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Does Covid-19 help Sustainable Business Configuration through Big-Data Analytics (BDA)?

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Abstract
During the Covid-19 pandemic, a new age digital era has emerged; the Big-data Analytics (BDA) could be instrumental in keeping this new virus within reasonable limits. Beside, BDA has the potential to transform firms to implement sustainable business practices. So, the main target of the study is to analyze BDA focused sustainable business strategy by the lens of the Covid-19 emergency. A systematic analysis of literature has been executed to discuss the DBA focused sustainable business configuration triggered by pandemic, in which over 250 publications are read and reviewed by the authors. The analysis confirms that the Covid-19 emergency can be one of the most important drivers, influencing sustainable business configuration through the implementation of BDA. This pandemic sets the perfect platform for digitalization in business organizations to obtain sustainable accomplishments avoiding high infrastructure expenses. Prior empirical attempts are subsequently required to inquiry about the proposed conceptualization from different perspectives. The direction of the paper provides recommendations for businesses on how to remain competitive through BDA focused sustainable business strategies. This article is the first to discuss BDA focused sustainable business configuration to harness the hidden potential of the pandemic.

Keywords: AI, Competitive advantage, Covid-19, IoT.
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Introduction

A social and economic crisis that has targeted the center of regular human life is the coronavirus disease (Covid-19). It continues to propagate uncontrollably across the world; 2,403,888 individuals had been contaminated worldwide as of May 11, 2020 (WHO, 2020). The epidemic is expected to rise its peak in June 2020, diminishing only as of July 2020. The leaders of several countries agreed to save lives before saving the economy in response to the pandemic, declaring abrupt or staggering lockdowns in their countries. Policies such as "communal distancing" and "stay-at-home" have been enforced immediately, seriously affecting many firms across sectors (Donthu and Gustafsson, 2020, Vinuesa et al., 2020).). Covid-19 is characterized by a long duration of incubation, extreme infectivity, and difficulty detecting, culminating in a sudden outbreak and rapid epidemic growth. This scenario requires Big-data technologies to allow fast responses and evaluations, fast supply of disease dynamics information, and an understanding of the rules for disease production to provide timely guidance for decisions and interventions on prevention and control (Zhou et al., 2020). Several governments have adopted new security techniques in the fight against Covid-19 (Buckee, 2020). Big-data research on the mobility of people, disease transmission trends, and wellbeing surveillance may be used to help prevention initiatives. Indeed, a new modern era has emerged; artificial intelligence (AI) and analytics in Big-data may be influential in keeping this new epidemic within acceptable limits.

Data is not only about evaluating changes; the shift is often encouraged and catalyzed. Big-data resources include market analysis, market assessments, and value-creation (Das and Kumar, 2013). Big-data is currently evolved further scientifically to define corporate financial wellbeing. It is not possible to evaluate the importance of Big-data only by basic statistics (Sandhu and Sood, 2015). This will be useful if companies are able to establish the capacity to use emerging or smart technology in operational procedures. The capacities are data-driven and deliver advantages as follows: enhancement of the process of data creation (Duan and Xiong, 2015), heterogeneous data convergence suggested (Zhang et al., 2017), assimilation of various kinds of outcomes into the market process (Dubey et al., 2018), and the capacity to visualize data improves the decision-making process (LaDeau et al., 2017). Again, it must be noted that BDA can transform various types

of industries to apply sustainable practices more efficiently. BDA has a positive effect on supply chain efficiency and operation management (Wamba et al., 2017), green supply chain (Zhao et al., 2017), sustainable production outline (Dubey et al., 2016), sustainable procurement (Kaur and Singh, 2018), and improved market principles (Ajah and Nweke, 2019). BDA transforms industries and will enable them to adopt sustainable policies more efficiently (Dubey et al., 2016).

