Maximizing the Value of Public Sector Information for Scientific and Socioeconomic Development in Africa

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Abstract

Although it has always been an important asset to those who posses it, in the current knowledge society, information is considered as one of the most important goods in our daily life (Porat, 1977; Machlup & Mansfield, 1983; Mueller 1995; Stiglitz, 2000).
At the same time, the public sector is the biggest single producer and owner of a large variety of information (e.g., health and geographic information, financial reports, social and economic statistics, legislation and judicial proceedings, food and water resources information, and many other kinds of data and information, collectively referred to as Public Sector Information). Public Sector Information (PSI) represents an important resource with vast socio-economic potential to different communities. For example, governments can use this strategic resource to make sound policies and to promote transparency and accountability; and private sector can use it to produce innovative products and services, which in turn can contribute to the nation's economy. Scientific communities benefit tremendously from the PSI.

The list of benefits to the community includes the promotion of interdisciplinary, inter-sector, inter-institutional, and international research. As for citizens, PSI is essential for exerting their civic rights and enabling democratic participation. Finally, for civil society organizations, PSI can be a strategic resource for their work, especially in areas such as poverty eradication, public health, food security, disaster management, and governance, where the combination of different types of PSI (e.g., geo-spatial, economic, and health data) can be of tremendous value for successful targeting and support of marginalized communities. Although the OECD countries are sparing no effort to maximize the socioeconomic value of their PSI, similar efforts, or even discussions and future plans, are almost absent in most of the developing countries, especially in Africa.

This paper provides a comprehensive overview of the potential social and economic value of the PSI for different communities in Africa (and other developing countries), especially to areas such as good governance, market and organizational innovation and competitiveness, scientific research and development, good citizenship, poverty eradication, as well as other socioeconomic problems facing the developing world.

Because of the unfortunate absence of scholarship about the potential value of PSI in the developing countries, this paper mainly draws upon literature, experiences, and examples from the OECD countries. The author realizes, ofcourse, that for these potential values to be realized and enjoyed by different communities in the developing world, there should be sound government policies in place to govern the PSI in these countries. However, discussing such policies and their pros and cons is beyond the scope of this paper and will be the focus of a future paper.

Introduction

The public sector in most countries, by nature of its size and scope of activities, represents the largest single producer of data and information that could be a resource for the creation of value-added information content and services (Aichholzer & Buekert, 2004; see also

Steinberg & Mayo, 2007). The economic, social, and political value derived from the vast quantities of data and information being produced by the public and private sectors around the world have become a source of global interest for a variety of stakeholders across academic, social, and political fields. Use and reuse of these resources within various industries and by different organizations is what allows for the creation of such value.

The OECD (2006a) defines PSI as having characteristics of being dynamic and continually generated, directly generated by the public sector, associated with the functioning of the public sector (e.g., meteorological data, business statistics), and readily useable in commercial applications. Given the assumed special characteristics of the PSI (e.g., comprehensiveness, reliability, timeliness, and accuracy), this information is considered by different stakeholders to have potential economic, social, and political values (Aichholzer & Buekert, 2004; Uhlir, 2004; Abd Hadi & McBride, 2000). These values make the PSI a strategic resource, potentially important for different stakeholders such as different agencies within the public sector, private businesses, academia, citizens and civic organizations (see Blakemore & Craglia, 2006; Aichholzer & Buekert, 2004; Uhlir, 2004; Abd Hadi & McBride, 2000; Young, 1992). In a recent review, Steinberg & Mayo (2007) emphasized the importance of PSI and argued that it “underpins a growing part of the [British] economy and the amount is increasing at a dramatic pace” (p.3). The review, titled The Power of Information, maintains that “ when enough people can collect, re-use and distribute PSI, people organize around it in new ways, creating new enterprises and new communities” (Mayo & Steinberg, 2007, p.3).

