BIG DATA USE AND LIFE IMPROVEMENTS IN DEVELOPING COUNTRIES

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ABSTRACT -- Affordability of digital device, which are mostly handheld plus innovations in technology, have been the occupancy of todays Era of Big Data. Big Data brought about the explosion in the quantity and diversity of high frequency digital data. These data hold the potential—as yet largely untapped— to allow decision makers to track development progress, improve social protection, and understand where existing policies and programmes require adjustment. Applying Big Data, like call logs, mobile-banking transactions, online user-generated content such as blog posts and Tweets, online searches, satellite images, etc.—into actionable information requires using computational techniques to unveil trends and patterns within and between these extremely large socioeconomic datasets. These insights need to complement official statistics, survey data, and information generated through concentrating in-depth and nuances on human behaviors and experiences—and doing so in real time, thereby narrowing both information and time gaps for proper development.

Key Words-- Big Data, Analytics, and Development

I. INTRODUCTION

In order for data and technology to certainly benefit people in the developing world, there must be willing hearts to impact over how information is collected and used. Having good intentions only is not enough to help people to reach their life's goals and standards; the data must be combined with new technologies for social good. Big data applications must be careful monitored and studied in order to have positive and desired changes and prevent adverse effect and unexpected consequences.

Some people believe that the application of big data insights to developing world could help in solving some challenging problems. Having big stock of data is one scenario and applying the data correctly is another one. Ownership of mobile phones is spreading across the developing world, offering a flow of huge data about people's everyday lives.As mobile phone being among big source of big data in developing world, the challenge is to democratize big data and mobile technology so it is a partnership between the technology industry, governments and the communities where they work and bring about developments through solving problems. The data can be temporal, spatial, or dynamic; structured or unstructured; and the information and knowledge derived from data can differ in representation, complexity, granularity, context, quality, provenance, reliability, and trustworthiness. This phenomenal growth means that you must not only understand big data in order to interpret the information that truly counts, but also understand the possibilities of big data analytics.

Improving lives through big data use requires the stakeholders to be aware and understand on how the data will be used and their implications. As the cultures are various to various people, the data privacy is a paramountconcern whether you are in a developed country in Europe or a rural community in India. The ongoing high-profile debate about privacy in the developed world is hot. This is a high challenge in developing world; the new technology will never leave us as we are. There is new technology and capability, which could be used to do enormous good - and have been - but there is a need to work sensibly taking into accounts the different views and context of people who live in.For the success of privacy issues it is supposed to involve the people, monitor impacts and be open about the intentions of the researchers and practitioners to enable sensible debate.

The organizations and individuals involved in using big data in developing countries need a forum to discuss potential applications, projects, problems and ethical issues with people from the developing world who have the cultural perspective to appreciate how these technologies will impact the users.

II. EVOLUTION AND BACKGROUND OF BIG DATA

The latest and wider information revolution is the invention of big data. This revolution is making rapid changing life around human being. Big data is built upon discoveries made during and after the Second World War, the Information Revolution rapidly picked up speed in the 1970s with Intel's invention of the microprocessor (Richard and King, 2014). If the microprocessor and the power to compute, and the second defined the first act of the Information Revolution by the network and the power to connect, the third will be defined by data and the power to predict. One way to look at things is that we have collectively built and are now living with a really big metadata computer (Richard and King, 2014).

The information is always around us. We have also long had mathematics and human "computers" to help us process and make sense of information. After World War II, however, urgent problems like nuclear weapon, air defense, etc., spurred investment into new kinds of computers (Richard and King, 2014). These computers used innovations in communications and material sciences that enabled machine computers with transistors to reliably transfer, store, and retrieve information as data (Waldrop, 2001). Uses for these early computers quickly expanded beyond military applications to meet limitless corporate demand.

Early discoverers saw the human potentials as well. In a

famous 1950 article, Alan Turing suggested that one day computer processing might become so powerful as to be externally indistinguishable from human thought (Turing, 1950). J.C.R. Licklider predicted in a 1960 paper entitled Man-Computer Symbiosis that "in not too many years, human brains and computing machines will be coupled together very tightly, and that the resulting partnership will think as no human brain has ever thought and process data in a way not approached by the information-handling machines we know today (Licklider, 1960).He also, optimistically believed that man-computer symbiosis would be "intellectually the most creative and exciting in the history of mankind(Schonberger and Cukier, 1960).