Sustainability researchers and other academics have just begun to explore the consequences of this emergency, owing to its recent growth. The epidemic of COVID-19 provides a rare opportunity to examine real-time impacts on the diverse directions of transformations in sustainability. More lasting adjustments related to digitalization are likely to cause by the long-term impacts of the Covid-19 pandemic (Kanda and Kivimaa, 2020). However, a number of recent studies addressed the connection between the Covid-19 emergency and the rise of Big-data (Agbehadji et al., 2020; Bragazzi et al., 2020; Wang et al., 2020) whereas only a few research activities analyzed the collaboration of Big-data and business sustainability under a globalized business context (Jeble et al., 2018; Raut et al., 2019). Only a small number of scholars have been able to systemize an acceptable course, given the interplay for future research expeditions within Covid-19 emergency, BDA, and sustainable business configuration (Sarkis et al., 2020). At this juncture, we argue that the Covid-19 emergency could carry the seeds of our sustainable business roadmap for a potential vision. The pandemic of Covid-19 has been classified as a black swan occurrence that caused any area of industry or human activities to have a ripple effect. Matter of regret, the research into simultaneously applying the influence of Covid-19 on sustainable business outline leading to the strategic configuration is still in its infancy (Donthu and Gustafsson, 2020). Our research objective is, therefore, to further explore how the Covid-19 pandemic will foster a stable framework for an organisation's future sustainable strategic architecture based on Big-data Analytics (BDA), in order to overcome these limitations. The understanding and expertise discovered are expected to further improve the conceptualization of this configuration that will guide politicians, supporting entities, IT consultants, entrepreneurs, and scholars in the sustainable business achievements leading to the digitalization realm (Industry 4.0).

The underlying role of this study is that the emergency of Covid-19 has an inherently beneficial component connected to the BDA facet of sustainable business planning leading to Sustainable Development Goals (SDGs). Here, sustainability is often related in management literature to the "triple bottom line" paradigm which includes economic, environmental, and social factors (Elkington, 1997). Through these concepts, it is clear that sustainability is a broad term that reflects on human societies' interactions with the natural world and future generations (Holmberg and Sandbrook, 2019). However, the overarching motivation of this paper is to add to the ongoing pool of studies on transdisciplinary approaches to business sustainability based on a socio-technical paradigm. This research explicitly takes as its starting point scholarly contributions based on sustainable business scenarios regarding the digitalization age and commenting on the potential use of appropriate Big-data Analytics in those setups.

Here, a detailed study of the literature is based on an earlier comprehensive overview of the fields of concern on which the authors of this paper have read and reviewed over 250 publications. We followed the recommended criteria for implementing a review process (Hart, 2001): a) identification of references, b) identification of applicable articles, and c) identification of similar item reviews. Different databases were selected: Web of Science (WoS), Scopus, Emerald, Science Direct, Springer, Sage, JSTOR and Mdpi, etc. This mix of database types helped us to compile an extensive list of associated publications. We checked the articles by reading their abstracts, and in some cases by reading the documents, by focusing on their importance to the topic. The Covid-19 equation activated sustainability because of emerging technology being very incipient in the business sector; hence, non-academic sources were also important and essential to help us understand the real situation. In this study of literature, reliability was aimed at providing methodological steps for carrying out a literature examination given by Hart (2001). We have carried out the structural review, and each of the interventions was presented before and then contrasted to boost inter-rater efficiency during the evaluation period (Seuring and Müller, 2008). The validity goal was to use sampling experiments based on current criteria (Hart, 2001) and to compare models or results from previously published literature reviews within and outside the field of research (Collin et al., 1996; Fagerberg et al., 2012).

