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Implementing bigdata analytics for small and medium enterprise (SME) regional growth

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Abstract: *In all economies, especially in developing and transition economies, there is now a consensus among state policy makers, development economists as well as international development partners that small and medium enterprises (SMEs) are a potent driving force for their industrial growth and indeed, overall economic development. In recent times, the concept of Big Data has been seen as a new solution to help in policy and practice in all sorts of application context and domains. The impact of abundance data collected and stored over a number of years by various organisations both public and private has led to many innovative data analytics technologies. The thrust of this paper therefore is focusing on SME growth, that is, how to assist regional small business growth using Big Data. Harnessing big data practice for SME growth has potential to challenge current decision making and policy initiatives both at the government level (macro), as well as at the SME level (micro). Thispaper will assess the extent to which Big Data can be harnessed for SME growth; and develop a systems based method for making intervention based on Big Data practice for SME growth.*
Keywords:*SMEs, Big data, Analytic, regional, Economies, growth.*

I. Introduction

The increasing focus on big data and its potential to influence almost every sector ofindustry, gives it the edge to be seen as new solution for enterprises. However, many organizations and often SMEs fail to successfully implement technological and analytical frameworks in order to harness some of the potential that big data has. The early uses of gathering a large variety and volume of data has mostly been within large corporations. Mostly larger enterprises has launched initiatives to complement their analytical proficiencies, but as technologies mature, and more companies adopt analytics for handling data, and learn how to organize within this new analytics, SMEs might find an easier time reaping some of the benefits. Also led by cheaper and more easily accessible servers and data centers, delivered through cloud vendors, SMEs now face less of a constraint on upfront investment, rather the challenges presents themselves as organizational and strategic of nature. The right technologies still needs to be chosen, but with well supported and documented open source data systems being available, it has increasingly become a question of choosing right, and choosing a scalable option that fits the specific need of an SME.

Big Data is not just for only big businesses with bigger budgets. Today, small business, too, can reap the benefits of the massive amounts of online and offline information to make wise, data-driven decisions to grow their businesses. Although most Big Data discussions concern enterprises that have all the resources to hire data scientists and research firms, there are several ways that small business can gather, analyze and make sense of data they already have.

The data accessibility and improved analytics revolution are igniting opportunities for new companies and existing SMEs to find new ways to harness the power of the growing aggregation of digital data. These immense opportunities generated by capturing and analyzing data are creating new companies every day.The power of data is not limited to startups but also apply to existing business models across industries. The use of digital data and analytical tools enables SMEs to extend their products and services as well as to create new ones (Intuit, 2012).

II. Literature Review

Lawal, et al (2010) opines there is no universal definition of small scale industry. Definition also changes overtimes, owing to changes in price level, advances in technology and other considerations. Criteria that may be used in the definition of small scale enterprises(SSEs) often include turnover, gross output and employment. These factors are usually used because they are functional and easy to measure. According to Rouse, (2011) SME is a convenient term for segmenting businesses and other organizations that are somewhere between the "small office-home office" (SOHO) size and the larger enterprise. The European Union has defined an SME as a legally independent company with no more than 500 employees.

Small andmedium-sized enterprises (SMEs) are a veryheterogeneous group. SMEs are found in a wide arrayof business activities, ranging fromthe single artisanproducing agricultural implements forthe village

market, the coffee shop at the corner, the internet café in a small town to a small sophisticatedengineering or softwarefirmselling in overseas marketsand a medium-sized automotive partsmanufacturer selling to multinational automakers in the domestic and foreign markets. The owners mayormaynot be poor; the firms operate in verydifferentmarkets(urban, rural,local, national, regional andinternational); embodydifferent levelsof skills, capital, sophistication and growth orientation, and maybein the formal or the informal economy(Organisation for Economic Co-operation and Development (OECD), 2004).

