

# **How is Big data changing management thinking?**

Research paper

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# How is Big data changing management thinking?

## **Abstract**

This paper will review how giant companies, especially in the field of technology, utilizing the big amount of data available for managers today, to improve their product or create a new one, and how manager taking decision method has changed to rely more on the data gathered from different sources. This is also known as Fact-Based Decision Making or DDD (data-driven decision making) – no more taking decision based on guesses and gut feeling. Decision are taken based on the ordered process of real data analysis.

This essay support that with the wider availability of knowledge, all companies should invest in Big Data as a management tool, as a finding of researches found 5-6% increase over the market prediction.

## **Introduction**

“We never, ever in the history of mankind have had access to so much information so quickly and so easily.”

Vint Cerf, ‘father of the internet’ (quoted in Silva, 2009)

In recent years the term Big Data become common in business communication, entrepreneurs and almost everyone who wants to associate itself with innovative options that bring technological era.

This data can be found at any company, without the company even thinking to use it. The data can come from the sales figures of the company's own information, information from mobile devices, social networks, video cameras, surfing the Company's website, use of credit cards, public information, demographic information and more. Data from these sources are accumulated at a rate unimaginable and enormous amounts - terabytes and petabytes bytes.

The magic in Big Data is to know how to connect all source of information into insights.

## Literature Review

“In God we trust; all others bring data.” (W. Edwards Deming)

I. Chien-fa et al. (2014) Indicating that there is no clear definition of what Big Data is, however, most of the definitions concludes around the “four Vs”:

Volume – The huge amount of data the company collected and produced.

Velocity – The need for continuous and repeated analysis in real time.

Variety – Data comes in different forms. Some are harder to extract the information from.

Veracity – The human factor. How to collect data that is related to trust and uncertainty.

Gordon (2015) thought that it is not always clear how to translate all those data, amorphous and large-scale, to a real success. Gordon claims that with a little creativity and a lot of research and analysis, there is no limit to the potential application of conclusions derived from Big Data, especially in marketing, sales, and customer relationship management.

Professor Susan Athey (2013) claims that the vast knowledge accumulated in recent years in implementing such tools and databases inexhaustible enabled many organizations around the world to successfully adopt oriented management culture of the facts, and translated into huge improvements in performance and to generate real business value and significant. We witness increases in reports of enterprises using databases powerful lever for change: strengthening ties with customers and increase their loyalty, restructuring production and service processes, streamlining logistics, more cost-effective management of inventory and resources, and more. It's understood that changes as such, which could lead to a significant increase in revenue and/or cost-cutting, may eventually have considerable implications for the bottom line, in terms of the financial strength of the organization.

Jay Lee et al (2014) support the benefits of Big Data analysis as long as companies aware of the challenges which affects the whole organisation while implementing the changes, some of them are the key to the end result and must be carefully researched. The organisation will need to consider availability, continuity, ability to replicate the

solution to different levels, concern about the security of the organisation data. A detailed change management plan should be focusing on the human resource of the company. Big Data analysis takes a lot of the decision powers of managers is a relay on the manager and technical operator interaction to properly analysis pattern of customer behaviour. In this essay, I'll focus on 4 sectors to demonstrate the change or potential change that Big Data brings.

### **Big Data in Science and Technology**

Barua et al (1995) indicate that since the mid-1990s, it has been recognized that information technology is a significant driver of productivity at the business unit. We see emerging literature on the contribution of I.T. enterprise systems, such as ERP, CRM and cloud-based technology, to the abilities of companies to perform better and able to respond to a crisis quickly. With years of data collecting, Information technology in companies managed to collect historical data of the company, which is very hard to access without the use of a Big Data facilities. Up to recent years, this was only available to giant companies who can invest in this technology. Today a manager is able to analyse data in a based on a custom, to the point, reports that were designed for managers and decision makers. Social network Facebook has enormous amounts of valuable information stored in its server farm. Most waiting there without being used daily. Though Facebook uses some of this information to tailor advertisements to us, not much beyond that. Facebook recently started to allow its users to enjoy this information when it launched the Graph Search. Which allows users to access most of the data stored on Facebook to help servers from the comforts of their home. Access such as this was up to recent years was only available to high-end managers and was very costly. The ability to analyse data based on the known pattern allows producing reports that are eliminating known information or one that should already be known to the manager.

### **Big Data in Marketing**

Chen et al. (2012) tried to arrange the benefits in 3 categories by acknowledging that in the past, marketing managers had only partial access to information about the target audience of their products and about the effectiveness of various marketing activities. Their decision was based largely on intuition and gut feelings rather than the full accurate data. The 3 areas where having the Big Data information help marketing decisions:

Better knowing the customer - One of the most important elements in marketing for companies of all sizes is familiarity with customers. Big Data and Business Intelligence solutions allow marketers to understand their customers better than ever before. With these solutions, marketing managers can know who their customers are, what they want, how they prefer to be addressed to them and when. If you get to know your customers and give them the service they need, it is likely that they will stay with you longer and be interested in other transactions.

Customer retention - Trust is one of the most essential elements in preserving customers. Big Data and BI solutions enable managers and marketing staff to find out what affects the sense of trust of customers and prepare to get them to stay loyal to the company and its products. Collection and analysis of information, which includes social networks, purchasing patterns and browsing data network, will allow managers to know what is interesting to their customers.

