

# The Roles of Big Data and Knowledge Management in Business Decision Making Process

**Siti Hajar Mohd Mokhtar and Safawi Abdul Rahman**

Faculty of Information Management, University Technology of Mara, UiTM Selangor, Malaysia

DOI: 10.6007/IJARBSS/v7-i12/3623 URL: <http://dx.doi.org/10.6007/IJARBSS/v7-i12/3623>

## **ABSTRACT**

The decision-making process is marked by several kinds of elements which related to and must be made and aligned with the companies' strategies. There are toolsets such as analysis of decision, data repositories and information systems used to aids the decision making process. Besides, investment on big data wills enhancement performance of many different processes in an organization and making the effective decision process. However, in the literature and reviews of big data and knowledge management have a few reviews on the roles of both big data and knowledge management on the influences of business decision – making processes. The main objective of this paper is to identify the roles of big data and knowledge management in decision making process.

**Keywords:** *Big Data, Business Intelligence, Knowledge Management*

## **INTRODUCTION**

Big data is vigorous to organizations as more data would lead to a more accurate analysis. The accurate analysis can prompt to more effective and efficient decision – making for the decision maker. In making an effective strategic decision (Ali and Simone, 2017) stated that the managers required to have critical abilities in order to lead their organization in the progressively volatile and to faces the competitive business world. McAfee et al., (2012) argue that one of the objectives of knowledge management is to assimilate data from different perspectives and analyse them to extract value for effective decision making. For instance, one of the foremost travel website, expedia.com (Expedia.com.my, 2017) has invested a large amount of money to use big data analytics to generate valuable insights from the huge amount of data that is generated from everyday use of the site. They analyse the market strategies that attract the customers who visit their website and establish a related relationship between their adopted strategies and customers' response. In this manner, the company generates useful insights by analysing the big data and decides on how to use this valuable information in improving business strategy.

However, what is lacking in the literature and reviews of big data and knowledge management is a research and reviews on the roles of both keyword on the influences of business decision – making processes. This present a gap that this research intents to bridge. This work seeks to outline a comprehensive view of the roles of big data and knowledge management towards business decision making.

## **LITERATURE REVIEW**

Big data will be imperative to business organizations since more data and information can make the more exact analysis which can thus prompt more sure to decision - making process. As acknowledge by Bernam (2013), big data is an apparatus or tools to help the decision - maker in processing the decision by utilizing technology to quickly analyse the huge amount of data came from different type and diversity of sources in producing a torrent of actionable knowledge. Initially, big data (Jagadish et al., 2014; Watson and Marjanovic, 2013) specified by the Volume, Velocity and Variety, which fill as a refinement between traditional data set and big data. Recent literature had addition of Veracity and Value in the element of big data (Sathi, 2012; Jagadish et al., (2014). From this statement, big data is characterized by volume, velocity, variety, veracity and value that can generated in supporting and enhancing the decision making.

As from previous literature, stated big data had presented a variety which spreads beyond structured data. According to (Shorfuzzaman,2017) the big data shows variety which reaches out past organized data or information, including unstructured or semi-structured data from various types (audio, text, videos posted online and digital pictures) is incompatible for the distinctive relational database action (Elgendy and Elragal, (2014) This big data also delivered with incredible velocity and should be captured and prepared or processed rapidly as in the case of making a real - time of decisions.

Recent literature highlighted the additional (value and veracity) in the definition of big data. Which Huang et al., (2015) see the value of the data that were collected as such some of data of economic value will differ reliant on the source of the data and it is used. Yet other researchers (Chen et al., 2014) refer veracity to the precision and reliability of data and the method of analyzing that data. Big data is apparent by researchers and experts as a chance to enhance the decision-making, creating significant experiences and increase competitive advantage (Davenport, 2013; Delen and Demirkan, 2013).