Impact of Covid-19 on Business

In every area of the planet, the mentioned pandemic has already had drastic, rippling consequences across multinational business processes (Bofinger et al., 2020). Activities including direct contact between customers and service providers, for instance, have been adversely impacted by mobility and social distance constraints (Giritli et al., 2020). The collapse of the economy has also raised the uncertainties associated with household and company activities. Many firms are either facing failure or losing their production potential, leading to increased unemployment and underemployment (Bofinger et al., 2020). The prospect of a major rise in corporate and government debts is also enhanced by a prolonged lockout period, leading to fundamental financial imbalances that could delay the recovery period from the Covid-19 crisis (Donthu and Gustafsson, 2020).

Businesses operate faster through the crisis to gain a strategic edge (Lee et al., 2020). To address evolving challenges, organizations adopt strategies and structures that are sensitive rather than reactive to the challenge (Papadopoulos et al., 2020), and they turn to new customer-focused organizational models that are enabled by the right governance (Graves and Karabayeva, 2020, Lee et al., 2020). They are easier in determining whether to invest and capital reallocation. Furthermore, businesses are expected to develop different goods and services and to adapt radically to stay relevant, competitive and profitable (Bergman, 2020; Kim, 2020). Again, the Covid-19 crisis has severely affected the opportunity for innovation and prevented start-ups that may have been feasible in normal conditions (Kuckertz et al., 2020). A high number of start-ups are expected to go out of business in a few months, as the money and profits needed to support them is drying up fast (Bofinger et al., 2020). The pandemic-induced freeze has limited opportunities for direct contact and casual interactions leading to deleterious effects on the growth curves of start-ups. Also besides, the virus epidemic has paralysed the tourist sector, resulting in employment losses and crippling extremely tourism-dependent economies (Boulos and Geraghty, 2020).

According to the WTO (2020), trade in 2020 would fall by -13 percent or -32 percent. The recovery in 2021 is still unpredictable, and will focus on the length of the Covid-19 pandemic and the efficacy of policy responses (Evenett, 2020). Despite the closing of international borders, it is important to sustain trade flow to ensure access to vital products such as medicine and food, in addition to maintaining employment and economic activities (Ozili and Arun, 2020). The virus significantly impacts service trades and risks permanent shutdown (Garvey and Carnovale, 2020). Some service trades, such as information technology providers, are booming, though, so workers will work from home (Evenett, 2020). On the other part, about 3.3 billion people have been affected by the COVID-19 crisis (Monitor, 2020). People are reluctant to operate all over the world when they are asked to separate or quarantine themselves. Companies have prolonged layoffs and operating hours and lowered salaries due to lockdowns at Covid-19 (Dey and Loewenstein, 2020). If this crisis continues to affect industries in the coming years, fiscal, cultural , and technological changes will become crucial for survival.

Big-data Analytics (BDA)

Big-data, according to Zikopoulos and Eaton (2011), are massive data sets which can not be accessed by conventional DBMS (Database Management Systems) software. At this point, five V's of Big-data represents volume, velocity, variety, veracity, and value (Addo-Tenkorang and Helo, 2016). In our daily lives, the Internet of Things (IoTs), cloud computing (Côrte-Real et al. 2020), cellular sensor networks (Takaishi et al., 2014), and social media are often widely used concepts related to Big-data. There is no question that future socio-economic changes are all highly dependent on Big-data and associated technology and various methods of understanding. On the other hand, Big-data Analytics or BDA, in particular, involves collecting data in multiple formats from different sources. Data can come from the internet, social media, ERP networks, and cloud services, for example, and can be supported in text, graphics, audio, and video formats. Terminologies such as online analytics, social analytics, network analytics, text analytics, and multimedia processing are then created (Chen et al., 2012; Choi et al., 2018; Hu et al., 2014). Of all of the topical fields sponsored by Big-data Analytics, "forecasting" is perhaps the most straightforward and clear one if we intend to pick one to start with. Projections or forecasting historically rely heavily on historical evidence, expert advice and business knowledge (Mishra, 2018). There is no denying we are now in the age of Big-data. In all sorts of companies and industries, BDA is a form of necessity.