Processors doubling in computing power every two years also came with a corresponding decrease in the cost of computing (Richard and King, 2014). Lower costs of computing led to the development of ever more powerful software taking advantage of ever more powerful hardware. Half a century on, Moore's law and others like it have enabled the migration of computing from its military and corporate roots into the hands of virtually everyone in the developed world. Bill Gates's ambitious 1980s vision of "a computer on every desk and in every home" has already come and gone (Beaumont, 2008).We have moved on to the smartphone and tablet era, ushered in by Apple's triumphant transformation from a computer company into "a mobile device company (Jobs, 2010).

Now, at breakneck pace, computing is distributing to everything and "software is eating the world (Andreessen, 2011). Governments and corporations are speedily accepting Infrastructure as a Service ("IaaS"), also referred to as cloud computing. This computational power is also fueling exceptional growth in applications and software tools of all kinds. Leveraging the on-demand scale and power of cloud computing, an entire new model of software delivery has also emerged called Software as a Service ("SaaS"), which one leading industry analyst predicts will grow to $75 billion in 2014 (William, 2013). Right behind SaaS, developers now rapidly create custom-built applications on Platform as a Service ("PaaS") offerings.

Telegraph once upon a time dominated and termed as the fastest way of communication. Now the inventions of computers and Internet have brought just a different story.Global communications now surge through over 550,000 miles of undersea fiber-optic cables (Lindeman, 2013).From telecommunications provider to content provider, players like Google, Facebook, Microsoft, and Amazon are now building their own fiber-optic networks to have more control over their content and their economics (FitzGerald and Ante, 2013)

If we improve the basis of prior information on which to base our probabilistic estimates, our uncertainty will be reduced on average (Hilbert, 2013; p. 3). This is a well-established proven mathematical theorem of information theory that provides the foundation for all kinds of statistical and probabilistic analysis (Cover and Thomas, 2006; p. 29; also Rissanen, 2010). It means if we have the information to rely on during decision-making, the possibility of being accurate is very high compared to when we don't have. This will have developmental impact to developing countries

III. Big Data Adoption

During the early days of data analysis, companies had very difficult task to feed their internal data into their data warehouses as other activities in the companies were still running. Companies were to improve data insights as "production processes, sales, customer interactions, and more were recorded, aggregated, and analyzed. The era of big data came along with companies producing and gathering large amounts of information from within and from outside their organizations. To meet the demands of storing and analyzing these larger data sets, innovators like Google, Yahoo, LinkedIn, and eBay developed new, open-source software technologies such as Hadoop, a software tool that allows the storage and processing of very large data sets across collections of computers (Davenport, 2014). Larger data sets empowered new likelihoods of a profoundly different scale than in the past. Mayer-Schönberger and Cukier provide a helpful analogy here, stating, "[A] movie is fundamentally different from a frozen photograph. It's the same with big data: by changing the amount, we change the essence.

Currently, the volume and variety of data are in ample supply. And it is clear that some of the data we collect today will have unforeseen uses (and value) in the future. These unforeseen secondary uses of data create the incentive for institutions to collect and store data in order to have them for later analysis. Storage, after all, is getting much cheaper, too. Although employees with big data skills have been in relatively short supply (Olavsrud, 2013), and companies are still learning what to do with big data (Asay, 2013), this is rapidly changing.

Now days there are big data broker companies who have access to extensive data. The data market economy is now hyper in collection of billion of dollars for selling data. Data brokers collect their information's from all possible sources like government records, purchase histories, social media posts and hundreds and thousands of other sources. Data brokers compile this information and use it to build comprehensive data profiles about us, all of which they sell in turn to retailers, advertisers, private individuals, nonprofit organizations, law enforcement, and other government agencies (U.S Govt., 2013)

There is increasingly espousal of big data in such a way that all kinds of human activity, ranging from dating (Lehrer, 2013),to hiring (Peck, 2013), voting (Issenberg, 2012), policing (Robertson, 2013) and identifying terrorists, have already become heavily influenced by big data techniques.These new insights and predictions are already starting to have an impact on the relationships between citizens, governments, and companies. And it is happening so quickly that most people are not aware of both the scale and the speed of these transformations.