## **THE ROLE OF BIG DATA TOWARD BUSINESS DECISION MAKING**

Business Intelligence (BI) covers all the processes involved in extracting useful and valuable and information from the various data that exists within a distinctive organization to support the decision-making process. In point of fact, competitive intelligence can be viewed both as a process and a product (Chang, et al.,2014; Yap, et al.,2013). Where from the process perspective, the main objective of business intelligence to support the process of decision - making and reduce the time spent on the decision that need to be solved (Chang, et al.,2013). For this to happen, it necessary to implement and defined all the set of basic components regarding. Next, from the product perspective, the business intelligence is the Information Technology (IT) component that stated to set of basic components and used core engine of Decision Support System (DSS) to create analytics for manager used as the decision-makers.

From the perspective of Poletto et al., (2015) they argued that business intelligence also is part of decision - making process. Where, by referring to Simon's model, intelligence is the first step that will be used in the process of decision making. In this phase, the decision maker will identify or make the perception that there have several problems that need to be solved by

applying the problem structuring methods. To be added according to Poletto et al., (2015) mention in their research stated that the tools of Business Intelligence (the concept of business intelligence can be present as centered on data analytics in supporting the decision - making process and another one is focusing on technologies and tools for storing the data and excavating for knowledge discovery) also can be used in supporting the opportunities that been discovered by the organization for decision making by including advanced analytic and the integration of data. So, as well as problem - solving, the addition of decision opportunities can be added to the set of assistances that Business Intelligence can use in supporting the decision. As indicated by Azma et al., (2012) Business Intelligence (BI) can cover all the procedures associated in extracting the valuable and helpful data from the mass of information that existing within the organization in supporting the process of decision making. To be added, Business Intelligence Systems (BIS) are the tool that establishes from the combination of the process of IT solution and knowledge from the expert so from that it can be used in operating the business, incorporation and acquired the organizational management so it can give a result of intelligent decision making for the organization.

#### **THE ROLE OF KM TOWARD BUSINESS DECISION MAKING**

Previous literature emphasized that mostly the decision – makers had rely on knowledge management when the decision is making, which adequately lead to practical decisions. This statement clearly mentioned by Alberts et al., (2006) in their articles, where more knowledgeable that organization, which means from large number of individual, can distribute the right decision, rather than only one individual which less knowledge is present. As supported by Borgonovo (2006), that knowledge can be used by management in maintaining the power, renew and develop available resources and asset. This means, organization that have more knowledgeable persons, can make an effective decision rather than just one person that make a decision.

The value of the knowledge in decision – making is depends on how well it has been distinct for the proposed use and how effective it can be used and give impact for future choices and used. Knowledge management (Mohammed and Jalal, 2011) has allowed a dynamic task of decision rights, where it actually depend on the situation, involvement of people from various level in management in accessing to the decision making process. According to (Weatherly, 2002; Iglesias, 2005) the requirement of adequate resources and skills as well as an evidence-based approach to make a decision is a must for the successful operation or utilization of economic evaluation knowledge. Because the most valued of knowledge utilization in the organization, the most effective and efficient decision can be making, where that valuable knowledge can only be achieved by improving and enhancing the resources (Barney,2002). As for that the organizations need to select the best information and knowledge that need to be use so it can achieve to an effective decision and also for organisation to become a knowledge-base, it should understand the value of the information.

Knowledge sharing also part of knowledge management practices that mostly been applied by the employees that willing to share for the successful of organization. Miettinen and Korhonen et al., (2005) disputes the operation or utilization of varied knowledge is voluntary or

the willingness of a person, and it also depending to the initiative and willingness of decision – maker to use it. Still, the manager or top management should motivate their employees to share their knowledge and come up with new ideas in order to help the organization to achieve their determined benefits. Furthermore, (Minbaeya, 2005) mention that the member of organizational need to have some shared language, basic skills, technical knowledge and constructed through effective people management practices. As a result, if the organization does not have practices of formal knowledge sharing the possibility to left behind or fail to leverage its employees' intellectual capital for business growth and innovation and also this knowledge sharing practices enable the exchange of experience, the transfer of knowledge among the employees and clients to underneath the competitive advantage since it will affect the decision that will take in improving the quality of service provided by the organization.

