practitioners to hone their skills, merge talents, and build leadership competencies for effective leadership within their organisations (Harris, 2008; Hill-Berry, 2015). Flexibility and adaptability are also required in the HIM context but not without procedural compliance. The researcher encourages all HIM academic leaders, practice leaders, and policy leaders to lead well as they also lead others to lead.

Conclusions

This study has created opportunities for HIM practice, policy, and academic leaders to reflect on their processes and make the necessary adjustments. For academic leaders, this study proposes a review and adjustment of both HIM curricula, and the expansion of HIM training through leadership and management short courses, facilitating in-service workshops and seminars, and continuing education seminars on leadership and management. For policy leaders, this study suggests overhauling HIM policies and procedures, and developing new policies and guidelines to meet changing HIM needs. For practice leaders, this study suggests creating opportunities to engage academic and policy leaders to better manage and lead within the confines of those policies, identifying means for harnessing the skills and competencies in HIM, continuing professional development and capacity building of practitioners; and engaging in purposeful activities toward and capacity building for other leaders.

Declaration of Conflicting Interests: The author declares that there is no conflict of interest.

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Management as an Academic Discipline:

An Examination of Whether the Profile, Structures and Nomenclature of Programmes in the Caribbean Region Facilitate Workforce Mobility

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Abstract

Many regions of the world are dealing with issues of regional integration. The goal of this study was to examine whether the structures, the nomenclatures, the profile, and the dynamics of the academic discipline of management in Caribbean universities enable the adequate mobility of their management faculty members, students, and graduates between and among the Spanish-speaking, French-speaking, Dutch-speaking, and English-speaking countries and territories in the Caribbean region. The aim of the study, that was guided by a qualitative methodology with a case study approach in which information about the various universities in the Caribbean region was collected from their websites and other sources, was to highlight the differences (as well as the similarities) and illuminate the changes and the harmonization of the structures of degree programs that are needed to facilitate mobility to work and make contributions in any other country in the Caribbean region. Based on the diversity found in the programs, it is recommended that the Bologna process can serve as a template for the harmonization of business management degrees for all the countries in the Caribbean region. Greater mobility of management faculty members, students, and graduates between and among the countries and territories of the Caribbean region has the potential to enlarge and enrich the pool of management practitioners and thereby contribute to business and economic growth in all Caribbean countries and territories.

Keywords: Management, Caribbean Region, Workforce Mobility, Economic Growth.

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Introduction

The main goal of this study is to examine whether the structures, the nomenclatures, the profile, and the dynamics of the academic discipline of management in Caribbean universities enable adequate mobility of their management faculty members, their management undergraduate and graduate students, and management practitioners with their management degrees, between and among the Spanish-speaking, French-speaking, Dutch-speaking, and English-speaking countries and territories in the Caribbean region. Therefore, this study examines the similarities and the differences in the profile, the structures, the nomenclatures, and the dynamics of the undergraduate and graduate degree programs in Caribbean universities. The knowledge gained from this comparative examination and analysis of the academic discipline of management in the Caribbean region will provide a roadmap of areas that need the harmonization of the structures, the nomenclatures, the profiles, and the dynamics of the academic discipline of management in Caribbean universities, and thereby enable the adequate mobility of management faculty, students, and graduates between and among countries and territories in the Caribbean region. Increased mobility of a pool of high-level management skills in the work force has the potential to accelerate the economic and business growth of the whole Caribbean region.

This study was also motivated by the dearth of literature on the academic study of the state of the academic discipline of management in the Caribbean region. Therefore, another goal of this study was to help to fill this gap.

Literature Review

As an academic discipline that is now offered as degree programs in universities in almost every country in the world, management has a rich history and a significant number of major past and current theorists (Hartley 2006; Lamond 2006). Management is also a discipline that is forward looking and interdisciplinary (Al-Gasaymeh, 2020; Alterman, Bamberger, Wang, Koopman, Belogolosky, & Shi 2021; Aluko, Fapetu, & Ibitoye 2021; Aoki, K, 2020; Arora,

Malik, & Chawla, 2020; Banik, & Chatterjee, 2021). Many individuals think that management, as an academic discipline, has now found an adequate footing and foothold in universities; though it still has to adjust itself to the positions occupied by older basic social science disciplines and some applied social science disciplines (Agarwal & Hoetker 2007; Bartunek, 2007; Hambrick, 2007; Hitt, Beamish, Jackson, & Mathieu, 2007; McGrath, 2007; Pfeffer, 2007; Rynes, 2007; Tsui, 2007). Publications by scholars in universities in the Caribbean region, and by scholars outside the Caribbean (who write on Caribbean topics), have also helped to enrich the academic discipline of management (Banik & Bhaumik, 2006; Bhattacharya, 1980; Klak 1995; Perez, 2001; Ray, 1987; Roberts, 1995; The University of the West Indies at Mona, Jamaica, *Department of Management Studies – Publications,* 2010; Woodward, 1993).