These information resources can be used broadly by public-sector organizations themselves, through intra- and inter-governmental exchange of information (see Sheriff, 2000; Abd Hadi & McBride, 2000); by private-sector companies in general and by information industry firms in particular as re-users, to use it in their operations or to produce value-added information products and services (Abd Hadi & McBride, 2000; Young, 1992); by scientific communities (e.g., employment information is now used extensively in the social sciences

and in policy making; and data from public health organizations play a growing role in the advancement of life sciences) (see Arzberger et al., 2004) ; by individual users (e.g., for health and educational purposes and for making social and economic decisions); and by civil society organizations (e.g., the use of geospatial data, economic statistics, health and education information for poverty mapping and other related activities) (see CIESIN, 2006).

The assumed economic value of PSI comes from its exploitation by different communities. Given the perceived unique properties that the PSI has such as comprehensiveness and continuity (Hadi & McBride, 2000), successful exploitation of such resources can generate income to a country1 as well as expand its ability to compete internationally. An interesting aspect related to the economic value of PSI is that the economic synergy between many pieces of information makes the whole of the information worth more than the sum of the individual pieces.

The assumed social value of PSI relates to the value that citizens and civic organizations can derive from utilizing this information. An example of the social value of PSI is given in the “Policy Guidelines for the Development and Promotion of Governmental Public Domain Information,” a report conducted by the UNESCO in 2004 (Uhlir, 2004). This report shows that the United States weather information collected by the National Weather Service of the National Oceanic and Atmospheric Administration (NOAA) and provided free of charge, has resulted in a large number of public users in many sectors including education and research. The accessibility of such information enables citizens to make well-informed decisions related to any business or leisure plans. Expanding this principle across information sectors indicates that the availability of the different types of PSI will lead to a more knowledgeable society and therefore a smarter workforce, which will be able to leverage this information for the benefit of the nation as a whole (see Steinberg & Mayo, 2007; Bargmann, Pfeifer, & Piwinger, 2004; Weiss, 2003).

The economic, social, and political values of PSI all have the potential to enable a more effective and transparent government, a healthier and competitive economy, as well as a more knowledgeable and

responsible citizenry. The special need to study and highlight the potential value of PSI to the developing world stems from the assumption that, given the special characteristics of PSI that I mentioned above, this strategic resource can be of special importance and usefulness to the humanitarian and development work that these societies need in areas such as governance, poverty eradication, public health, and environmental protection.

Potential Value of PSI to Societies in the Developing World

PSI represents an important asset with vast socio-economic potential2. It is an important element in the existence of a robust knowledge economy. According to Horton (2002) diffusing public information and knowledge resources efficiently and effectively is essential to:

- "Sustaining the competitive competency of the country's businesses and industries, in both domestic and global marketplaces;
- Attaining the highest levels of educational excellence for all the nation's children and adults in a lifelong learning context;
- Enabling citizens to participate more effectively in all facets of a democratic society;
- Informing public officials at all levels of government so that they can enact better laws, formulate and enact enlightened public policies, monitor the programs they authorize effectively, and govern fairly, equitably, and wisely; and,
- Enhancing the quality of life of all a country's citizens, including responsibility to the special government information needs of disadvantaged and disabled individuals." (p.3)

Below, I provide detailed discussions and examples of the value of PSI to different communities in the society3.

Potential Value of PSI to Governments

According to Pierre & Peters (2005), there are two key variables in determining the State's capacity to govern. First is the authority of the State, referring to its ability "to make and enforce binding decisions on the society" (p.46), second is the State's ability to gather and process information. The authors argue that the State must act in concert with society to gather information about it, and must also be "open to a wide range of information, including much that is uncomfortable and dissonant, if it is to be successful in governing" (p.46). Hill (1995) argues "if government wants its well researched and sensible policies to be accepted, therefore, it must not be willing merely to provide full and clear information about the issues and the expected consequences of its proposed policy; it must take every reasonable step to ensure that the electorate is given that information" (p. 280). The wealth of information generated by the government holds great value to the government itself and to the nation. The public sector, while it is the collector and creator of PSI, it is also one of the primary users of this information. Governments can use these resources in creating policies, dealing with everything from education to employment public health.