IV. Big Data for Development

This big data for development is based on (Hilbert, 2012) literature where he had a conceptual framework termed as the

ICT4D literature (Information and Communication Technology for Development) that is also based on a Schumpeterian notion of social evolution through technological innovation (Schumpeter, 1939; Freeman and Louca, 2002; Perez, 2004).

The first requisites of making Big Data work for development are a solid technological (hardware) infrastructure, generic (software) services, and human capacities and skills (Hilbert, 2013). The careful combination of these aspects are used to analyze different characteristics and types of data, which could be words, locations, nature's elements, and human behavior, to mention a few. While this set-up is necessary for Big Data Analysis, it is not sufficient for development (Hilbert, 2013).

For Big Data work for development it requires the social construction of its usage through carefully designed policy strategies. There is a need of assurance on how the so called cheap large-scale data analysis could help to create better goods and services to societies in developing countries.Big data analysis should be considered as among tools to transform and transfer development to developing countries. From a systems theoretic perspective, public and private policy choices can broadly be categorized in two groups: positive feedback (such as incentives that foster specific dynamics: putting oil into the fire), and negative feedback (such as regulations, that curb particular dynamics: putting water into the fire) (Hilbert, 2013). The result is to be of a three- dimensional framework as suggested by Hilbert: whereas different circumstances (e.g. infrastructure deployment) and strategies (e.g. regulations) intersect and affect different aspects of Big Data Analysis.

Bellagio Big Data, 2014 had a focus on how big data would help LMICs (Low and Middle Income Countries) in ways that are locally driven and locally relevant for societal processes. Its not uncommon to see various projects have focused on the growing importance of big data in humanitarian response and in large institutionally driven development projects, but little attention has been given so far to big data as a tool for local activism, advocacy, empowerment or projects focusing on specific marginalized or excluded groups which are the day-to-day coverage in developing countries. One reason for the under development is lack of access to data and information, and even though accessed, deciding, sorting, processing and decision making on the same bring the utmost nightmare to users. At first pace we need to know how local people, local groups and individuals can become more data-aware, how their concerns might benefit from insights being produced by international networks, and under what circumstances big data might become an important tool for smaller-scale groups working for social development.There is a consideration on the usefulness of big data to a broad range of communities engaged in bringing for positive social change. The positive changes considered are activists on digital issues such as personal data protection and privacy; accountability and transparency organizations; funders and international agencies aiming to promote social change and interested in using new tools and resources; researchers and policymakers working on economic or human development for whom digital data is a central resource; and researchers working with big data to inform development or humanitarian action.

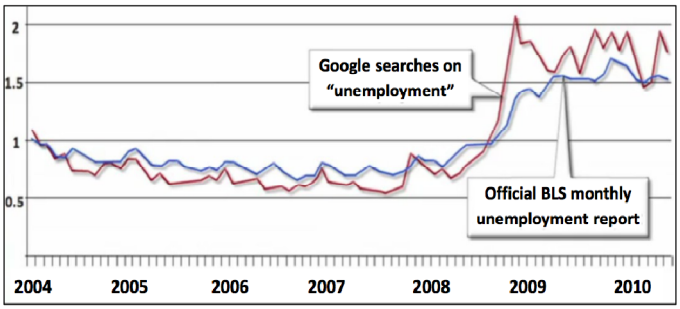
The concern of big data is based on making data helpful on understanding and revealing social issues such as unfairness and representation. The inevitable categorization that accompanies the analysis of digital data tends to crush out some of the differences and touches that are important in understanding the historical and structural aspects of inequality such as gender, ethnicity, economic or social status and religion. These choices are often made for historical reasons – France and Rwanda, for instance, do not collect statistics on religion or ethnicity (Bellagio Big data, 2014). Paradoxically, this effort not to profile may lead to problems of representation by making racial and ethnic violence, for example, invisible. In connection with this question of representation and profiling, there is consideration of the power of the data analyst, and the responsibility to consider whether everything should be based on.