For the purpose of this study, the term 'the academic discipline of management' is used in two ways. These two ways the term is used in this study are both different and related at the same time. The two ways in which the term is used are different in the sense that these two ways give the term different connotations. At the same time, the two ways are also related in that in some countries the term is used in a very inclusive way. This study will use the term in both the way that it generates different connotations and in the way the term generates inclusive profiles and tendencies. In universities and colleges in the United States, management as an academic discipline refers to one of the academic disciplines found in a School or College of Business Administration. In a university or college in the United States, the Department of Management (which obviously houses the academic discipline of management) often refers to one of the degree-awarding academic departments in the School or College of Business Administration in a particular university or college. In addition to the Department of Management, other academic departments that often constitute the School or College of Business Administration in a particular university or college in the United States are the Department of Marketing, a the Department of Finance, the Department of Accounting, and the Department of Real Estate. Some Schools or Colleges of Business Administration also have a Department of Management Information Systems, Department of Insurance, and other departments. The Department of Economics is one of the departments in the School or College of Business Administration in some universities or colleges in the United States, while in other universities or colleges in the United States, the Department of Economics is one of the departments in the College of Arts and Sciences or the College of Social Sciences.

On the other hand, in some countries like the United Kingdom, a School

of Management Studies in a university will have undergraduate and graduate degrees-awarding Department of Accountancy, Department of Marketing, Department of Management, and Department of Finance; or a Department of Management Studies will have undergraduate and graduate degree programs separately for Accountancy, Marketing, Management, and Finance. Therefore, in many universities in the United Kingdom, the term Management Studies tends to be very inclusive, since it means a degree awarding school or department in a university that awards separate degrees in Accountancy, Marketing, Management, and Finance. Thus, in many universities in the United Kingdom, the term Management Studies tends to mean the same thing as the term Business Administration in universities and colleges in the United States, while at the same time also meaning the distinct academic discipline of management. It is also important to note that while many universities in the United Kingdom have Schools of Management Studies or Departments of Management Studies that play academic roles like Schools of Business Administration or the Departments of Business Administration in the United States, there are also universities in the United Kingdom that have Schools of Business Administration or Departments of Business Administration. In fact, some universities (especially, some relatively younger universities) in the United Kingdom are gradually adopting the structures, the practices, the processes, and the dynamics of universities in the United States.

This clear understanding of how the term 'the academic discipline of management' is used in various countries, especially in the United States and in the United Kingdom, is very important for this study. This is because some countries in the Caribbean region were formerly colonized by the United Kingdom, and the current reality that all countries in the Caribbean region, due to their proximity to the United States, have great contacts with the educational traditions, practices, structures, and dynamics of the United States. The net result of these various impacts is that the varying structures and profile of the academic discipline of management in the United States and the United Kingdom exist in various countries in the Caribbean region, in various universities in the same country in the Caribbean region, and even in the same university in a country.

For analytic ease and convenience, the academic discipline of management will be examined separately for universities in the Spanish-speaking, the French-speaking, the Dutch-speaking, and the English-speaking countries and territories in the Caribbean region, starting with the universities in the Spanish-speaking countries and territories.

Methodology

This study was guided by a qualitative methodology with a case study approach in which information about the various universities in the Caribbean region was collected from their websites and other sources. The variables of interest for this study were the structures and nomenclatures of the management/business degree programs in universities in Caribbean countries and territories vis-a-vis the level of mobility of faculty members, graduate students, undergraduate students, and workers, between and among universities and firms (and other organizations).