PSI for Improving Governments Efficiency

PSI can greatly improve the efficiency of many public agencies and functions. Public agencies can use their own information or information from other public sector bodies to craft policies, maintain, evaluate, and improve relevant government operations, plan for the future, inform the public, and ensure the vitality of the economy. Specific examples may include making decisions about where and how many schools, hospitals, nursing homes, prisons and roads to build based on information the government collects from the public. Governments also can plan and prepare for natural disasters by using such information as geospatial, health and population. Moreover, governments can exchange scientific and technical information to foster excellence in scientific research and to ensure effective use of federal research and development funds. To that end, public agencies can use PSI to determine appropriate funding to areas where further development is needed. Finally, access to and sharing of PSI within

these agencies can eliminate work duplications, promotes faster services and better coordination.
In thinking topically, governments may find themselves better able to communicate across boundaries, thus eliminating duplication of effort and information.

PSI for Direct and Indirect Financial Gain for Governments

The last two decades or so have witnessed a noticeable increase in governments' awareness of the commercial value of PSI (Weiss, 2003; Hadi & McBride, 2000). According to Hadi & McBride (2000), issues and developments that affected this increased awareness include:

- "increasing commercial pressure for access to government information;
- the expansion of the information industry;
- increasing dependence on information by many organizations and the expansion of information of information intensive industries;
- increasing use of the Internet and electronic exchange of data;
- the development of electronic access to government departments; and
- a push by governments towards identifying new means of income generation" (p.553).

Governments can benefit from the PSI by generating some direct and indirect financial gains. Because of the strong potential for re-use, some public bodies, especially from countries that follow a "cost recovery" policy, may use the PSI they collect to develop products and services on their own (see the U.K. OFT, 2006). Under the same policy approach, some other agencies may sell or license PSI to other public bodies, to commercial entities, or to a commercial "arm" of the government (U.K. OFT, 2006 ; Weiss, 2003). For example, revenues to the UK government from the sale and licensing of PSI are around 340 million pounds, and the total market for PSI stands at 590 million pounds per year (U.K. OFT, 2006). Approximately half of the income

came from businesses, 45% from other public sector bodies and the rest from the general public.
On the other hand, in countries that follow the open access model such as the USA, the public sector benefits indirectly from the PSI through the increased financial rewards generated by open and free access to PSI. By increasing the revenues that the private sector generates from commercializing the available PSI, the government increases the tax base that the it can draw upon when funding future activities and projects (Weiss, 2003).

PSI for Awareness Raising and Democratic Values

Finally, PSI has increasingly been seen and used as an instrument to educate (and influence) citizens and raise their awareness regarding many social, economic, and political dimensions of their lives, which subsequently can speed up the social development of the country (see Thomson, 1999). Also, one major value that affects the government is transparency and promotion of democratic ideals: equality, democracy, and openness. The more information that is accessible from the government, the less likely it is to create corruption. Furthermore, if the information is easily and readily accessible in a certain format, then people can have the opportunity to obtain the desired information, and pursue their democratic rights. The transparency of government and public information prevents discrimination of access and use, which fulfills citizens' right of freedom of information.

Potential Value of PSI to the Private Sector

The great variety of PSI is not only significant in administration, control and policy making processes, it can also have huge potential commercial value. Some specific qualities of the PSI that are becoming essential with the increasing reliance on information resources include:

- PSI has usually been collected over a long period of time, which makes it useful for time series analysis.

- PSI enjoys the assumption of reliability. The public sector has the means to enforce information collection. Reliability is increased because in many cases providing correct information is on the best interest of the information subjects if such information is, for example, necessary to obtain a specific legal status.
- The PSI collection enjoys the assumption of sustainability. At least discontinuing information services could be turned into a public policy issue (Buekert, 2004, p. 7-8).

In the OECD countries, the last two decades have witnessed a growing awareness within the private sector of the commercial value and reuse of PSI. The private sector understood that this source of information has a number of inherent qualities that are vital for the information market and could not simply be left to the public sector and their associated private enterprises (Buekert, 2004). Although much of the collected PSI was not intended for commercial purposes, businesses are continuously discovering that there are many potential commercial applications for this raw PSI. In such a process, the private sector plays an intermediary role between the PSI and the end-user, through adding some value to the raw PSI (i.e., combining sources and creating new data). According to the OECD (2006 a), some of the products and services that the private sector can produce using PSI include in-car navigation systems, digital online maps, weather forecasts for different platforms (e.g. mobile phones), enhanced legal text databases for research, location-based information on doctors and pharmacies, and location-based tourist recommendations including weather conditions, to name some.