Statistical definition of SMEs varies bycountryand is usually based on the numberof employees, and value of sales and/or value of assets (Ayyagariet al, 2003). Due to its ease of collection, the most commonly used variable is the number of employees. The EU and alarge number of OECD, transition anddeveloping countries set the upper limit of number of employees in the SMEs between 200-250, witha few exceptions such as Japan(300 employees) and the USA (500 employees). At the lowerend of the SME sector, a large number of countries define a group, which is a mixture of the self-employed and "micro" enterprises, with less than 10 employees. Irrespective of the level of development of an economy,asignificant proportion ofmicro and, sometimes, small enterprises are found in the informalsector or the shadow economy (OECD, 2002).OECD (2004) in Schneider (2003)compared the size of theinformal sector in 22 transition (former SovietUnion and Central and Eastern Europe) and 21 OECDeconomiesfrom 2000-2002 and found that the sizeofthe informal sector amounted to an average of16.7%, 29.2%and 44.8%of GDP in OECD, Central and Eastern Europe and the former Soviet Unioneconomies, respectively.

As the United States took the big jump from agriculture dominated society to an industrialsociety, self-employment statistics also changed dramatically. By 1900, about 80 percent of the work force was self-employed, while about 20 percent worked for other firms. As the year 2000 approaches, the opposite is essentially true. 20 percent of workers today are self-employed, while 30 percent work for other firms and businesses. One might conclude from this that there are fewer small firms in the Country, but that is not true. In fact, small firms are as popular as ever. The decrease in self-employment came from a decline in the number of Independent farmers, which was largely offset by an increase in large firm employment.

Osoba (1987) argued that financing strength is the main determinant of small and medium enterprises growth in developing countries. Similarly, Yue and Ma (2008) studied issues pertinent to the sustainable development of technological innovation in Small and Medium Enterprises (SME). At the end of their study, they argued that sustainable development of technological innovation in SMEs is a systemic engineering, which involves a number of issues such as technical level, capabilities of key research and develop personnel, availability of fund for research and development and business development etc. SMEs need to develop and implement strategy based on their own characteristics and strive to realize sustainable growth in the long run which cannot be resolved in a short time. Oluba (2009) summarized the contribution of SMEs to an economy, especially developing ones as: Greater utilization of raw materials, employment generation, encourage of rural development, development of entrepreneurship, mobilization of local savings, linkages with bigger industries, provision of regional balance by spreading investments more evenly, provision of avenue for self-employment and provision of opportunity for training managers and semi-skilled workers. Ogunsiji and Ladamu (2010) argued that entrepreneurial orientation is the panacea to the ebbing productivity. Each of these engines of growth like people, market, capital, technology and organization can only flower and blossom fully where the efficacy of entrepreneurial orientation is appreciated and implemented. Asta and Zaneta (2010) examined the growing importance of small and medium enterprises (SMEs) and their influence on economic development of Lithuania's demand special attention given to processes, tendencies, perspectives in them and encourage the search for the effective SME performance improvement measures. They noted that to improve their environmental performance, economic and social effectiveness, the integrated, based on financial analysis, decision-making model is needed which would be oriented to strategic sustainability goals, not requiring significant time, financial and human resources, The integration of sustainability management accounting (SMA) and composite sustainable development index (ICSD) methodologies makes the basis of sustainable development decision-making model for SMEs.

Jones, (2014), opined that, regardless of the size of a company, big data is a reference to data sets too large and complex for companies to manage within their traditional IT systems.But a look past the technical jargon will reveal that big data is about opportunity.The opportunity to learn from a company's data in order to make smarter business decisions.While it may come as no surprise that large enterprise companies are taking advantage of the opportunity that big data affords, some entrepreneurs may not know that small businesses can do the same.

Owners of a small business ability to succeed in the face of larger competitors is driven personal intuition and ability to provide a superior service. But big data is changing the business landscape. Chances are some competitors large and small are using big data to enhance product quality, improve marketing operations and further customer relationships. This newfound efficiency of larger competitors can be a very real threat to the sustainability of SME business. A small retailer could analyze the relationship between social-media

conversations and buying trends to quickly capitalize on emerging sales opportunities. Or launching a new online service, ability to analyze a site's visitors and track how they move from page to page so as to understand what engages them, the things that turn them off and detect promotional and cross-selling opportunities. Some believe that big-data analytics projects are too costly and complex for a small business to take on. Indeed most of the analytics solutions on the market were built specifically for larger enterprises, making them costly and complex to implement. This is meaningless to the owners of small businesses who are focused on simply finding the right tool for the right users quickly so as to accomplish more work done faster.Fortunately, with big data now on the minds of everyone, new solutions are coming to the market each day and some have been created for the specific needs of smaller businesses (Jones, 2014).