From the big picture, any informed decision making will have the positive outcome on effect and efficiency as had been a case with ICT have had during the recent decade (Brynjolfsson and Hitt, 1995; Jorgenson, 2002; Melville, Kraemer, and Gurbaxani, 2004; Castells, 2009; Peres and Hilbert, 2010). Big data is becoming a resource for positive social change in low- and middle-income countries (LMICs) (Bellagio Big Data, 2014). However, it is expected to have more impact as digitalization is increasing through handheld mobile devices. Brynjolfsson, Hitt,and Kim (2011) surveyed 111 large firms in the U.S. in 2008 about the existence and usage of data for business decision-making and for the creation of a new products or services. They found that firms that adopted Big Data Analysis have output and productivity that is 5 – 6 % higher than what would be expected given their other investments and information technology usage. There are sectors, without data could not develop. They are data intensive and users: education, health, government, and communication host one third of the data in the country (Hilbert, 2013). The following reviews some illustrative case studies in development relevant fields like employment, crime, water supply, and health and disease prevention.

As it has mentioned earlier, there are varieties of big data to be worked upon. One among famous type is word. Institutions and individuals using big data for decision-making must not ignore the power of words as they are among representative. This logic is based on the old wisdom ascribed to the mystic philosopher Lao Tse: "Watch your thoughts, they become words. Watch your words, they become actions..." (Hilbert, 2013). Or to say it in more modern terms: "You Are What You Tweet" (Paul and Dredze, 2011). Analyzing comments, searches or online posts can produce nearly the same results for statistical inference as household surveys and polls (Hilbert, 2013). Figure 1 shows that the simple number of Google searches for the word "unemployment" in the U.S. correlates very closely with actual unemployment data from the Bureau of Labor Statistics (Hubbard, 2011).

Figure 1: Real-Time Prediction: (A) Google Searches On Unemployment Vs. Official Government Statistics

From The Bureau Of Labor Statistics



Source: Hubbard, 2011;
http://www.hubbardresearch.com

In our developing countries, we can simply use location-based data, which can simply be obtained from four primary sources as narrated by Hilbert, (2013): in-person credit or debit card payment data; in-door tracking devices, such as RFID tags on shopping carts; GPS chips in mobile devices; or cell-tower triangulation data on mobile devices. The last two provide the largest potential, especially for developing countries, which already own three times more mobile phones than their developed counterparts (reaching a penetration of 85 % in 2011 in developing countries) (ITU, 2011). There is evidence that shows that through mobile phones and handheld devices could help developing countries to prosper through big data analytics generated from these devices. Manyika, et al., 2011 narrates that; by 2020, more than 70 percent of mobile phones are expected to have GPS capability, up from 20 percent in 2010, which means that developing countries will produce the vast majority of location-based data.

Nature And Their Use In Big Data

Nature is among major causes of uncertainty. The uncertainty caused by nature can simply be reduced by big data analysis and the impact is quickly felt. In developing world, a recent project by the United Nations University uses climate and weather data to analyze "where the rain falls" in order to improve food security in developing countries (UNU, 2012). In developing world, agriculture is a backbone of economy and livelihood, through such applications; big data and its analysis could be a stepping-stone to save many lives. Combing Big Data of nature and social practices, relatively cheap standard statistical software was used by several bakeries to discover that the demand for cake grows with rain and the demand for salty goods with temperature (Hilbert, 2013). Cost savings of up to 20 % have been reported as a result of fine-tuning supply and demand (Christensen, 2012). The cost savings and meeting people's demands it means there will be an increment of productivity and hence economic growth and livelihood.

V. Tracking Economic Activity Through Big Data Use In Developing Countries

Big data can bargain a new penetration of fact on exacting concerns. This balance of detail can be used to advocate the possibility of showing granular detail of given phenomenon, and it can be used to create cooperating tools which employ the reader and lead them to seek to understand the problem better.

A touchy area of Big Data for development is the reporting of economic activity that could potentially affect the economic performance of an individual, state, country, and/or region. There is evidence of big data use in developing countries through the collaboration with organizations from developed world. There are issues ofa mixed blessing and difficulty for many developing countries (often being accompanied by autocracy, corruption, property expropriation, labor rights abuses, and environmental pollution) (Hilbert, 2013). The datasets administered by sourcewithdrawalbodies are extremely rich. There are recent cases from Brazil, China, India, Mexico, Russia, the Philippines and South Africa have argued that the publication of data that relate to the economic activity of these sectors could help to remind the current shortcomings, without endangering the economic competitiveness of those sectors in developing countries (Aguilar Sánchez, 2012; Tan-Mullins, 2012; Dutta, Sreedhar and Ghosh, 2012; Moreno, 2012; Gorre, Magulgad and Ramos, 2012; Belyi and Greene, 2012; Hughes, 2012).