In general, there are two distinct uses of this information within the private sector: dissemination and creation of value added products and services.

Publishing companies, web design firms and broadcasting networks are in the business of disseminating PSI. Many of these companies do nothing more than taking the information and making it viewable to the general public through print, television and the Web. On the other hand, companies who provide value added products and services

transform and present this information in different ways so that consumers use it more easily to make decisions and to manage their lives. These companies come from the information intensive industries. IT consulting firms, research database providers, insurance firms and legal service providers are all part of these industries.
According to the U.K. Office of Fair Trading (2006, p.29), there are three ways to utilize PSI in the private sector:

- Own Business Use—This includes using PSI to make improvements within a business, such as developing an inventory system for a retailer. Using PSI to identify patterns to maximize sales and services is another application.
- Produce Products for Consumers—This includes the use of PSI to produce, for example, car navigation systems, hiking maps and genealogy services.
- Produce Products for Industry—This includes the use of PSI to develop products for an industry, such as training manuals, radar or auto-pilot maritime systems.

According to the U.K. OFT survey (2006), 39% of businesses in the UK use PSI for their own purposes, 28% use it to produce products for consumers, and 44% use it as an input to produce products for industry. The same survey found that among businesses generating products from PSI, 98 % ranked PSI as an important or very important input to their products. Moreover, three out of four of them stated that they would not be able to continue production in the absence of PSI.

Potential Value of PSI to Scientific Communities

The scientific community benefits tremendously from the PSI. The list of benefits to the community includes the promotion of interdisciplinary, inter-sector, inter-institutional, and international research (OECD, 2006b). Also, using PSI promotes new type of research; reinforces open scientific enquiry; encourages diversity of analysis and opinion; and facilitates the education of new researchers. Furthermore, it supports studies on data collection methods and

measurement, permits the creation new data sets when data from multiple sources are combined, helps the scientific community to maximize the research potential of new digital technologies and networks.

Arzberger et al. (2004) argue that access to the raw data for research – not just the polished, published final product - is vitally important to furthering scientific progress. Factual databases that are supported by government collections and funding are fundamental to the progress of science, to the advancement of technological innovation, and to an effective educational system. Examples of the PSI that can be used in the scientific arena include general scientific research data, such as geographic information (e.g., aerial photos, geology, hydrology, or topography) or meteorological information (e.g., climate data and weather forecasts), as well as some aspects of social data (e.g., health statistics for medical research) (MEPSIR, 2006).

Potential Value of PSI to the General Public

The unique characteristics of information in a free, democratic society are best expressed by Thomas Jefferson who called it 'the currency of democracy'. A democratic society requires free flow of information between the government and the public. As PSI relates to all spheres of life, it is important for this kind of information to be accessible to the potential users. Indeed, the general public benefits from obtaining information on various issues that improve their well-being and allows them to be productive citizens.

PSI can inform citizens of their rights and responsibilities, educate them and provide opportunities for life-long learning, and preserve cultural and historical information for the future. The general public can benefit from PSI directly and indirectly. Directly, through access to PSI, the general public can get information and instructions related to, for example, tax (e.g., domestic and international tax arrangements), education for children and adults (e.g., educational policy, further and higher education, special educational needs and additional support, workplace training and development), health services (e.g., hospitals, insurance coverage, compensations), housing issues (e.g., housing

advice, housing finance, housing repairs and renovation), and safety matters (e.g., civil emergencies, emergency response, emergency services, emergency planning, and emergency warnings). The information on justice and legal rights is also important to the public. This information includes civil and human rights, consumer rights, crime and law enforcement (including crime prevention and police) employment rights, justice system (including prisons, probation, coroners, remand and youth justice), law (including legal services) and security (including data security, national security and security of equipment)4.