Results

The Academic Discipline of Management in Universities in the Spanish-Speaking Countries and Territories in the Caribbean Region

The structures and profiles of the academic discipline of management in universities in Caribbean Spanish-speaking countries and territories (Universidad Autonoma de Santo Domingo, *Planes de Estudio* 2010; Universidad de Autonoma de Santo Domingo, *Planes de Estudio* 2010; Pontificia Universidad Catolica Madre y Maestra, *Oferta Academica* 2010; Universidad Adventista Dominicana, *Facultades* 2010; Universidad Catolica Santo Domingo, *Facultad Ciencias Economicas y Administrativas* 2010; Universidad del Caribe 2010; Universidad de La Habana, *Universidad de La Habana* 2010; Universidad de Cienfuegos Carlos Rafael Rodriguez, *Universidad de Cienfuegos Carlos Rafael Rodriguez* 2010; Universidad de Camaguey, *Facultades* 2010; and Universidad de Oriente, *Universidad de Oriente* 2010) provide a graduating student a licenciatura (a rough equivalent of degree in universities in English-speaking countries), as shown in Table 1.

Table 1: Universities and degree nomenclatures in Caribbean Spanish speaking countries and territories

(a)	**The Dominican Republic:**
	i. Universidad Autonoma de Santo Domingo; Licenciatura
	ii. Pontificia Universidad Catolica Madre y Maestra; Licenciatura
	iii. Universidad Adventista Dominicana; Licenciatura
	iv. Universidad Catolica Santo Domingo; Licenciatura
	v. Universidad del Caribe; Licenciatura

(b) **Cuba:**
i. Universidad de La Habana; Licenciatura
ii. Universidad de Cienfuegos Carlos Rafael Rodriguez; Licenciatura
iii. Universidad de Camaguey; Licenciatura
iv. Universidad de Oriente; Licenciatura.

The Academic Discipline of Management in Universities in the French-Speaking Countries and Territories in the Caribbean Region

The structures and profiles of the academic discipline of management in universities in Caribbean French-speaking countries and territories (Universite d'Etat d'Haiti, *Universite d'Etat d'Haiti* 2010; *Universite Adventiste d'Haiti* 2010; Universite Notre Dame d'Haiti, *Programmes Academiques* 2010; Universite Quisqueya, *Faculte des Sciences Economiques et Administratives* 2010; and Universite des Antilles et de la Guyane, *UFR Droit and Economie* 2010) provide a graduating student a licence (a rough equivalent of a degree in universities in English-speaking countries), as shown in Table 2.

Table 2: Universities and degree nomenclatures in Caribbean French speaking countries and territories

(a) **Haiti:**
i. Universite d'Etat d'Haiti; Licence
ii. Universite Adventiste d'Haiti; Licence
iii. Universite Notre Dame d'Haiti; Licence
iv. Universite Quisqueya; Licence

(b) **The French Antilles (Guadeloupe, Martinique, the French part of St. Martin, etc.) and French Guyana:**
i. Universite des Antilles et de la Guyane; Licence

The Academic Discipline of Management in Universities in the Dutch-Speaking Countries and Territories in the Caribbean Region

The structures and profiles of the academic discipline of management in universities in Caribbean Dutch-speaking countries and territories (The Anton de Kom University of Suriname, *The Anton de Kom University of Suriname* 2010; The University of the Netherlands Antilles, *About UNA* 2010; The University of the Netherlands Antilles, *Intro FdSEW* 2010; The University of the Netherlands Antilles, *Intro FdTW* 2010; and The University of the Netherlands Antilles, *Welcome to the Frontpage – Executive Financial Management* 2010)

provide a graduating student a Bachelor's degree (similar to a Bachelor's degree in universities in English-speaking countries), as shown in Table 3.

Table 3: Universities and degree nomenclatures in Caribbean Dutch speaking countries and territories

(a)	**The Dutch part of Sint Maarten/St. Martin:** i. University of St. Martin; Bachelor's degree and other Anglophone degree nomenclatures
(b)	**Suriname:** i. Anton de Kom University of Suriname; Bachelor's degree and other Anglophone degree nomenclatures
(c)	**The Netherlands Antilles:** i. University of the Netherlands Antilles; Bachelor's degree and other Anglophone degree nomenclatures

The Academic Discipline of Management in Universities in the English-Speaking Countries and Territories in the Caribbean Region

