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Big Data Applications in Logistics: A Brief Review

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Purpose of the paper

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The purpose of this paper is to concisely review the literature on Big Data and provide a few insights on its possible applications in logistics activities. As such, we conducted a review on the literature regarding the definitions and characteristics of Big Data, identifying the main challenges and benefits related to its applications in the logistics field.

Structure of the paper

- Introduction
- Big Data analytics – Definitions and main characteristics
- Main benefits and challenges of using Big Data in logistics
- Role of Big Data in logistics processes
- Conclusions and research limitations
- References

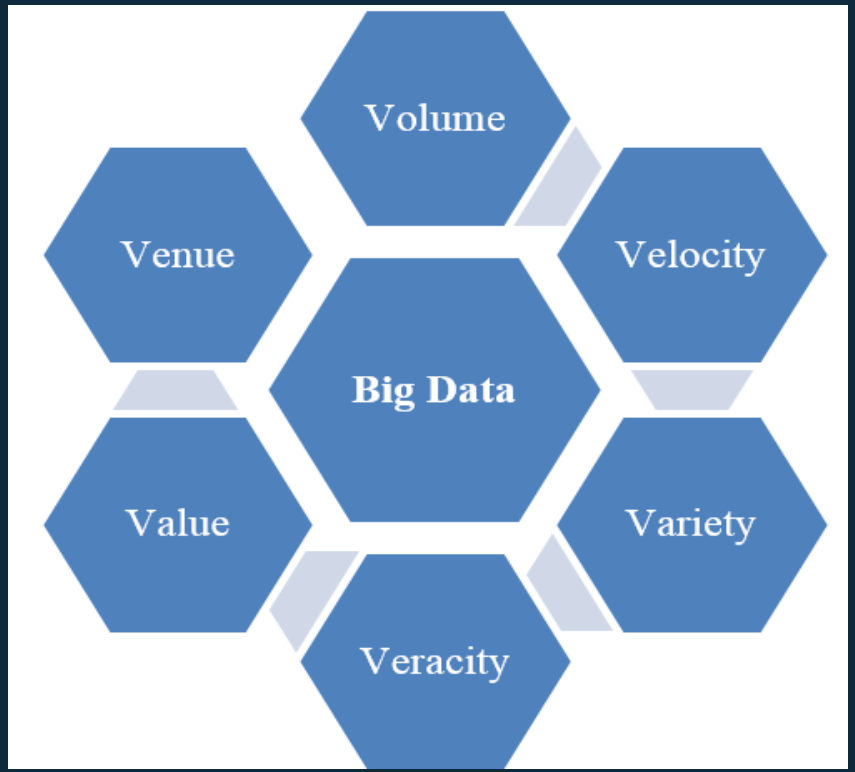
Introduction

- Information – the fourth production factor, alongside resources, labour and capital, and a vital factor that thoroughly influences the competitiveness of a business (Talari, 2018)
- Big Data (BD) has revolutionized the way many activities are carried out nowadays and logistics is one of the industries in which BD exploitation has an incredible potential.

Literature review

- Big Data (BD) can be defined based on large volumes of extensively varied data that are generated, stored and processed at high speed (Laney, 2001)
- Two main characteristics that influence the possibility of creating value for the company by using BD: portability and interconnectivity (Gunther et al., 2017)
- Given the large amount of data which sometimes is very different in structure and sources, the aggregating and structuring processes can be very complex, so companies need business intelligence software programs to help manage their logistics analytics (Lebied, 2018).

6Vs Big Data characteristics starting from the 5Vs model



Source: Authors' representation based on information from Bello-Orgaz et al. (2016) and Herrero (2015)

Main benefits and challenges of using Big Data in logistics

Benefits

- real-time monitoring of shipments and inventory
- identifying market trends, customer preferences and buying habits
- generating information that can be useful in strategic and operational decisions for a company