III. Characteristics of Bigdata solution in SME

Here are three characteristics small businesses should seek in a big-data solution:

1.1. Flexibility and choice

Big-data solutions targeted at large enterprises are typically an all-or-nothing proposition, requiring customers to gut existing systems, thereby imposing a heavy cost and time burden on information-technology departments. This simply doesn't work for small businesses.

When the marketing department of a small company needs a marketing-automation system, it typically acts independently of the IT department, laying out its requirements, cost justifications and system requirements and then researching and choosing the best solution to meet its needs.

As a result, small businesses regularly deploy a variety of solutions throughout the organization, including desktop software for business tasks, a software as a service solution like those of Salesforce or Workday for marketing or HR, a public or private cloud for development and perhaps some custom-built solutions to meet specific needs. This leads to an environment with many different types of data.

A big-data solution for small businesses must allow them to choose only the capabilities they need and leverage the solutions and systems already in place.

The solution should be complete in having everything a customer might need in one pre-integrated package, but the vendor shouldn't force a company to replace a capability it already has implemented and adopted.

1.2. Simplicity

A big-data solution for small businesses should be easy to deploy and use and take only a few days or weeks for a company to start using it not months or years. All the capabilities of the system should work together seamlessly. And if the customer is integrating new capabilities with existing systems, it should be possible to accomplish this without the need for expensive specialists.

In addition, the system should not require staffers to undergo a lot of training and should include self-service capabilities so a broader audience of analysts and business users can use it without the need for the IT department to become involved.

1.3. Cost

Finally, a big-data solution for small businesses must be priced right. Customers should be able to pay for only the capabilities they need, and the licensing strategy should allow them to start small and scale up as the need for analytics increases. This approach is particularly useful for a rapidly growing small business, where it's critical for the cost and capabilities of software investments to align with the rate of growth and expansion of the operation.

The transition from an intuition-driven company to an analytics-driven company is one small-business owners can embrace. Finding the right IT solution, one geared to the specific needs of the small business, can help make it practical and affordable to benefit from the opportunity big data affords.

IV. Bigdata analytics for SME growth

In this paper we selected five Big Data solutions for Small and medium Enterprise regional growth, we provided an insight on how they can help grow SMEs.

1.4. IBM's Watson Analytics

While many Big Data solutions are built for extremely knowledgeable data scientists and analysts, IBM's Watson Analytics makes advanced and predictive business analytics easily accessible to small businesses. The platform doesn't require any requisite skills of using complex data mining and analysis systems, but automates the process instead. This self-service analytics solution includes a suite of data access, data

refinement and data warehousing services, giving you all the tools you need to prepare and present data yourself in a simple and actionable way to guide decision-making.

Unlike other analytics solutions that focus on one area of business, Watson Analytics unifies all your data analysis projects into a single platform — it can be used for all types of data analysis, from marketing to sales, finance, human resources and other parts of your operations. Its "natural language" technology helps businesses identify problems, recognize patterns and gain meaningful insights to answer key questions like what ultimately drive sales, which deals are likely to close, how to make employees happy and more.

Watson Analytics takes the complex math and coding of analytics and does it for you. Smart data discovery gives you predictive modeling, data preparation, dashboards and visualizations, all in a few clicks. It can be a spreadsheet on your computer, relational data in a database, report data or data you've stored in a cloud storage service. Below are three major activities in IBM Watson Analytics.

Figure 1: Three activities of IBM Watson Analytics
Source (ibm.biz/watsonexplorer.)

1.4.1. Search

Watson Explorer's search combines content and data from many different systems throughout the enterprise, and presents it to users in a single view; dramatically reducing the amount of time spent looking for information and increasing their ability to work smarter. Watson Explorer's 360-degree information applications deliver data, analytics and cognitive insights relevant to the user's role, context and current activities.

1.4.2. Analyze

While structured analytics can provide insighton the what, where and when of a businesschallenge or opportunity, content analyticsprovides insights to answer why and how. Watson Explorer's content analytics allow enterprises to extract meaning and insight from natural language content such as customer comments and research reports, and to use those insights to streamline business operations, uncover risk, gain a better understanding of customers and make better decisions.

1.4.3. Interpret

The IBM Watson Developer Cloud provides a portfolio of content and services through application programminginterfaces (APIs) to help create a new generation of cognitive applications to enhance, scale and augment human expertise. The services make direct participation in the era of cognitive systems available to everyone who shares the goal of a new partnership between people and computers. Watson Explorer provides the ability to integrate a growing list of these services for an enhanced experience by leveraging the combined strengthof search, analytic and cognitive capabilities.