PSI also includes information on leisure time and culture (e.g., arts, entertainment and events, children's activities, parks and gardens, sports and recreation facilities, tourism and young people's activities) that could help people make decision on different vacation-related issues. The information on transportation and infrastructure (e.g., air transport, community transport, commuting, public transport, road transport, parking, road safety and traffic management, roads and highways, structures and installations, transport for disabled people, transport planning and water transport) can explain which means of transport is good to travel at a given time or a season. Moreover, information on government and public administration is also important for the general public. This category includes information on central government, constitution, democracy and elections, local government (including council procedures, councils, local government committees and structure and mayors), politics, public administration (including public bodies, public consultation, public services, public service agreements & standards in public life), etc. One of the most important examples of the value of the PSI can be seen when people use public health information. The Power of Information report (2007) highlights a few cases where the use of this information has greatly contributed to the health of the public. The report states that the provision of food safety information has lead to a 13.3% drop in food borne illness in Los Angeles. Medical studies have also proven that HIV patients better cope with their disease and have a lower treatment cost when they better understand their condition (Mayo & Steinberg, 2007).

Potential Value of PSI to Civil Society Organizations

In addition to providing an important link between citizens and the state, civil society organizations (CSOs) also provide an enabling environment necessary to enhance community cohesion and decision-making, with free and easy access to information being of paramount importance (see Arko-Cobbah, 2007). Given the importance and diversity of areas these organizations work on, CSOs stand to benefit a lot from the availability of PSI. Areas that could benefit the most from such information include good governance, public health, environmental protection and poverty eradication. The following section focuses on the potential value of PSI to poverty eradication.

PSI and Poverty Eradication

One of the lessons learned from the U.S. National Research Council (NRC) study “Down to Earth: Geographical Information for Sustainable Development in Africa” (2002) was that geographical information (most of this information is produced by governments) and technologies are central to achieving successful transition from traditional environment and resources management practices to sustainable development due to their integrative quality (i.e., linking social, economic, and environmental data) and their place-based quality (i.e., addressing relationships among places at local, regional and global scale). Furthermore, this growing interest in the potential role of spatial data (and other types of PSI) in sustainable development, especially in poverty eradication area, was clearly demonstrated by the organization of the 9th International Conference of the Global Spatial Data Infrastructure (GSDI) in Chile in November 2006 with the main theme of Spatial Information: Tool for Reducing Poverty.5 The conference highlighted specific issues such as spatial information platform for reducing poverty, geospatial data for sustainable development, applications relating to poverty and mapping, applications in disaster management and eradication, and applications related to poverty and community.

There was a general consensus that this kind of information will

continue to play a critical role in eradicating poverty and enhancing other sustainable development activities. One of the of the main conference recommendations concerning spatial data and poverty eradication was: “Spatial Information becomes a real tool for reducing the poverty while the governments of the world create geo-referenced territorial information and statistics about the social, economic, cultural, institutional and environmental conditions of the territory and its population. Poverty is the major issue and scourge of our current society, leading in turn to other problems, for example the increase in crime, corruption, drug addiction, child abuse and so on…”6.

The logic behind the link between spatial data and poverty eradication is that the livelihoods of the majority of poor people around the world, especially in Africa, depend heavily on agriculture and natural resources, and that there are many pressing problems in these sectors that contribute to the level of poverty in these regions. Addressing these problems successfully in many cases requires better data and information, and more importantly better ways to integrate these information resources and to analyze the relationships between human activities and the changes in these land and natural resources. For example, poverty maps have proved to be a very strong tool to better understand the relationship between poverty and geographic factors such as climate conditions, elevation, access to transportation networks, exposure to natural disasters, and other important factors (CIESIN, 2006). They also are seen as permitting more effective targeting of poverty eradication efforts by enabling decision makers and the public to visualize the problems they are attempting to solve and facilitating more precise delivery of disaster relief services to vulnerable populations. These poverty maps7 have already been useful for some poverty eradication activities in Mexico and Bolivia (CIESIN, 2006).

Furthermore, the integration of health data and statistics in a relational database with a GIS interface, among many other benefits, is seen as enhancing health facility utilization, improving distribution of preventive care and response, and providing evidence-based rationales for targeted assistance and service delivery. Also, this integration of information is seen as useful in cases such as: health trends, human

and animal disease tracking, health facilities, location and asset management, tracking child immunizations, and epidemiology (Cromley & McLafferty, 2002). Finally, the integration of environmental data and statistics in databases with a GIS interface can help in many applications such as land-use management and planning, urban planning and development, water and air quality assessments and enforcement, property assessment and tax policy development, and various agriculture-related services, and systems modeling and forecasting (Clarke et al., 2002). The integration of these different types of PSI (e.g., geospatial, health, unemployment, donors information, education information, etc.) and the resulting applications could have a significant and direct impact on the poverty eradication and other sustainable development efforts in the developing world.