The structures and profiles of the academic discipline of management in universities in Caribbean English-speaking countries and territories (The University of The West Indies – Open Campus, *Postgraduate* 2010; The University of The West Indies – Open Campus, *Undergraduate Degrees* 2010; University of Belize, *Faculty of Management and Social Sciences – Program Offerings* 2010; University College of the Cayman Islands, *Graduate Programs* 2010; University College of the Cayman Islands, *Programs* 2010; University of Guyana, *Focus on UG – June Edition* 2010; University of Guyana, *Programmes* 2010; University of Guyana – Turkeyen Campus, *Online Registration* 2010; University of Technology, Jamaica, *Colleges and Faculties* 2010; University of Technology, Jamaica, *Head of School's Message* 2010; University of Technology, Jamaica, *Programmes* 2010; University of Technology, Jamaica, *School of Business Administration – About the School* 2010; Northern Caribbean University, *College of Business and Hospitality Management* 2010; Northern Caribbean University, *Undergraduate Degrees* 2010; Northern Caribbean University, *Postgraduate Degrees* 2010; The University of The West Indies at Mona, Jamaica, *Department of Management Studies – Master of Science – National Security and Strategic Studies* 2010; The University of The West Indies at Mona, Jamaica, *Department of Management Studies – Postgraduate Programmes* 2010; The University of The West Indies at Mona, Jamaica, *Department of Management Studies – Undergraduate Programmes* 2010; The University of The West Indies at Mona, Jamaica, *Department*

of Management Studies – Publications 2010; The University of The West Indies at Mona, Jamaica, *Departments* 2010; The University of The West Indies at Mona, Jamaica, *Mona School of Business – FAQs* 2010; The University of The West Indies at Mona, Jamaica, *Mona School of Business – Doctorate in Business Administration* 2010; The University of The West Indies at Mona, Jamaica, *Mona School of Business – Programmes* 2010; The University of The West Indies at Cave Hill, Barbados, *Academic Departments Index* 2010; The University of The West Indies at Cave Hill, Barbados, *Department of Management Studies – Department Overview* 2010; The University of The West Indies at Cave Hill, Barbados, *Department of Management Studies – Graduate Programmes* 2010; The University of The West Indies at Cave Hill, Barbados, *Department of Management Studies – M.Sc. Management and Management with Specializations* 2010; The University of The West Indies at Cave Hill, Barbados, *Department of Management Studies – Undergraduate Programmes* 2010; The University of The West Indies at Cave Hill, Barbados, *Cave Hill School of Business – Doctorate in Business Administration (DBA)* 2010; The University of The West Indies at Cave Hill, Barbados, *Cave Hill School of Business – Our Programmes* 2010; The University of The West Indies at Cave Hill, Barbados, *Cave Hill School of Business – Who We Are* 2010; The University of The West Indies, St. Augustine Campus, Trinidad and Tobago, *Department of Management Studies – Degree Programmes* 2010; The University of The West Indies, St. Augustine Campus, Trinidad and Tobago, *Department of Management Studies – Graduate Degree Programme – Ph.D. Business Administration* 2010; The University of The West Indies, St. Augustine Campus, Trinidad and Tobago, *Department of Management Studies – Graduate Degree Programme – M.Sc. Aviation Management* 2010; The University of The West Indies, St. Augustine Campus, Trinidad and Tobago, *The Arthur Lok Jack Graduate School of Business – Doctor of Business Administration Information* 2010; The University of The West Indies, St. Augustine Campus, Trinidad and Tobago, *The Arthur Lok Jack Graduate School of Business – Lok Jack GSB Faculty* 2010;) provide a graduating student a Bachelor's degree, a Master's degree, or Doctoral degree (just like in universities in other English-speaking countries), as shown in Table 4.

Table 4: Universities and degree nomenclatures in Caribbean English speaking countries and territories

(a)	**The Bahamas:**
	i. University of The Bahamas; Bachelor's degree and other Anglophone degree nomenclatures
(b)	**Belize:**
	i. University of Belize; Bachelor's degree and other Anglophone degree nomenclatures
(c)	**The Cayman Islands:**
	i. University College of the Cayman Islands; Bachelor's degree and other Anglophone degree nomenclatures
(d)	**Guyana:**
	i. University of Guyana; Bachelor's degree and other Anglophone degree nomenclatures
(e)	**Jamaica:**
	i. University of Technology, Jamaica; Bachelor's degree and other Anglophone degree nomenclatures
	ii. Northern Caribbean University; Bachelor's degree and other Anglophone degree nomenclatures
iii.	The University of the West Indies at Mona; Bachelor's degree and other Anglophone degree nomenclatures
(f)	**Barbados:**
	i. The University of The West Indies at Cave Hill; Bachelor's degree and other Anglophone degree nomenclatures
(g)	**Trinidad and Tobago:**
	i. University of The West Indies, St. Augustine Campus; Bachelor's degree and other Anglophone degree nomenclatures
(h)	**Serving all English-speaking Countries and Territories in the Caribbean region:**
	i. The University of The West Indies – Open Campus; Bachelor's degree and other Anglophone degree nomenclatures