1.5. Google Analytics

SME owners done need expensive software to begin gathering data. It can start from an asset you already have, your website. Google Analytics, Google's free Web-traffic-monitoring tool, provides all types of data about website visitors, using a multitude of metrics and traffic sources.

With Google Analytics, you can extract long-term data to reveal trends and other valuable information, so you can make wise, data-driven decisions. For instance, by tracking and analyzing visitor behavior such as where traffic is coming from, how audiences engage and how long visitors stay on a website (known as bounce rates). You can make better decisions when striving to meet your website's or online store's goals. Another example is analyzing social media traffic, which will allow you to make changes to your social media marketing campaigns based on what is and is not working. Studying mobile visitors can also help you extract information about customers browsing your site using their mobile devices, so you can provide a better mobile experience.

1.5.1. Architecture of Google Analytics

T he diagram in figure 2 show an architecture of Google Analytics and how it works

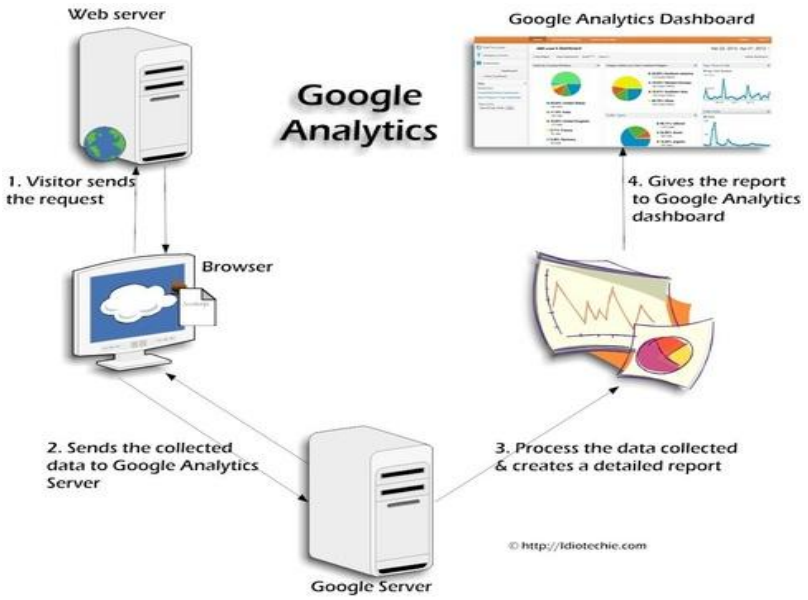


Figure 2: Architecture of Google Analytics

Source (http://www.quora.com/What-is-the-architecture-of-Google-Analytics)

When any visitor accesses any section of your website, a request is made to the webserver to display the page. The webserver process the request and sends back the response to the browser. When the visitor's browser loads the page, it executes the javascript GA tracking code present in that webpage. Google Analytics will extract user cookie values. It updates and creates the cookies as necessary and sends the request to Google Analytics server where the data is processed. After the processing all the data then forms the part of the Google Analytics Report. This data is finally available for user's view in the user's Dashboard.

1.6. InsightSquared

InsightSquared connects to business solutions such as Salesforce, QuickBooks, ShoreTel Sky, Google Analytics, Zendesk and more to automatically gather data and extract actionable information. For instance, using data from customer relationship management (CRM) software, InsightSquared can provide a wealth of small business sales intelligence, such as pipeline forecasting, lead generation and tracking, profitability analysis, and activity monitoring. It can also help businesses discover trends, strengths and weaknesses, sales team wins and losses, and more. In addition to sales tools, InsightSquared's suite of products also includes marketing, financial, staffing and support analytics tools.

1.7. Canopy Labs

Big Data will not just help a SME owner make better business decisions; it can help you predict the future, too. Canopy Labs, a customer analytics platform, uses customer behavior, sales trends and predictive behavioral models to extract valuable information for future marketing campaigns and to help you discover the most opportune product recommendations.