One bold example of big data use in economies of developing world is the data activism using volunteered data is the Black Monday movement in Uganda (https://www.facebook.com/BlackMondayMovement), begun by civil society organizations in 2012 to publicize stories of corruption and to show that there is money to provide services for people. This cheap big data from Facebook has been used to inform the government on what it's supposed to do to her citizens. The activism involved in Black Monday is both locally rooted, publicizing local problems and protests, and global in the technology it uses (websites and social media tools). This corruption information from big data store could make economic activities more visible and impact the society in Uganda.

VI. Behavioral Pattern With Big Data Function

Users of big data can use big data to trace behavioral abnormalities as they are usually spotted by analyzing variations in the behavior of individuals in light of the collective behavior of the crowd. In USA, health sector was traces to track the hospitalization rates for forearm and hip-fracture (Darthmouth, 2012). The case showed that hip-fractures is within expected standard deviations (only 0.3 % of the regions show extreme values in the case of hip-fractions); forearm fracture hospitalization rate is 9 times larger (30 % of the regions can be found in the extreme values). This shows that a particular area is overwhelmed by a particular behavior and hence mostly caused forearm fracture and the other area had much of hip-fracture.

Behavioral data can also be produced by digital applications. Examples of behavioral data generating solutions are online

games like World of Warcraft (11 million players in 2011) and FarmVille (65 million users in 2011) (Hilbert, 2013).

VII. Problems And Challenges For Big Data Use In Developing World

Big data use raises some challenges, as it has to be advocated between individuals and organizations. Problems identified by advocacy specialists fall into three main categories:

VIII. Data Interpretation

Data interpretation is always accompanied with vast challenges as Organizations and activists often handle multiple languages (both linguistic and programming) even when dealing with a local phenomenon (Bellagio Big data, 2014). When the scale of these two languages (linguistics and programming) becomes uncontrollable then comes the challenge to find the linguistic and technical capacity to scale up its representation in response.

There are number of issues which cause data to be misinterpreted and lead to false positives or negatives. The metadata (attached information which describes and helps to understand the limitations of a digital dataset) is often missing or incomplete in the case of big data, given that it tends to come from multiple sources and this information may only be available several steps back in the analytical process.

IX. Organizational Challenges

Organizations have never had the task and capacity to do big-data-scale analysis, data storage and computation. Data size and handling issues may therefore be a problem for them, as it seems to be new responsibility, particularly in terms of locating the capacity and willingness to store, compute, utilize, and understand big datasets at organizational level. Organizations need to ask at what point they should choose to invest in this capacity, and understand the indicators that show it will pay off.

Another organizational challenge appears to data that are socially available. Having them available doesn't mean they are not legally protected (Often according to where an organization is located – for example different rules apply in the EU versus the US in terms of what can be done with data about people), proprietary claims, and particular data science requirements. Related to this, but more broadly, organizations need to consider how to keep sensitive data secure, both because it may be proprietary, but also because even open data may refer to attributes of people which, when read across datasets, may become sensitive.

X. Use And Dissemination

Whenever there is a big data analysis use by whomever, being consultants or collaborators, the organization must be responsible of their analysis to the societies they draw and use their data. Once data reflecting people's activities, movements, opinions or networks is scraped, downloaded or created by analytics, researchers run the risk of profiling and discriminating – and organizations of allowing this to happen. All risks associated with analysis must be well studied and precautions taken to prevent any backward impact. Even though data protection strategies are usually only mandated when organizations deal with data which may be used to identify people, rather than anonymised data, this divide can be deceptive when handling big data due to its distributed nature. When different datasets are made to speak to each other, their combined power may say things about people and communities that would not otherwise be obvious. Organizations therefore need to be aware of cases where data may cement inequalities and detrimental categorizations, and where their work may be feeding into unequal.