Optimization of marketing channels - Analysis of customer experience throughout is essential to develop solutions for different channels. Big Data solutions using business intelligence and data allows managers to get real-time insights, be effective and useful than the weekly sales meeting.

### **Big Data in Security**

Chen et al. (2012) also covered the area of how the security arm forces changed their operations by benefits from Big Data analysis information, which allow them to minimise the need of human collecting information, that is now available on the net. In recent years we witness an increase of terrorist acts around the world that was driving by the ability of the terrorists and criminals to use social networks and other means to communicate. Researchers in computational science, information systems, social sciences, engineering, medicine, and many other fields have been called upon to help enhance our ability to fight violence, terrorism, cyber-crimes, and other cybersecurity concerns. Australia government invested \$88 million in 2014 to build the Data to Decisions CRC (D2D CRC) to boost Australia national security. The Data to Decisions analysts are building tools to maximise the filths of Big Data to support the Australian defence force. The prediction is that in the coming 5 years the evolutions of tools to predict events will improve preventing of criminal acts such as credit cards and online frauds, and will help managers assign resources to other areas.

## **Big Data in Healthcare**

Raghupathi W, Burghard C (2014) suggested that by definition, big data in healthcare refers to electronic health data sets so large and complex that they are difficult (or impossible) to manage with traditional software and/or hardware; nor can they be easily managed with traditional or common data management tools and methods.

Health Data Collection on a global scale has always been an imperfect science. Workers had to walk between villages, knock on doors and ask questions in order to obtain the desired information. This information was written on paper forms, which they were fed to a computer to accept the conclusions and decisions in the future.

Jay Lee et al. (2014) suggested that using Big Data technology can reduce the need of operator of machines to work closely to a machine that potentially can harm the operator. Currently, machine operators control the machine while managers control the operation of the machines, designing the way they work and assigning tasks for the machine. By using centralized Big Data information, healthcare provider, from small to large, can benefit from being able to access early warning about diseases, help to prevent individual or population healthcare frauds.

## **Conclusion**

The findings in this essay show that using information gathered from Big Data sources can improve the performance of the company. The big benefit for the organisation is shown by the improvements in key areas of management. Managers don't need to rely only on their gut feeling, they have a fast, easy way to access up-to-date information, responded to events or crises in real time, and in most of the time, and the right tools, be able to get alerts on potential issue before it becomes one, and respond to customer needs quicker. Hiring managers with knowledge of Big Data analysis can benefit companies for the short and long run.

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**Summary table:**

<b>Title of the article and its citation</b>	<b>The key point discussed in paper</b>	<b>Relevance to the topic</b>	<b>Student personal comments</b>
<p>Erik Brynjolfsson, Lorin M. Hitt, and Heekyung Hellen Kim, "Strength in numbers: How does data-driven decision making affect firm performance?" Social Science Research Network (SSRN), April 2011.</p> <p><a href="http://ebusiness.mit.edu/research/papers/2011.12_Brynjolfsson_Hitt_Kim_Strength%20in%20Numbers_302.pdf">http://ebusiness.mit.edu/research/papers/2011.12_Brynjolfsson_Hitt_Kim_Strength%20in%20Numbers_302.pdf</a></p>	<p>They examine whether firms that emphasize decision making based on data and business analytics show higher performance.</p>	<p>The benefit in investing in Big Data analysis</p>	<p>This article supports the argument of the necessity for Big Data.</p>
<p>Barua, A., Kriebel, C.H., and Mukhopadhyay, T. 1995. "Information Technologies and Business Value: An Analytic and Empirical Investigation,"</p>	<p>Discuss the question whether the anticipated economic benefits of Information Technology are being realized in the emerge of Big Data information.</p>	<p>Support the argument of the need for an organization to invest in I.T. management and security applications.</p>	<p>I see on a daily basis the increasing need for reports for managers. Allowing them to generate these reports themselves, will free up I.T. time to improve and develop the systems.</p>

Information Systems Research (6:1), p. 3.			
W. Raghupathi, V. Raghupathi. Health Information Science and Systems 2014, 2:3 <a href="http://www.hissjournal.com/content/2/1/3">http://www.hissjournal.com/content/2/1/3</a>	The potential of big data analytics in healthcare.	Review the importance in Big Data analysis especially in healthcare, as they have a lot of historical data and can help prevent the mass spread of disease.	Seems like healthcare can be the big beneficial of Big Data analysis, however, as they are not a profit based sector, the big investment is a “roadblock”.
Jay Lee, Hung-An Kao, Shanhu Yang. Service innovation and smart analytics for Industry 4.0 and big data environment. Procedia CIRP Volume 16, 2014, Pages 3–8	This paper addresses the trends of manufacturing service transformation in the big data environment	Discuss how Big Data can help organisations achieving transparency and productivity	The author's review of the Big Data trends, show the profitability of the organisation in the short and long run.
Gordon S. Linoff, Michael J. A. Berry. Data Mining Techniques: For Marketing, Sales, and Customer Relationship management. 2011.	The chapter discusses how to harness the newest data mining methods and techniques to solve common business problems.	Contribute to the general understanding of the challenges for a manager using big data.	I used a chapter from this book as I couldn't find a journal that can review it so profoundly.