Discussion

As shown by this study, the examination and analysis of the structures and nomenclatures of the management/business degree programs in universities show important regional differences between and among the four regions of this study (Caribbean Spanish speaking countries and territories, Caribbean French speaking countries and territories, Caribbean Dutch speaking countries and territories, and Caribbean English-speaking countries and territories). Specifically, this study has shown important differences between and among the four Caribbean regions, in terms of the licenciatura system of the struc-

tures and nomenclatures of the degree programs in universities in Caribbean Spanish speaking countries and territories; the licence system of the structures and nomenclatures of the degree programs in universities in Caribbean French speaking countries and territories; the mixture of Anglo-American system and the former European continental system of the structures and nomenclatures of the degree programs in universities in Caribbean Dutch speaking countries and territories; and Anglo-American system of the structures and nomenclatures of the degree programs in universities in Caribbean Spanish speaking countries and territories.

As can be expectedly, these very significant differences in the structures and nomenclatures of the management/business degree programs in universities, between and among the four regions of the Caribbean, have meant that an examination of universities in these four regions (The Anton de Kom University of Suriname 2010; Northern Caribbean University 2010a to 2010c; Pontificia Universidad Catolica Madre y Maestra 2010; Universidad Adventista Dominicana 2010; Universidad Autonoma de Santo Domingo 2010; Universidad Catolica Santo Domingo 2010; Universidad de Camaguey 2010; Universidad de Cienfuegos Carlos Rafael Rodriguez 2010; Universidad de La Habana 2010; Universidad de Oriente 2010; Universidad del Caribe 2010; Universite Adventiste d'Haiti 2010; Universite des Antilles et de la Guyane 2010; Universite d'Etat d'Haiti 2010; Universite Notre Dame d'Haiti 2010; Universite Quisqueya 2010; University College of Cayman Islands 2010a and 2010b; University of Belize 2010; University of Guyana 2010a to 2010c; University of St. Martin 2010a and 2010b; University of Technology, Jamaica 2010a to 2010d; The University of the Netherlands Antilles 2010a to 2010d; The University of The West Indies at Cave Hill, Barbados 2010a to 2010h; The University of The West Indies at Mona, Jamaica 2010a to 2010h; The University of The West Indies – Open Campus 2010a and 2010b; and The University of The West Indies, St. Augustine Campus, Trinidad and Tobago 2010a to 2010e) show that, currently, there is negligible or almost non-existent mobility of faculty members, graduate students, undergraduate students, and workers, between and among universities in these four Caribbean regions (Caribbean Spanish speaking countries and territories, Caribbean French speaking countries and territories, Caribbean Dutch speaking countries and territories, and Caribbean English-speaking countries and territories).

Additionally, the examination and analysis of management degree programs in universities in Spanish-speaking countries, French-speaking countries, Dutch-speaking countries, and English-speaking countries in the Caribbean

region, clearly show that universities in the English-speaking countries in the Caribbean region have the best management programs. The English-speaking countries in the Caribbean region also have more programs. The University of The West Indies at Mona, in Jamaica; The University of West Indies, St. Augustine Campus, in the Republic of Trinidad and Tobago; and The University of The West Indies at Cave Hill, in Barbados, have been shown to have the most excellent and world class business management doctoral, master's and bachelor's degrees programs. At Cave Hill, and St. Augustine, each of these two universities have two separate academic units offering business management programs. Each of these two universities have Departments of Management that have numerous high-quality bachelor's and master's degree programs; with the Department of Management Studies at St. Augustine also offering a Ph.D. degree in Business Administration. The two universities also have professional graduate business schools that offer only doctoral and master's degree programs. Thus, The University of West Indies, St. Augustine Campus offers both the Ph.D. degree in Business Administration and a Doctor of Business Administration degree.