XI. CONCLUSION

Licklider predicted that there would be intellectually and the most creative and exciting in the history of mankind, It's really that we are living in the same era. Like other story, from information technologies to big data and this brings the possibility of amazing discoveries and great innovation in the history of human being. Big data are to be used by governments for human development, especially to usher services to citizens. Citizens are to be safe through proper defense that is done contemporarily through the use of big data. Companies should serve better their customers through the application and use of big data. Big data should not ignore privacy ethics even though some are open data, yet the confidentiality of information must be maintained. Big data must apply legal protections to prevent important societal values like privacy, confidentiality, transparency, and identity from becoming subordinate to the new capabilities of big data.

There is threat in three big areas of humankind. The threat is on privacy, confidentiality, and identity, but this has no legal capacity to cease the power of law. The rules governing information flow are inevitable in our societies. We need to develop an approach to those rules that ensures personal information in our society flows and is used in ethical ways, which require broad discussion. Big Data Revolution have revealed to be powerful in almost every aspect like power to predict, power to shape, and power to make decisions that affect the lives of ordinary people. As we all try to harness the benefits of our new technologies without succumbing to their potential harms, developing proper use of big data will be essential. Big Data applications are development.

XII. REFERENCE:

Alex Williams, Forrester: Saas And Data-Driven "Smart" Apps Fueling Worldwide Software

Growth, Techcrunch (Jan. 3, 2013), Http://Techcrunch.Com /2013/01/03/Forrester-Saas-And-Data-Driven-Smart-Apps-Fueling-Worldwide- Software-Growth/.

A.M. Turing, Computing Machinery And Intelligence, 59 Mind 433, 460 (1950).

Aguilar Sánchez, C. (2012). Brazil: No Easy Miracle. Increasing Transparency And

Accountability In The Extractive Industries (Working Paper Series 2012). Revenue Watch Institute And Trans Parency And Accountability Initiative. Retrieved From Http://Www.Revenuewatch.Org/Sites/Default/Files/Brazil_Tai.Pdf

Andrew V. Papachristos& Christopher Wildeman, Network Exposure And Homicide

Victimization In An African American Community, 104 Am. J. Pub. Health 143, 143 (2014) (Arguing That Awareness Of Offenders' Positions In Social Networks Is "Essential To Understanding Individual Victimization Within High-Risk Populations").

Bellagio Big Data Workshop Participants. (2014). "Big Data And Positive Social Change In

The Developing World: A White Paper For Practitioners And Researchers." Oxford: Oxford Internet Institute. Available Online: Http://Www.Rockefellerfoundation.Org/Uploads/Files/C220f1f3-2e9a-4fc6-Be6c-45d42849b897-Big-Data-And.Pdf .

Belyi, A., & Greene, S. (2012). Russia: A Complex Transition. Increasing Transparency And

Accountability In The Extractive Industries (Working Paper Series 2012). Revenue Watch Institute And Trans Parency And Accountability Initiative. Retrieved From Http://Www.Revenuewatch.Org/Sites/Default/Files/Russia_Tai_Eng.Pdf

Claudine Beaumont, Bill Gates's Dream: A Computer In Every Home, Telegraph (June 27,

2008, 12:01 Am), Http://Www.Telegraph.Co.Uk/Technology /3357701/Bill-Gatess-Dream-A-Computer-In-Every-Home.Html.

Brynjolfsson, E., &Hitt, L. M. (1995). Beyond Computation: Information Technology,

Organizational Transformation And Business Performance. Journal Of Economic Perspectives, 14, 23–48.

Castells, M. (2009). The Rise Of The Network Society: The Information Age: Economy,

Society, And Culture Volume I (2nd Ed.). Wiley-Blackwell.

Cover, T. M. And Thomas, J. A. (2006) Elements Of Information's Theory 2nd Edition, A John

Wiley & Sons, New Jersey.

Don Peck, They're Watching You At Work, Atlantic (Nov. 20, 2013, 9:07 Pm),

Http://Www.Theatlantic.Com/Magazine/Archive/2013/12/Theyre- Watching-You-At-Work/354681/.

Drew Fitzgerald & Spencer E. Ante, Tech Firms Push To Control Web's Pipes, Wall St. J.

