

Exploiting Data for supporting developing countries

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INTRODUCTION

The developments in communication and information technologies (e.g., Internet use and mobile devices) have experienced an explosive growth in recent years in developed as well as in developing countries. It is reported by the UN that in Africa almost 20 percent of the population are online, up from 10 percent in 2010. In 2014, Internet use in developing countries grew by almost 10 percent, about twice as fast as it did in the developed world [The Millenium Development Goals 2014 report]. The expectation is that the number of people with Internet use and mobile devices will grow further in the coming years. Nowadays, mobile devices are used for various purposes. Besides voice communications, mobile devices are used to share information/knowledge via applications, such as SMS services, Whatsapp, and Facebook. Recent technological developments of mobile devices have made it easier to involve citizens in collecting data, also known as 'crowdsourcing'. By collecting data by means of crowdsourcing, governments connect with the common mass by acquiring information quickly and learning the issues that affect day-to-day life of citizens. The potential of 'crowdsourcing' should not be underestimated, especially in developing countries, where the mobile network is growing rapidly. Although crowdsourcing has already had a strong impact in developing countries, for example, in Haiti and Pakistan this approach has been used to coordinate crisis governance work after natural disasters, crowdsourcing and mobile technology

may also play a role in important developmental goals such as safety and health issues. In this article, we explore how the growth of data by means of modern information and communication technologies such as mobile devices, can be further exploited by developing countries.

POSSIBILITIES AND BENEFITTING OF DATA GROWTH

The increased availability of mobile devices and emerging technologies has been encouraging or a lot of projects where data is collected digitally. This data can be used for various applications and purposes. For instance, with the application called 'Burgerschouw', which was developed in 2012 by a private company for a municipal in the Netherlands. Currently, 'Burgerschouw' is deployed in eight municipalities in the Netherlands, and has about 250 users. Citizens can rate various aspects of their district, e.g., litter, the condition of trees, verges and streets. While inspecting their district, citizens may rate an aspect of their district as fair, high and low. To help a citizen with the interpretation of the ratings, examples of the ratings are given by means of pictures. For example, the app gives pictures of what should be understood under a healthy tree (good), an average healthy tree (fair), and an ill tree (low). Valuable information can be received by analyzing the data that the citizens have provided by means of this app. Governmental organizations may take advantage of this data to obtain insight in certain phenomena. This insight may support policy and decision - making. For instance, suppose the data shows that there are many reports of ill trees in a certain district of the municipal. With this information, policymakers of the municipal may react by conducting a research about why there are so many ill trees in this district. The research may reveal that there are toxic waste dumps in this district. As a consequence the municipal may decide to take measures for this illegal practice.

In these examples, citizens are aware of their role as data collectors and actively perform this role. Today, users download and use apps that are equipped with several tracing and logging functionalities, without exactly knowing which data

these applications collect and pass to which entities. Governmental organizations and businesses take advantage of the availability of huge amount of data by exploiting these data and in turn develop new apps to encourage better and smart governance of its citizens. For example, in the energy sector, energy suppliers can anticipate and influence the future energy consumption by introducing apps that make citizens aware of their energy consumption. Such apps may recommend users to turn off the heating system if the app notes that nobody will be at home for a while. Furthermore, these apps can be tailored to simulate as if people are at home while they are actually on holiday. A functionality as this might be useful to minimize the risk of a burglary when people are not at home.

Other examples where data is collected digitally, include the Pothole Patrol where sensor data submitted by smartphones is used to assess road quality, and the Copenhagen Wheel which was developed by MIT students back in 2009 and sponsored by the mayor of Copenhagen. In the Copenhagen Wheel sensors were attached to city bicycles to submit data about pollution, road conditions and congestions. Currently, a commercial version of the Copenhagen Wheel is available to the general public in several countries. Yet another example is data mining of uploaded photos to map tourist movement and so on.

Many more examples are to think of where data is collected digitally and in turn is exploited to encourage better and smart governance of citizens.

TAILORING EXISTING APPS FOR ADDRESSING DEVELOPMENT ISSUES

Since citizens of developing countries are using modern information and communication technologies such as internet and mobile devices more and more, and thus also (passively) produce a huge amount of data in a relatively easy way, governments in developing countries should anticipate on these ICT developments and exploit the possibilities of data growth for their own specific issues, like safety or health issues. But how can governments effectively take advantage of the

data to improve development issues? We argue that this may be obtained by tailoring existing apps to the specific needs of a country or a district of a country and by involving citizens in a more active way in the process of data collection. For example, an application like 'Burgerschouw' can be tailored to report about unsafe districts in a country instead of reporting about some aspects of trees. Citizens may be requested to report about safety issues in a specific area. These safety issues may differ for various countries and areas.

For example, in some countries, such as the US, the selling and use of alcoholic beverages in public is subjected to severe rules and regulations and also to strict enforcement, to counteract nuisance. These rules and regulations of alcohol use may be less severe in developing countries. Also, there may be less enforcement in these countries. Streets with crowded stands and alcohol sale may be considered as unsafe since it may lead to nuisance or even harassment and violence, especially during the evenings. In a tailored version of an application such as 'Burgerschouw', citizens may be requested to collect information by means of their mobile devices about whether it is crowded or not at stands, whether there is nuisance, enough lightning at night, broken roads, violent incidents, and so on. Having insight in these kinds of data collected by citizens, can in turn be used for several purposes by governmental organizations. For instance, the data may show there is not enough lightning in an area. Governmental organizations may use this information to place more lampposts in an area such that citizens who are traveling at night may feel safer. Or in case that the data shows a lot of violence and harassments in certain areas, the government may decide to raise additional surveillance or place (more) cameras in these areas.