School of Business Administration of University of Technology, Jamaica, and the College of Business and Hospitality Management of Northern Caribbean University both offer numerous excellent bachelors degree programs and strong Master of Business Administration degree programs. Also, University of Guyana, University of Belize, University College of the Cayman Islands and College of The Bahamas all have strong business management degree programs at bachelor degree and master degree levels. On the whole, all universities in English-speaking countries have been shown to have excellent business management degree programs with structures, profiles, standards, and nomenclatures that are easily recognizable in any part of the world. Thus, those with degrees from these universities can easily work in any country in the Caribbean region and other parts of the world.

Next in quality, to the universities in the English-speaking countries of the Caribbean region, are the three universities in the Dutch-speaking countries and territories of the Caribbean region; the structure, profile, quality and nomenclature of the business management degrees programs in these three universities also make those with degrees from these universities easily employable in any country in the Caribbean region or any part of the world. The University of the Netherlands Antilles was shown to be the best university with business management degree programs in a Dutch-speaking Caribbean country or territory; it has numerous high-quality bachelor and master degrees

programs. The Dominican Republic is the Spanish-speaking Caribbean country with very many business management programs, but the licenciatura (the rough equivalent of degree in universities in English-speaking countries) structure, profile, and nomenclature presents some limitations to very easy mobility for jobs in other parts of the Caribbean region which do not have the licenciatura nomenclature for university degrees. The licence (the rough equivalent of degree of the universities in English-speaking countries) of the universities in the French-speaking countries of the Caribbean also presents the same problems and issues in terms of structure, profile and nomenclature as the licenciatura of the universities in the Caribbean Spanish-speaking countries. The obvious solution to the problems presented by licenciatura and licence is the harmonization of the structure, nomenclature, standards, quality control, course outlines, content of courses, length of programs, accreditation bodies, teaching standards, and research standards, for all the business management degrees in universities in all the Spanish-speaking, French-speaking, Dutch-speaking, and English-speaking countries in the Caribbean region.

The Bologna Process, which is being used to harmonize degree programs for universities in Eastern, Western, and Southern parts of Europe (please see The Bologna Process [The European Higher Education Area], *About the Bologna Process: A European Reform Process Aimed at Creating the European Higher Education Area*, 2010; The Bologna Process [The European Higher Education Area], *Bologna Work Plan 2009-2012* 2010; The Bologna Process [The European Higher Education Area], *Employability* 2010; The Bologna Process [The European Higher Education Area], *Mobility* 2010; The Bologna Process [The European Higher Education Area], *Participating Countries and O*rganizations 2010; The Bologna Process [The European Higher Education Area], *Qualifications Framework/Three-Cycle System* 2010; The Bologna Process [The European Higher Education Area], *Recognition of Qualifications* 2010; The Bologna Process [The European Higher Education Area], *Welcome to the Website of the European Higher Education Area* 2010; European Commission – Education and Training, *The Bologna Process – Towards the European Higher Education Area* 2010) can serve as a template for the harmonization of business management degrees for all the countries in the Caribbean region. Borrowing from this Bologna Process template, the key element or goal for the harmonization of the structure, nomenclature, and profile of business management degrees of all the Caribbean universities is the enhancing of mobility for graduates, students, and staff. Flowing from this key goal of enhancing of mobility, are the goal of enhancing of recognition of qualifications and the goal of enhancing of

employability. These harmonization processes for business management degree programs in all universities in all countries in the Caribbean region has the potential to enlarge and enrich the labor market, the business corporations, the economic growth, and the general economy of all countries and territories in the Caribbean region.

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COMMENTARY

Jamaica's NCD Crisis:
Options for Addressing It

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Introduction

According to the most recent snapshot of the health and lifestyle of Jamaicans 15 years and older, the overall prevalence of hypertension, diabetes and pre-diabetes were 32%, 12% and 12% respectively and half of Jamaicans (54%) were overweight (pre-obese or obese)[1]. The link between non-communicable diseases (NCDs) and lifestyle is well established and unsurprisingly, the survey also indicated poor dietary practices and physical activity. More than one-quarter (28%) consumed sugar sweetened beverages at least once per day; only one-third read food labels; and only 16% met the minimum WHO recommendations for moderate physical activity 1. There is also a concern for young Jamaicans. In a survey of school children, it was found that one-third (33%) of students aged 13–17 were overweight (pre-obese or obese) with (36% among 13–15 year olds) 2. Predictably, these young Jamaicans also demonstrated poor dietary practices and little physical activity. The majority (69%) of the students aged 13–17 reported that they drank carbonated soft drinks at least once per day

