# Chapter 1
# Big Data and Cloud Computing:
## A Review of Supply Chain Capabilities and Challenges

**Marcus Tanque**
*Independent Researcher, USA*

**Harry J Foxwell**
*George Mason University, USA*

## ABSTRACT

*Big data and cloud computing are transforming information technology. These comparable technologies are the result of dramatic developments in computational power, virtualization, network bandwidth, availability, storage capability, and cyber-physical systems. The crossroads of these two areas, involves the use of cloud computing services and infrastructure, to support large-scale data analytics research, providing relevant solutions or future possibilities for supply chain management. This chapter broadens the current posture of cloud computing and big data, as associate with the supply chain solutions. This chapter focuses on areas of significant technology and scientific advancements, which are likely to enhance supply chain systems. This evaluation emphasizes the security challenges and mega-trends affecting cloud computing and big data analytics pertaining to supply chain management.*

## INTRODUCTION

Big data and cloud computing are technologies that continue to gain customers' attention. These technologies, provide a wide range of capabilities to numerous global clients: resources, services, applications and Internet. In recent years, vendors i.e., Microsoft, IBM, Oracle, Yahoo, Google, Amazon, eBay, GoGrid, 3Tera, Salesforce, Zoho, CloudPassage among others are leasing their cloud-based computing solutions and big data services to many organizations (Leighon, 2009). These service signatures are based on each organization's requirements, including the volume of storage capacity that is required to provision or store data. Whereas virtualization and grid computing technologies have perfected cloud and big data services. Vendors continue to refine and plan for groundbreaking IT solutions to satisfy

customer's requirements (Gartner, 2009; Gartner, 2012). The adoption of cloud solutions and big data analytics comprises a number of business and technology factors applicable to supply chain systems. To effectively align with the adoption of cloud-based solutions and big data analytics, decision makers must first evaluate their offered financial resources as a key factor for implementing innovative products (Gartner, 2009; Gartner, 2012; Leighon, 2009). Decision makers should also view the total cost owner-ship, as alternate strategic factor toward the implementation of new information technology solutions. It is common for organizations to lease commodity computer system hardware and application software appliances from cloud service providers or managed service providers. Commissioning these informa-tion technology resources i.e., servers, bandwidth, storage & network systems, and applications, offers business the ability to reduce their capital and operational expenditures (Leighon, 2009).

## BACKGROUND

Big data and cloud computing offer organizations relative and cost-effective advantages. Aside from cloud and big data technology continuous adoption, decision makers are concerned about user's privacy and data security/protection (Gartner, 2009; Gartner, 2012). Privacy and data protection are both vital IT solutions for logistic functions and supply chain. Any violation of business and IT infrastructures could impact an organization's productivity. High security for distributed systems in supply chain can be regarded as superior solutions for protecting the enterprise IT infrastructures that are physically dispersed in several locations worldwide. The advantages big data and cloud computing have include: cost-effectiveness, pay-per-use, rapid readiness of resources, acquiring extra bandwidth, hardware and software resource-leasing. Through proportional and economic advantages, organizations have the option for not acquiring extra IT computer system hardware and applications software. Cloud services providers or managed service providers are responsible for ensuring that scalable technology is developed that can fulfill information technology and supply chain organizations' requirements (Gartner, 2009; Gartner, 2012).

## MAIN FOCUS OF THE CHAPTER

For many years, big data and cloud computing contributed for the convergence of supply chain systems. Big data and cloud computing are defined as areas the industry should research on due prevalent issues affecting a range of services associated with these technological solutions. Vendors should also give precedence to the following big data elements: data acquisition, management and analytical mechanisms (Cooper & Mell, 2012). In spite of several investigations and findings related to big data analytics, more research attention is required. Big data is still a growing area where further research must be done to at-tract more information technology stakeholders and supply chain organizations (Cooper & Mell, 2012). Over the course of years, several dynamic supply chain systems have converged with cloud computing, big data analytics, computational models, and cyber-physical systems (Gartner, 2009; Gartner, 2012). To deliver these augmented supply chain management solutions, vendors should adopt agile IT based solutions. Augmented challenges in the globalized financial markets encouraged many corporations, to leverage on their supply chain capabilities required to augment the way IT infrastructure and processes are being deployed (Gartner, 2012; Gartner, 2009; Buyya, et al., 2015). The introduction of big data

## Related Content

Towards Clinical and Operational Efficiency through Healthcare Process Analytics

Vassiliki Koufi, Flora Malamateniouand George Vassilacopoulos (2016). *International Journal of Big Data and Analytics in Healthcare (pp. 1-17).*

www.irma-international.org/article/towards-clinical-and-operational-efficiency-through-healthcare-process-analytics/171401

Analysis of Heart Disease Using Parallel and Sequential Ensemble Methods With Feature Selection Techniques: Heart Disease Prediction

Dhyan Chandra Yadavand Saurabh Pal (2021). *International Journal of Big Data and Analytics in Healthcare (pp. 40-56).*

www.irma-international.org/article/analysis-of-heart-disease-using-parallel-and-sequential-ensemble-methods-with-feature-selection-techniques/268417

Improvement in Task Scheduling Capabilities for SaaS Cloud Deployments Using Intelligent Schedulers

Supriya Sawwashere (2021). *International Journal of Big Data and Analytics in Healthcare (pp. 1-12).*

www.irma-international.org/article/improvement-in-task-scheduling-capabilities-for-saas-cloud-deployments-using-intelligent-schedulers/287104

Unstructured Healthcare Data Archiving and Retrieval Using Hadoop and Drill

Hang Yue (2018). *International Journal of Big Data and Analytics in Healthcare (pp. 28-44).*

www.irma-international.org/article/unstructured-healthcare-data-archiving-and-retrieval-using-hadoop-and-drill/223165

What the 3Vs Acronym Didn't Put Into Perspective?

 (2019). *Big Data Analytics for Entrepreneurial Success (pp. 28-60).*

www.irma-international.org/chapter/what-the-3vs-acronym-didnt-put-into-perspective/216180