Conclusions

As shown in this paper, provided that there are sound policies in place, the PSI has a huge potential to contribute to the information society, environmental protection, economic growth and the overall welfare of citizens in the developing world.The experiences and examples provided in the previous sections about the use and reuse of PSI by public sector agencies, private sector, scientific communities, CSOs, and the public demonstrate the potential importance and value that the PSI contains for political, legal, scientific, technical, and medical fields; the innovation and economic growth resulting from its use, and its role in educating citizens and maintaining a transparent and accountable government (Aichholzer & Buekert, 2004).

PSI can contribute value to governments through social, political and economic aspects. The availability of this information promotes a healthy economy. These social and economic aspects greatly add to the smooth functioning of a democracy. More specifically, the government can gain such social and political benefits as promoting national law and order as well as strong and peaceful global relationships. Also, enriching the educational and cultural knowledge of citizens can improve the economic well-being of citizens and thus the country and its government. The government that provides open and

easy access to PSI to all interested parties can gain the trust, respect and support from both the public and private sectors, which in turn will ensure the prosperity of the country in general. Furthermore, there could be some financial benefits from the direct or indirect utilization of PSI by different communities.

Also, PSI is one of the raw materials that fuel the dynamic relationships between governments and private sector, allowing businesses to reduce their research and development overhead. Given an open marketplace, private corporations can make use of PSI to create new goods and services that add value to the raw data and in turn promote economic growth. This could increase the market size of information industry, and thereby expand the potential job market in the future. These kinds of positive externalities that result from access to and re-use of PSI create wealth and stimulate the economy, and are responsible for “enriching the population” (Uhlir, 2004).

Similar to the use of PSI in other areas, its application to science holds many opportunities for public benefit and socioeconomic development. Its value is magnified when used in important domains such as using meteorological information for agricultural predictions, using digital maps for responding to natural disasters, and in increasing research collaboration with the developing countries.

Finally, citizens and civic society can benefit tremendously from the utilization of PSI, especially in areas such as education, health, and environment. At a very basic level, it is quite known that citizens may incur some loses because they lack information when making important decisions, particularly in health and education areas. Also, the value of PSI to general public is in many ways parallel to the value of PSI to governments. Just as the government functions better with knowledgeable citizens, citizens are empowered and elect better governments with openly available information. The public needs to have access to government information to hold it accountable. The PSI becomes a communication tool that explains publicly funded projects and concerns. Furthermore, PSI is integral to the public’s freedom of expression; a freedom that is one of the hallmarks of a democratic society. PSI has practical value to the general public as well. Either directly from a publicly funded agency or indirectly available through

other communities, PSI impacts the general public by creating new products, stimulating sales, adding jobs, and contributing to wealth.

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Footnotes

1. *In an influential and widely cited study of the value of spatial PSI in Australia, it was claimed that for every dollar invested on producing land and geographic data, $4 of benefits was generated within the economy. (ANZLIC, 1995). Available at http://www.anzlic.org.au/pubinfo/2358011751.html*
2. *Although this information is ascribed no power in its own right, however, it is a very valuable in the way it supports development of organizations and societies (Rraman, 1989).*
3. *It should be noted that the value of certain types of PSI is easier to grasp than the value of other types {see Cragila & Blakemore (2004) on meteorological information and Hannapi-Egger (2004) on cultural info.}*
4. *For more examples see www.Info4local.gov.uk*
5. *See the conference website: http://www.gsdiassociation.org/events/eventdetails.asp?event_id=97/*
6. *Ibid*
7. *In Mexico, poverty maps were the framework for selecting 22 locations in thee states for on-farm work using innovative breeding techniques for maize. The Bolivian government think tank UDAPE, together with the World Bank and INE developed poverty maps to report on poverty and inequality in municipalities.*