### **METHODOLOGY**

For this study, grounded theory (GT) – a qualitative research method- has been used due to the available and interrelated data that could be used to facilitate the generation of theoretical results (Locke, 2001). The data used in this paper is a combination of cases and review from previous research and present study. The reviews and cases were selected through search process in popular online databases such as Emerald, ScienceDirect, Ebsco Business Source Complete and google scholar that match or related with keywords, namely, big data, knowledge management and business decision making. This search paradigm is based on an in-depth qualitative study that has some similarities to ethnography (Atkinson, 1990) and other forms of research that derive their theoretical outcome from naturally occurring data (Marshall and Rossman, 1989). To analyze data for this research, data from the case studies and reviews were collected and in-depth review study was developed.

### **DISCUSSION**

Most business organizations today have some of business intelligence activities whether performed it formally or informally. The organization need to have formalized business intelligence system to systematically conduct competitive intelligence activities because it seen to be vital in making effective business decisions and it will help businesses to be more familiar to changes in the business environment.

The organizations can obtain a lot of benefits when the knowledge acquire is managed effectively for instance it can improve customer satisfaction, enhancing the quality of product that been produce and so on. Therefore, effective knowledge management plays important roles in decision – making process and compatibly guiding the strategic plan for knowledge – based organizations in the context of maintainable competitive advantage. Besides, KM involves activities or procedures creation of knowledge and distribution in achieving different objectives of an organization for instance, the success of the business, the improvement of employee's performance and accomplishing competitive advantage.

## CONCLUSION

Organizations have realized the importance of huge amount of data that are collected to make enhanced decision. Likewise, from the review, it demonstrates that big data can create new possibilities and immense opportunities for the organizations to manage knowledge effectively. This paper attempts to identify and discuss the roles of big data and knowledge management and make extensive contribution in linking these two concepts in enhance decision-making. Besides, the high volume, velocity and variety of big data play critical roles in informing and enhancing the quality of strategic decisions which should not be underestimated.

## REFERENCES

- Agarwal, R. and Dhar, V. (2014). Editorial – big data, data science, and analytics: the opportunity and challenge for IS research, *Information Systems Research*, 25(3), 443-448.
- Alberts, D. S., & Hazes, R. E. (2006). *Understanding Command and Control*. CCRP, Washington
- Ali, I and Simone G. (2017). Information and reformation in KM systems: big data and strategic decision-making", *Journal of Knowledge Management*, 21(1),71-91
- Atkinson, P (1990). *The Ethnographic Imagination: Textual Constructions of Reality*, London, Routledge
- Azma, F., Mostafapour, M.A. (2012), Business intelligence as a key strategy for development organizations. *Procedia Technol.* 1, 102–106
- Barney, B. (2002). *Gaining and Sustaining Competitive Advantage*, 2nd Ed. NJ, Prentice-Hall.
- Barton, D. and Court, D. (2012). Making advanced analytics work for you. *Harvard Business Review*, 90(10),78-83.
- Bassi, L.J. (1997). Harnessing the power of intellectual capital. *Training and Development*, 51,25-30.
- Berman, J.J. (2013). *Principles of Big Data Preparing, Sharing, and Analysing Complex Information*. Elsevier, Waltham
- Borgonovo, E. (2006). Measuring Uncertainty Importance: Investigation and Comparison of Alternative Approaches. *Risk Analysis*. 26(5), 1349-1326.
- Bose, R. (2009). Advanced analytics: opportunities and challenges. *Industrial Management & Data Systems*, 109(2), 155-172.
- Brown, M. S. (2014). Big Data, Mining, and Analytics. Components of Strategic Decision Making. In S. Kudyba (Ed.), *Big Data, Mining, and Analytics. Components of Strategic Decision Making Boca Raton: CRC Press Taylor & Francis Group*, 211- 230.
- Chang, Y.-W., Hsu, P.-Y., Shiau, W.-L. (2013). An empirical study of managers' usage intention in BI. *Cogn. Technol. Work*,16, 247–258
- Chang, R.M., Kauffman, R.J., Kwon, Y.(2014). Understanding the paradigm shift to computational social science in the presence of big data. *Decision Support Syst.* 63, 67–80
- Chen, M., Mao, S. and Liu, Y. (2014). Big data: a survey. *Mobile Networks and Applications*, 19(2),171-209.

