This paper addresses the critical challenges faced by businesses in the era of big data (BD), marked by the unprecedented growth in the volume, variety, and velocity of data. Traditional systems, overwhelmed by this data deluge, have paved the way for the development of BD systems designed to offer a competitive edge. However, the adoption of these systems has been fraught with challenges, leading to a mere 20% success rate among companies attempting to implement BD projects. These challenges span organizational culture, rapid technological changes, system development, data architecture, and engineering.

To combat these issues, the paper proposes a novel approach: a domain-driven decentralized BD reference architecture (RA). Developed in accordance with empirically grounded guidelines for reference architectures, this artefact aims to streamline the development, architecture, and engineering of BD systems. The paper thoroughly evaluates the proposed RA through a real-world scenario, culminating in the creation and utilization of a prototype to address a practical problem. The findings highlight the RA's applicability and provoke discussion on architectural trade-offs and challenges, offering valuable insights for organizations striving to harness the power of big data effectively.