One of Canopy Labs' standout features is the 360-degree Customer View, which shows comprehensive data about each individual customer. Its purpose is two-fold: first, it reveals each customer's standing, such as lifetime value, loyalty and engagement level, as well as purchase histories, email behaviors and other metrics and this shows which customers are profitable and worth reaching out to. Second, with this information, businesses can better create personalized offers, track customer responses and launch improved outreach campaigns. Canopy Labs handles the complex, technical side of Big Data, so all you have to focus on are your customers.

1.8. Tranzlogic

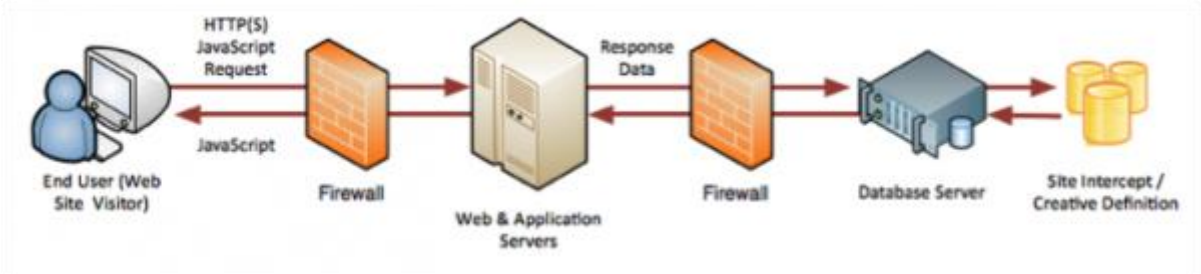
This is no secret that credit card transactions are chock full of invaluable data. Although access was once limited to companies with significant resources, customer intelligence company Tranzlogic makes this information available to small businesses without the big business budget.

Tranzlogic works with merchants and payment systems to extract and analyze proprietary data from credit card purchases. This information can then be used to measure sales performance, evaluate customers and customer segments, improve promotions and loyalty programs, launch more-effective marketing campaigns, write better business plans, and perform other tasks that lead to smarter business decisions. Moreover, Tranzlogic requires no technical skill to get started. it is a turnkey program, meaning there is no installation or programming required. Simply log in to access your merchant portal.

1.9. Qualtrics

SME owners that donot currently have any rich sources for data, conducting research may be the answer.Qualtrics lets businesses conduct a wide range of studies and surveys to gain quality insights to guide data-driven decision making.

Qualtrics offers three types of real-time insights: customer, market and employee insights. To gain customer insight, use Qualtrics' survey software for customer satisfaction, customer experience and website feedback surveys. To study the market, Qualtrics also offers advertising testing, concept testing and market research programs. And when it comes to a team, Qualtrics can help conduct employee surveys, exit interviews and reviews. Other options include online samples, academic research and mobile surveys.



V. Discussions

SME can be in any of this forms micro/cottage industry, small scale industry, medium scale industry or large scale industry.

Micro/Cottage Industry

This is an industry with total capital employed of not more than 15 million working capital but excluding cost of land and or a labour size of not more than 10 workers.

Small – Scale Industry

An industry with total Capital employed of over 1.5 million but not more than 50 million, including working capital but excluding cost of land, and or labour size of 11 – 100 workers.

Medium – Scale Industry

An industry with a total capital employed of over 50 million but not more than 200 million, including working capital but excluding cost of land, and or a labour size of 101 – 300 workers.

Large – Scale Industry

An industry with a total capital employed of over 200 million, including working capital but excluding cost of land or a labour size of over 300 workers. Comparatively, most advanced countries seemed to have agreed on a maximum limit of 500 employees as a small Firm.

1.10. Problems of Small and Medium Enterprises

Baadom (2004) asserted that the following problems militate against the effective operation of small and medium enterprises;

Poor Implementation of Policies: there have been many good policies formulated in the past by the government in developing countries to improve SMEs, but weak implementation has made it impossible to realize the goal.

Lack of Continuity: most small scale establishments are sole proprietorship and such establishment often ceases to function as soon as the owner loses interest or dies. This raises the risk of financing such business.

Poor Capital Outlay: inadequate capital outlay has often affected small scale business adversely. Financiers often regard the sector has high risk area and therefore feel skeptical about committing their fund to it.

Poor Management Expertise: Management has always been a problem in this sector as most small scale businesses do not have the required management expertise to carry them through once the business start growing. The situation gets compounded as training is not usually accorded priority in such establishments.