- Davenport, T.H. (2013). Analytics 3.0. *Harvard Business Review*. 91(12), 64-72.
- Delen, D. and Demirkan, H. (2013). Data, information and analytics as services. *Decision Support Systems*, 55(1), 359-363.
- Huang, T., Lan, L., Fang, X., An, P., Min, J., and Wang, F. (2015). Promises and Challenges of Big Data Computing in Health Sciences. *Special Issue on Computation, Business, and Health Science*, 2(1), 2-11.
- Izhar, T.A.T., and Shoid, M.S.M, 2016. A Research Framework on Big Data awareness and Success Factors toward the Implication of Knowledge Management: Critical Review and Theoretical Extension. *International Journal of Academic Research in Business and Social Sciences*, 6 (4), 325-338.
- Izhar, T.A.T., Shoid, M.S.M., Baharuddin, M.F., Mohamad, A.N., and Ramli, A.A.M.(2017), Understanding Big Data to Improve Knowledge Management Practices: Gaps and Limitations. *The Social Sciences*, 12(2), 241-244.
- Jagadish, H.V., Gehrke, J., Labrinidis, A., Papakonstantinou, Y., Patel, J.M., Ramakrishnan, R. and Shahabi, C. (2014). Big data and its technical challenges. *Communications of the ACM*, 57(7),86-94.
- Locke, K. (2001). Grounded theory in management research. London: Sage Publications
- Manyika, J., Chui, M., Brown, B., Bughin, J., Dobbs, R., Roxburgh, C., and Hung Bayers, A. (2011). Big data: The next frontier for innovation, competition, and productivity.
- Marshall, C., & Rossman, G.B. (1989). Designing qualitative research. Newbury Park, CA: Sage Publications
- McAfee, A., Brynjolfsson, E., Davenport, T. H., Patil, D., & Barton, D. (2012). Big data. The management revolution. *Harvard Bus Rev*, 90(10), 61-67.
- Miettinen, M., and Korhonen, M. (2005). Best practice recommendations and decision making support in health care processes: how best practice recommendations are used and how healthcare professionals view decision-making support. A case report.
- Miller, H.G. and Mork, P. (2013). From data to decisions: a value chain for big data. *IT Professional*, 15(1), 57-59.
- Mohammed, W., and Jalal, A. (2011). The Influence of Knowledge Management System (KMS) on Enhancing Decision Making Process (DMP). *International Journal of Business and Management*, 6(8), 216-229.
- Petter, S., DeLone, W. and McLean, E.R. (2012). The past, present, and future of IS success. *Journal of the Association for Information Systems*, 13(5).
- Sathi, A. (2012), *Big Data Analytics: Disruptive Technologies for Changing the Game*, Mc Press, Boise.
- Shorfuzzaman, M. (2017). Leveraging Cloud Based Big Data Analytics In Knowledge Management For Enhanced Decision Making in Organizations. *International Journal of Distributed and Parallel Systems (IJDPS)*, 8(1).

Watson, H.J. and Marjanovic, O. (2013). Big data: the fourth data management generation. *Business Intelligence Journal*, 18(3), 4-8.

Weatherly, H., Drummond, M., and Smith, D. (2002). Using evidence in the development of local health policies: Some evidence from the United Kingdom. *International Journal of Technology Assessment in Health Care*, 18(4), 771-81.

Yap, C. S., Rashid, M.Z.A. & Sapuan, D.A. (2013). Strategic Uncertainty and Firm Performance: The Mediating Role of Competitive Intelligence Practices, *Journal of Information & Knowledge Management*,12(4), 1–14.