Big-data Analytics (BDA) challenges

Discussing Big-data within the sustainability domain is very complicated, from logistical or technological problems to legal and regulatory restrictions. In reality, companies are actively placing new approaches to decision-making, privacy concerns, and ethical principles that are important to data mining (Boyd and Crawford, 2012). High-cost infrastructures are one of the most important obstacles throughout Big-data deployment. Sivarajah et al., (2017) argued that human analyses should be conducted to sort data for useful knowledge building. To increase storage capacity and human skills, computer technology is needed. Akerkar (2013) also mentioned that data problems, workflow problems, and management challenges are the key disadvantages of Big-data. In this context, Arunachalam et al., (2018) reported that the operational difficulties are time-consuming, scarce funding, questions regarding privacy-security, behavioral problems, investment return problems. Again, BDA gives the industry a rare range of prospects. Few academic papers have concentrated on BDA's market and environmental aspects. From another angle, data convergence, data protection concerns, limited services, and technology are other sets of the Big-data problems (Kim et al., 2014). In fact, advanced BDA requires incredibly effective, agile, and scalable skills to overcome Big-data challenges (Sivarajah et al., 2017).

Ecosystem of Big-data Analytics

The players in the Big-data sector are not yet well related, unlike in other fields, and certain mechanisms or disruptive scenarios need to be in place to get them together. The big data value chain was recently suggested to adjust high-level operations within information systems, drawing from the business ecosystem (Moore, 1996), and is positioned at a micro-level in the center of the Big-data outline, while various players occur at the micro and macro level (Curry, 2016). Inside the ecosystem, data actors need to improve the capabilities of Big-data Analytics in their respective contexts, contributing to value growth, market transformation, and social change (Saggi and Jain, 2018). This is an iterative method focused on which data actors use their expertise to continuously develop and grow their ability to interpret Big-data and enhance the value produced that impacts industry and society alike. In this context, a stakeholder can have several positions and contribute to building value within the ecosystem in multiple ways. Indeed to overcome challenging technological and market issues, the importance of Big-data and business analytics has been identified (Chen et al., 2012). Nevertheless, their social importance remains uncertain (Agarwal and Dhar, 2014), with most research in the field missing the opportunity for social issues to be solved by Big-data and business analytics (Zicari, 2014).

Public and private organizations, academia, industry, states, and individuals create massive quantities of pervasive data in today's modern world, spawning on new skills and prospects, and building value through innovative market strategies, regulations, etc. (Grover et al., 2018). Thus, in order to achieve digital transformation and create sustainable economies, we assess society as an ecosystem of Big-data and business analytics on which data, information, and knowledge are exchanged and transmitted among its stakeholders. The creation of such an ecosystem encourages numerous players to connect, coordinate, and coopetition in providing new opportunities for enterprises and policymakers to meet the needs of buyers and people, and can also provide new business opportunities for entrepreneurs, innovators, and companies to build creative digital data-based solutions and change the current situation.

Covid-19 emergency and rise of Big-data Analytics

Digital technologies increasingly became the strongholds of personal and professional life throughout the COVID-19 pandemic (Panigutti et al., 2020). Big-data and predictive analytics help to track pandemic-related surface markers during the Covid-19 emergency (Bragazzi et al . , 2020; Wang et al., 2020; Zhou et al., 2020). In particular, Big-data-driven perspectives in real-time have helped policymakers and researchers identify and predict the scope and effect of Covid-19 outbreaks. Real-time Covid-19 trackers help epidemiologists, experts, health professionals, and policy-makers make more educated choices to tackle the pandemic by aggregating and synthesizing major data events (Hancox-Li, 2020). In addition, real-time monitoring of GPS data showing the movement of people within a certain locality allows the government to consider the compliance of the population with social distancing mandates (Lin and Hou, 2020). Big-data analytics can help many decision-makers to make challenging choices that impact employees, consumers and

organizational capability. For example, businesses exploit their internal and external data on, for example, communication background for clients, information for staff, tracking company processes, and social media to consider multiple sustainable development scenarios before and after the Covid-19 pandemic (Donthu and Gustafsson, 2020).