(Dec. 16, 2013, 8:36 Pm), Http://Online.Wsj.Com /News/Articles/Sb10001424052702304173704579262361885883936

Dutta, R., Sreedhar, R., &Ghosh, S. (2012). India: Development At A Price. Increasing

Transparency And Accountability In The Extractive Industries (Working Paper Series 2012). Revenue Watch Institute And Trans Parency And Accountability Initiative. Retrieved From Http://Www.Revenuewatch.Org/Sites/Default/Files/India_Tai_Eng.Pdf

Freeman, C., &Louçã, F. (2002). As Time Goes By: From The Industrial Revolutions To The

Information Revolution. Oxford University Press, Usa.

Gorre, I., Magulgad, E., & Ramos, C. A. (2012). Phillippines: Seizing Opportunities.

Increasing Transparency And Accountability In The Extractive Industries (Working Paper Series 2012). Revenue Watch Institute And Trans Parency And Accountability Initiative. Retrieved From Http://Www.Revenuewatch.Org/Sites/Default/Files/Philippines_Tai.Pdf

Hilbert, M. (2012). Towards A Conceptual Framework For Ict For Development: Lessons

Learned From The Latin American "Cube Framework". Information Technologies & International Development, 8(Winter; Special Issue: Ict4d In Latin America), Forthcoming.

Hilbert, M. (2013) Big Data For Development; From Information To Knowledge Society, Ssrn-

Id2205145

Hughes, T. (2012). South Africa: A Driver Of Change. Increasing Transparency And

Accountability In The Extractive Industries (Working Paper Series 2012). Revenue Watch Institute And Trans Parency And Accountability Initiative. Retrieved From Http://Www.Revenuewatch.Org/Sites/Default/Files/Southafrica_Tai.Pdf

Itu (International Telecommunication Union). (2011). Measuring The Information Society

2011. Geneva: International Telecommunication Union, Itu-D. Retrieved From Http://Www.Itu.Int/Publ/D-Ind-Ictoi- 2011/En

J.C.R. Licklider, Man-Computer Symbiosis, Hfe-1 Ire Transactions On Hum. Factors

Electronics 4, 4 (1960), Available At Http://Worrydream.Com /Refs/Licklider%20-%20man-Computer%20symbiosis.Pdf.

Jonah Lehrer, The Web's Cockeyed Cupids, Wall St. J. (Mar. 2012, 6:04 Pm),

Http://Online.Wsj.Com/News/Articles16, /Sb10001424052702304537904577277830191481536.

Jordan Robertson, How Big Data Could Help Identify The Next Felon—Or Blame The Wrong

Guy, Bloomberg (Aug. 15, 2013, 12:01 Am), Http://Www.Bloomberg.Com/News/2013-08-14/How-Big-Data-Could-Help-Identify- The-Next-Felon-Or-Blame-The-Wrong-Guy.Html;

Jorgenson, D. W. (2002). Econometrics, Vol. 3: Economic Growth In The Information Age

(1st Ed.). The Mit Press.

M. Mitchell Waldrop, The Dream Machine: J.C.R. Licklider And The Revolution That Made

Computing Personal 113 (2001).

Manyika, J., Chui, M., Brown, B., Bughin, J., Dobbs, R., Roxburgh, C., & Hung Byers, A.

(2011). Big Data: The Next Frontier For Innovation, Competition, And Productivity. Mckinsey& Company. Retrieved From Http://Www.Mckinsey.Com/Insights/Mgi/Research/Technology_And_Innovation/Big_Data_The_Next_Fron Tier_For_Innovation

Matt Asay, Gartner On Big Data: Everyone's Doing It, No One Knows Why, Readwrite (Sept.

18, 2013), Http://Readwrite.Com/2013/09/18/Gartner-On-Big-Data-Everyones-Doing-It-No-One-Knows-Why#Awesm=~Orvsnl0senlqwz.

Melville, N., Kraemer, K., &Gurbaxani, V. (2004). Review: Information Technology And

Organizational Performance: An Integrative Model Of It Business Value. Mis Quarterly, 28(2), 283–322.