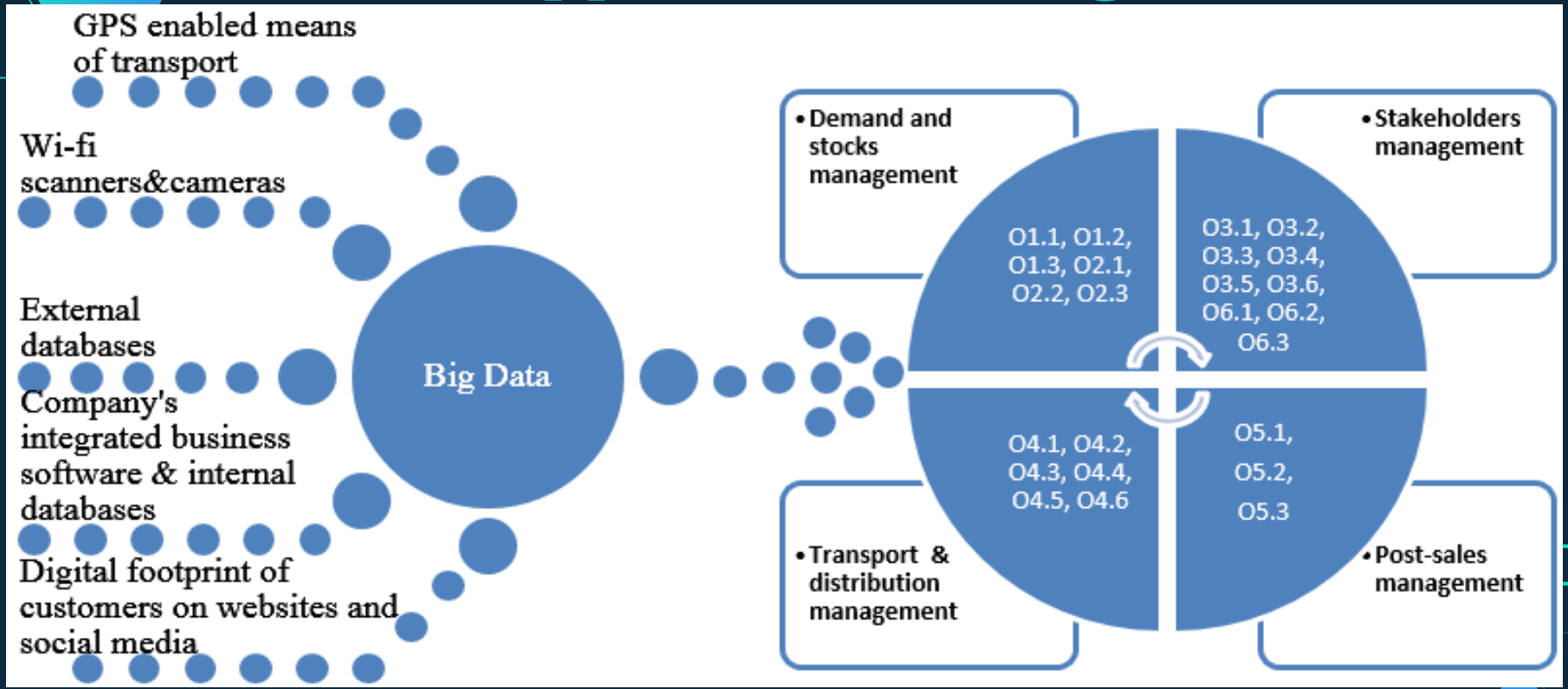
Challenges

- keeping data security
- identifying the useful data for various business decisions
- challenges related to characteristics of data: scalability, availability, integrity, quality, origin or source, traceability, heterogeneity, bias, privacy, and legal issues.

Role of Big Data in logistics processes

- The inclusion of information technologies (IT) into the management of business processes shows that Big Data has a decisive role in each stage of the logistics or supply chain associated activities
- Especially when investigating the companies that have a large number of customers around the world, the logistics activities are now intimately related to Big Data analytics.

Main Big Data sources and applications in logistics



Source: Authors' conception and representation.

Research limitations

Our research is not exhaustive; we consider that the subject is extremely wide and although we identified a relevant set of studies that helped us gain insights in the field of Big Data applications in logistics, there are certainly additional characteristics, benefits and challenges to be further studied.

Conclusions (1)

- There has been a lot of research dedicated to exploring the applications of Big Data in all economic, social and political fields.
- In the logistics industry, applications for Big Data can bring a lot of benefits in terms of real-time monitoring of shipments and inventories, identifying market trends, recognizing customer preferences and their corresponding buying habits, information that can be useful in strategic and operational decisions at organizational level.

Conclusions (2)

- The management of vast volumes of data also poses major challenges for companies (like data usefulness, efficiency and suitability related problems), in order to generate valuable information for the future development of the business.
- Managers must recognize the importance of exploiting Big Data and transform it into valuable knowledge that can be used to increase the company's competitiveness, but they should be also aware of the related challenges that come together with the BD advantages.

Thank you for your attention!

Any questions?

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