Inadequate Information Base: Small scale business enterprises are usually characterized by poor record keeping and that usually starve of necessary information required for planning and management purposes. This usually affects the realization of the sector.

Lack of Raw Materials: In some small scale business enterprises, raw materials are sourced externally, hence the fate of such enterprises to foreign exchange behavior. The fluctuation of foreign exchange may therefore make it difficult to plan and that may precipitate same stock that may destabilize the setup.

Poor Accounting System: the accounting system of most small scale business enterprises lack standard and does not make room for the assessment of their performances. That creates opportunity for mismanagement, which consequently may lead to enterprise failure.

Unstable Policy Environment: Government policy instability has not been helpful to small scale businesses. That has been destabilizing and has indeed sent many SMEs to early fold-ups.

1.11. Life Cycle of Small and Medium Enterprises

In general, the ideal life cycle of small and medium enterprises as posited by Udhe (1999) can be divided into four phases viz: start up, accelerated growth, stable growth and maturity.

Start-up:usually lasts for a period of one or three years during which the founder supervises the whole business activities that may be carried out by family members, friends or small number of employees.

The Phase of Accelerated Growth:usually lasts three to four years. During this period, the founder or a management expert handles management. At this point, a corporate organization is developed thereby leading to separation of ownership from management.

The Stable Growth phase typically has duration of two to five years. During this period, management expertise and the corporate organization are divided into numerous departments and inflow of stable, long-term venture capital from corporate investors begins to appear.

Finally, **the Phase of Maturity** that may start after several years of beginning in the business adopts the same type of management as stable growth phase but major difference being that sources of funding may become more diverse.

1.12. Strategic Importance of SMEs

In spite of the foregoing strategic advantages of SMEs, some analysts have argued that many assumed strategic benefits of small firms may be 'myth' rather than 'reality'. The following provides critical review of these arguments and their empirical evidence.

Employment: In most developing countries, micro enterprises and small-scale enterprisesaccount for the majority of firms and a large share of the employment. The relative importance of small business varies significantly across countries and within a given country, across stages of development over time. A comparative study of manufacturing firms by Snadgross and Briggs
(1996) shows common pattern in the transformation of the size distribution of firms as industrialization by concluding that small-scale enterprises play a declining role as countriesdevelop.

Labour Intensity: Small firm employ a large share of the labour force in many developing countries. Theoretically, SMEs are regarded to be more labour intensive than large firms. However, some research evidence suggests that many SMEs are in fact more capital intensive (Little, Mazxumbar and Page, 1987). Labour intensity exhibits more variation across industries than among firm-sized groups within industries (Snodgrass and Biggs, 1996).

Job Creation: It is often argued that SMEs are important for employment growth. This conviction has not been supported by empirical evidence, while job creation rates are substantially higher for small firms, so are gross destruction rates, SMEs exhibit high birth rates and high death rates and many small firms fail to grow (Davis, et al 1993).

Efficiency: Most studies of developing countries show that the smallest firms are least efficient and there is some evidence that both small and large firms are relatively inefficient compared to medium-scale firms (Little, Mazumdar and Page, 1987). It is often argued that SMEs are more innovative than larger firms probably due to the adoption of 'niche strategies', such as high product quality, flexibility and responsibility to customerneeds as means of competing with large-scale businesses (Snodgrass and Biggs 1996). However,ACS, Morck and Young (1999) found that these innovations often take time, and large firmsmay have more resources to adopt and implement them.

Wages and Benefits: Although, research evidence suggests that larger employers offer better jobs in terms of working conditions than SMEs. (David, et al 1993). There is some evidence that this disparity narrows as industrialization proceeds (Snodgrass and Biggs, 1996).

Social, Political and Equity Justifications: SMEs are often said to contribute to a more equal distribution of income or wealth. However, SMEs owners and workers are likely to be the poorest of the poor, so that SME promotion may not be the most effective poverty alleviation instrument. In reality, the desire of governments to promote SMEs is often based on social and political considerations rather than economic grounds.