Moreno, R. (2012). Mexico: A Moment Of Opportunity. Increasing Transparency And

Accountability In The Extractive Industries (Working Paper Series 2012). Revenue Watch Institute And Trans Parency And Accountability Initiative. Retrieved From Http://Www.Revenuewatch.Org/Sites/Default/Files/Mexico_Tai_Eng.Pdf

Paul, M., &Dredze, M. (2011). You Are What You Tweet: Analyzing Twitter For Public Health.

In Proceedings Of The Fifth International Aaai Conference On Weblogs And Social Media (Pp. 265–272).Association For The Advancement Of Artificial Intelligence. Retrieved From Https://Www.Aaai.Org/Ocs/Index.Php/Icwsm/Icwsm11/Paper/Viewfile/2880/3264

Peres, W., & Hilbert, M. (2010).Information Societies In Latin America And The Caribbean

Development Of Technologies And Technologies For Development. Santiago: United Nations Eclac. Retrieved From Http://Www.Cepal.Org/Publicaciones/Xml/3/43803/Libro_Cepal_98.Pdf

Perez, C. (2004). Technological Revolutions, Paradigm Shifts And Socio-Institutional

Change. In E. Reinert (Ed.), Globalization, Economic Development And Inequality: An Alternative Perspective (Pp. 217–242). Cheltenham: Edward Elgar. Retrieved From Http://Www.Carlotaperez.Org/Papers/Basic-Technologicalrevolutionsparadigm.Htm

Richard, N. M. And King, J. H (2014) Big Data Ethics Ssrn-Id2384174

Rissanen, J. (2010). Information And Complexity In Statistical Modeling (Softcover Reprint

Of Hardcover 1st Ed. 2007.). Springer.Sasha Issenberg, How President Obama's Campaign Used Big Data To Rally Individual

Voters, Part 1, Mit Tech. Rev. (Dec. 16, 2012), Http://Www.Technologyreview.Com/Featuredstory/508836/How-Obama-Used-Big- Data-To-Rally-Voters-Part-1/ ("The [Obama] Campaign Didn't Just Know Who You Were; It Knew Exactly How It Could Turn You Into The Type Of Person It Wanted You To Be.").

Schumpeter, J. (1939). Business Cycles: A Theoretical, Historical, And Statistical Analysis

Of The Capitalist Process. New York: Mcgraw-Hill. Retrieved From Http://Classiques.Uqac.Ca/Classiques/Schumpeter_Joseph/Business_Cycles/Schumpeter_Business_Cycles.Pdf

Steve Jobs, Speech Given At The Unveiling Of The New Apple Ipad (Jan. 2010), Available At

Http://Www.Apple.Com/Apple-Events/January-2010/ (Noting That "Apple Is The Largest Mobile Devices Company In The World Now");See Also Erick Schonfeld, Tim Cook: Apple Is "A Mobile-Device Company," Techcrunch

Thor Olavsrud, How To Close The Big Data Skills Gap By Training Your It Staff, Cio (Oct. 2,

2013),Http://Www.Cio.Com/Article/740818/How_To_Close_The_Big_Data_Skills_Gap_By_Training_Your_It_Staff?Page=1&Taxono Myid=600010 (Discussing The Big Data Skills Gap).

Todd Lindeman, A Connected World, Wash. Post (July 6, 2013),

Http://Apps.Washingtonpost.Com/G/Page/Business/A-Connected-World/305/.

Tan-Mullins, M. (2012).China: Gradual Change. Increasing Transparency And Accountability

In The Extractive Industries (Working Paper Series 2012). Revenue Watch Institute And Trans Parency And Accountability Initiative. Retrieved From Http://Www.Revenuewatch.Org/Sites/Default/Files/China_Tai_Eng.Pdf

Thomas H. Davenport, Analytics 3.0, Harv. Bus. Rev., Dec. 2013, At 66; See Also Jeff Kelly,

Big Data: Hadoop, Business Analytics And Beyond, Wikibon (Feb. 5, 2014, 3:04 Pm), Http://Wikibon.Org/Wiki/V/Big_Data:_Hadoop,_Business_Analytics_And_Beyond.

U.S. Gov't Accountability Office, Consumer Privacy Framework Needs To Reflect Changes

In Technology And The Marketplace 2–4 (2013).

Viktor Mayer-Schönberger& Kenneth Cukier, Big Data: A Revolution That Will Transform

How We Live, Work, And Think 6 (2013).