Commercial organizations may use these data to develop apps to compute safe routes from place A to place B at real-time. Such organizations should augment journey planners with the data about e.g., broken roads, lightning, crowded alcoholic stands, and harassments; and combine it with area maps to compute safe roads. Suppose that someone likes to travel in India from Nehru University to Meena

Bazar, then several routes are possible to travel. Which route is the best depends on the criteria that are applied to make a choice, e.g. a safe, fast, or sight-seeing trip. If a safe trip is chosen as criterion by the user then such an app will select a route where the streetlamps are working at night, the roads are in good or reasonable conditions and crowded alcoholic stands are avoided as much as possible.

NECESSITY OF GOOD DATA QUALITY

The success of apps like these depends on the quality of the data that is submitted by citizens. Therefore, citizens of developing countries should particularly be made aware of the importance of their role in data collection. Our opinion is that governments should promote the relevance and importance of the role of citizens as data collectors or their own and country's concerns. To obtain good data quality, guidelines should be developed that help citizens to rate the quality of the data before submitting the data. These guidelines should be about standardized methods, but also about supporting and providing tutorials for citizens as data collectors to ensure data credibility. Above this, the acknowledgement by (governmental) authorities for the effort of data collection by citizens, should be taken into account since this can act as an important motivator to involve citizens as data collectors. Moreover, this acknowledgement may also help to build better relationships between (governmental) organizations and citizens through joint fact-finding.

Datasets of good quality can give important insights in several phenomena as indicated by a few examples mentioned above. By having these insights, governments may adequately take action to tackle important developmental issues to ensure better and good governance for their citizens. However, although huge datasets can be produced by digital data collection and new insights in phenomena can be obtained, the privacy of individuals should be taken into account at all time, as such that violation of privacy of individuals is prevented.

LEARNING FROM DATA OF DEVELOPING COUNTRIES

Having datasets of good quality of developmental issues is not only of benefit for developing countries, but can also be useful for other countries. For instance, diabetes is a big health issue in developing countries, but it is also known as one of the health issues in other countries. It is reported, for example, that India and China have the highest number of people with diabetes in the world [report European Commission: The conference Diabetesity – A World-Wide Challenge: Towards a global initiative on environment interactions in diabetes/obesity in specific populations, 9 and 10 February 2012 in Brussels]. In the Netherlands diabetes is one of the biggest chronic diseases, where nearly one million people have diabetes.

Studies have revealed that there is a high correlation between food and diabetes. By means of apps that collect data about different kinds of food as well as eating behavior, valuable datasets may be obtained. An app that collects data about food and eating behavior, for instance, is the Dutch 'Eetmeter' app. This app is developed by the Netherlands Nutrition Centre and gives personal dietary advice, on basis of age, weight, eating behavior and kinds of food. A user of this app may add information about what he/she eats a day. With this information, the app immediately shows whether you eat too many calories. Also the app shows whether your nutrition intake is sufficient. A person can use this kind of information to hold a grip on his/her eating behavior and in turn minimize the risk to develop obesity. Currently, there are about a couple of hundred users.

By tailoring, and subsequently deploying apps like this for countries such as India and China, and also by adding other data, for example blood sugar levels and the extent of exercise a day, valuable datasets may be obtained. The collected datasets might be used in different ways. One way is that these countries themselves use the datasets to get new insights in this disease and other related phenomena. For example, by splitting the datasets

in obese and thin people, new insights may be obtained in how the eating behavior differs between these two groups in relation to the blood sugar level.

Another way is, that these datasets might be shared with other countries. By sharing and making these datasets available for other countries, these countries may benefit as well from these datasets for their own research purposes. For example, there is a huge population of Chinese people in Surinam. It is observed that the Chinese population in Surinam are becoming more obese over the recent years and thus having an increased risk of developing diabetes. These Chinese people immigrated to Surinam a while ago. As a consequence of this immigration, their eating behavior and kind of foods have changed through the years, since the foods in Surinam are different from the foods in China. Suppose that data of these people with regard to variables such as age, weight, eating behavior, kinds of foods and blood sugar level etc. are also collected in Surinam. Then this dataset may be compared with the dataset shared with China on various variables. Cross examinations of the different datasets may expose the role of food and eating behavior in more detail. For instance, by comparing the obese Chinese people of Surinam, with the thin people in China, it may show that a certain type of food eaten in Surinam is accountable for increasing the risk of developing diabetes under the Chinese people in Surinam. With this kind of information, the diet of the Chinese people in Surinam may be adapted in order to minimize the risk of developing diabetes. In this way developing countries may add value to research purposes for different countries.

CONCLUSIONS

The development in the field of ICT has opened doors for huge data collections. In order to take advantage of the huge data collections, research and development evolves in different directions, which are not necessarily divergent. We have set ourselves the question how developing and developed countries may share best practices to benefit from the explosive growth of data due to

ICT- developments. We argue that existing apps can be tailored and fed by data to solve problems, such as safety issues, in specific countries. Furthermore, we stress the importance of sharing datasets amongst different countries. Data sharing contributes to a better understanding of emerging phenomena on our planet.

Exploring The Design And Development Of The Electronic Government (E-Government) Applications Landscape In South Africa

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Introduction

Information and communication technology (ICT) is playing an increasingly and significant role in the delivery of information and services for a connected society. As in the case in the business sector, governments are making efforts in seeking to make effective and efficient delivery of government and services. Creating a connected society means utilising technology to deliver public information and services (Averweg, 2015). The Internet-driven activity that improves citizens' access to government information and services is known as electronic government (e-Government) (Yang & Rho, 2007). In order to achieve the objective of making effective and efficient delivery of government and services, one item on the agenda of many governments is transforming the conventional manual ways of