VI. Conclusions

Big data has now become a popular term used to describe the exponential growth and availability of data both structured and unstructured. In recent times, big data is seen to be as important to business and society as the internet has become. More data may lead to more accurate analyses. More accurate analyses may lead to more confident decision making. And better decisions can mean greater operational efficiencies, cost reduction and reduced risks to SMEs. Therefore, in this paper, we buttressed the extent to which small and medium-sized enterprises (SMEs) can benefit from using big data and implementing same to SMEs analytical practice. We highlighted the importance of bigdata to SMEs. We analysed some bigdata analytics that can enhance SME regional growth. We also considered the potential usefulness of big data to SMEs.

SMEs should seethe fundamental potential of Big Data for better decision making and policy creation in markets and business models, and begin to explore the opportunities. Big Data Value represents an extremely strategic and profitable opportunity for SMEs. In order to succeed very well in the world where its regions is driven by innovation and competitiveness, it is necessary to foster the development and wide-scale adoption of Big Data Value technologies, successful use cases and data-driven business models.

Reference

[1]. Margaret Rouse (2011) small to medium enterprise (SME), Business intelligence - business analytics retrieved from http://whatis.techtarget.com/definition/small-to-medium-enterprise-SME Accessed Wednesday, June 17, 2015 by 2:57pm GMT+1

[2]. Southard jones (2014) Retrieved fromhttp://www.entrepreneur.com/article/235338

[3]. Sonia Buchholtz, MaciejBukowski, AleksanderŚniegocki(2014), Big and open data in Europe -A growth engine or a missed opportunity?",Warsaw Institute for Economic Studies, report commissioned by demosEUROPA, 2014

[4]. Gabriella Catteneo (2014), The European Data Market, IDC presentation given at the NESSI summit in Brussels on 27 May 2014, available online at: http://www.nessi-europe.eu/?Page=nessi_summit_2014

[5]. Andrew SsegawaKiggundu (2013), How can Big Data benefit SME's in developing African Countries?, MSc. Thesis, Univesity of Botswana.

[6]. Safiriyu, AdijatMorenikejiandNjogo, BibianaOluchukwu (2012), Impact of small and medium scale enterprises in theGeneration of employment in Lagos state, Kuwait Chapter of Arabian Journal of Business and Management Review Vol. 1, No.11; July 2012.

[7]. Snodgrass. D. R & T Briggs (1996), Industrialization and small Firm Patterns and Policies, A co-publication of the international Center for Economic growth and Harvard Institute for International Development. San Francisco, California.

[8]. Little, M.D.; Mazumdar, D. and Page, J. M. (1987). "Small Manufacturing Enterprises: A comparative study of India and other Economies, Oxford, Oxford University Press.

[9]. Organisation for Economic Co-Operation and Development (OECD) (2004).OECD Principles of Corporate Governance. Available OECD Publications Service, Paris Cedex 16, France

[10]. Ayyagari, Meghana and Demirgüç-Kunt, Asli and Beck, Thorsten (2003), Small and Medium Enterprises across the Globe: A New Database. World Bank Policy Research Working Paper No. 3127. Available at SSRN: http://ssrn.com/abstract=636547.

[11]. Lawal, A. A.And Bello, M.A. (2010) Business Policy and Strategic Management. Lagos. Suhanif Nigerian Enterprises.

[12]. Schneider, Friedrich (2003): The shadow economy, in: Charles K. Rowley and Friedrich Schneider (eds.), Encyclopedia of Public Choice, Kluwer Academic Publishers, Dordrecht.

[13]. Osoba, A. M. (1987). Small-Scale Enterprises in the Development Process, In Osoba, A.M. (Eds.).Towards the Development of Small-Scale Industries in Nigeria, NISER, Ibadan. PP. 8-24.

[14]. Asta, L. &Zaneta, S. (2010). Sustainable development decision-making model for small and medium enterprises.Environmental Research, Engineering and Management. 2(52), 14-24

[15]. Ogunsiji, S. O. and Ladanu, W. K. (2010). Entrepreneurial orientation as a panacea for the ebbing productivity in Nigerian small and medium enterprises: A theoretical perspective. International Business Research, 3 (4), 192-199.
[16]. Oluba N. Martin (2009), Small and Medium Scale Enterprises and Economic Growth, Pakistan Journal of Business and Economic Review Vol. l. 2, Number 1 (2009).
[17]. Baadom, S. B.(2004). Fundamentals of Business Management in Nigeria.Port-Harcourt: AnoPublishers.
[18]. Yue, F. & Ma, L. (2008).Research on the sustainable development of technological innovation in small and medium enterprises.Pp 1051-1054