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(70% among 13–15 year olds), and only 23% overall (24% and 22% among 13–15 and 16–17 year olds respectively) met the minimum WHO recommendation for physical activity for children and adolescents [2,3]. When such information is coupled with the economic impact of NCDs in the Jamaican setting due to the direct cost of care and indirect costs related to absenteeism and low productivity [4], plus a 79% mortality due to NCDs5, it is easy to see that Jamaica has an economic issue now which will be even worse by the time these adolescents join the workforce. In addition, Jamaica is undergoing a demographic shift due to population ageing which also increases the prevalence of NCDs [5]. This spells long lasting implications for Jamaica's economy if we do nothing. Thus, investing in measures that result in positive lifestyle change is an investment in Jamaica's future.

One response has been the "Are You Drinking Yourself Sick?" campaign. This campaign originated from the Global Health Advocacy Project (GHAP) started in September 2018 by the Heart Foundation of Jamaica (HFJ). With an overall aim to reduce obesity through increasing the awareness of the Jamaican public about the ill effects of sugar consumption and the promotion of policy, the GHAP has a mammoth task. The HFJ uses mass media campaigns to get its obesity prevention message across, and it seems to be successful. According to the HFJ, "81 % of Jamaicans support a sugary drinks tax if the proceeds will go towards funding obesity prevention programmes, particularly for children" and "71 % of Jamaicans support a sugary drinks tax in general" [6]. Based on this feedback, it should be fair to say that if a sugar-sweetened beverage (SSB) tax were proposed, the public response would be mostly positive. However, would an SSB tax work in the Jamaican context?

To date, the SSB tax has been implemented in over fifty countries globally. This, however, does not necessarily mean that it would work in Jamaica. The SSB tax came about as part of a population-level NCD prevention strategy from the WHO. Given the increasing evidence of the link between the consumption of SSB and obesity/NCDs [7, 8, 9] targeting SSB consumption makes sense. The expectation is that the tax implementation will result in the healthier alternative being the more affordable choice and the consumer would choose according to price. Barbados imposed the SSB tax in 2015 making it the first Caribbean country to do so. Since then, the sale of SSB in Barbados has decreased, especially for carbonated SSBs, and there has been an increase in the sale of non-taxed SSB and water[10]. This success gives hope to Jamaica.

The Ministry of Health and Wellness (MOHW) also responded to the Jamaica Moves campaign and the National Food Industry Task Force (NFITF), which

among its many deliverables seeks to encourage product reformulation within the food industry and to tackle young child nutrition. It means therefore that between the HFJ and the MOHW, the lifestyle issues of diet and exercise are both being targeted.

I, however, have three proposals to put on the table that could be added for a more comprehensive approach.

First, although children spend a considerable amount of time at school, their food preferences were initiated at home over a period of at least three-four years prior to their first school attendance. In addition, meals after school, on weekends and during the summer are at home for most children. About three in every four (74%) Jamaicans use oil in meal preparation at home and frying is the preferred method of protein preparation for one-third of Jamaicans [11]. If home meal preparation methods are not addressed, regardless of food product reformulation, Jamaicans will continue to prepare foods according to taste preference. However, if we shifted culturally from the excessive use of oil, salt and sugar in home meal preparation, then, in the long run, Jamaicans would grow up with a palate more accepting of healthier meals.

Second, neighbourhood factors have been suggested to focus on the reduction of NCDs in Jamaica. Examples of neighbourhood factors are the availability of recreational space and attention to neighbourhood disorder. Women who resided in more disordered neighbourhoods in Jamaica were 26% more likely to have high cumulative biological risk (CBR) associated with NCDs than those who resided in less disordered ones. In addition, Jamaicans residing in areas with greater recreational space availability were 25% less likely to have a high CBR [12].

Third, I include here, the interesting suggestion of adding "under-recognised" environmental risk factors such as environmental toxic elements (e.g. heavy metals) and air pollution (household and outdoor) 13 to the WHO recommendations due to the negative effect such factors may have on NCD outcomes. With the constant reduction in green spaces as more high-rise buildings are constructed, and the increase in air pollution as more vehicles join our roads, perhaps, sooner than later, we ought to consider environmental risk factors.

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