Big-data also offers ways to model viral activity research and assist individual nation health care authorities in strengthening epidemic preparedness (Bragazzi et al., 2020). Utilizing three global datasets, the Official Aviation Guide, Tencent's (Shenzhen, China) location-based resources, and Wuhan Urban Transportation Management Bureau, Wu et al. (2020) conducted a model analysis of' nowcasting 'and Covid-19 disease forecasting practices inside and outside China that could be used by health authorities worldwide for public health planning and monitoring. In the same way, Gilbert et al. evaluated the preparedness and susceptibility of African countries in the war against Covid-19 using the WHO International Health Legislation, the State Parties Self-Assessment Annual Review Method, Joint Global Appraisal Reports, and the Infectious Disease Risk Index. That would help raise awareness among the health authorities in Africa in order to properly plan for the viral outbreak. Big-data will, however, boost education and connectivity in public health (Benke, and Benke, 2018). The government has collaborated with WhatsApp (owned by Facebook) in Singapore to help the public to get correct information about Covid-19 and government initiatives (Bouffanais and Lim, 2020). Healthcare organizations already use various social media channels (e.g., Facebook and Twitter) to offer 'real-time' information to resolve uncertainties for the public. As the saying goes,' a disaster creates an opportunity'; this first huge 2020 disaster presents a tremendous opportunity for analytics in Big-data.

Because Big-data in today's digital world will be crucial to handling the Covid-19 pandemic, the criteria for responsible data collection and analysis on a global scale must be clear. We contend that the use of digitally accessible data and algorithms for analysis and surveillance — e.g., detecting individuals who have traveled to places where the disease has spread or monitored, and isolating infectious people's contacts is of vital importance in fighting the Covid-19 emergency. In compliance with data security laws and with proper regard for privacy and confidentiality, however, it is equally important to use these data and algorithms in a responsible manner (Bertino and Ferrari, 2018).

Systemizing big data analytics for sustainable business strategy

Big-data provides a huge amount of innovation-focused business growth possibilities around sustainability. As for longevity, Big-data 's most noticeable first-order impacts are on corporate and inter-agency processes. The business's functional areas can at the same time achieve their objectives better and produce less effect on the environment by using Big-data from different origins (Xu et al.,2016). There are several origins of data on sustainable business concerns: news, government policies, rankings and awards, social media, and organization’s annual report. In fact, Big-data services can recognize issues of sustainability that are relevant to business operations, flag risks, benchmark the sustainability performance of an organization to rivals, track media references to environmental issues, and evaluate best practices for sustainability (Sun et al., 208).

Initially, the authors argue that smart sensors and continuous connectivity between various origins allow real-time device changes to optimize performance by maximizing item distribution only when and where it is required, for example from the forest product upstream in the supply chain all the way downstream to the paper trays in customer's office printers (Etzion and Aragon-Correa, 2016). Big data will usually offer more accurate and accurate market forecasts and, as a result, contribute to supply and waste reduction, while saving energy and money. Big-data can be extracted in addition to these real-time technologies to match the utilization of capital by businesses with the multidimensional powers of various behaviors and economies (Dai et al., 2016). At this point, we think that domestic smart energy meters can help individual customers minimize prices and energy usage, but the major environmental payoff might come on the supply side if utilities that are better able to forecast demand, allow them to use carbon-intensive peak power plants more sparingly during times of heavy demand (or, in an ideal scenario, withdraw them completely).

Again, the idea of mass customization, or the development of personally personalized products and services to customers, on a scale is a third, possibly more tenuous connexion between supply, demand, and sustainability created by Big-data Analytics. At least conceptually, items developed and assembled to follow

market requirements correctly would yield results that are pared down to what the consumers actually want. In exchange, these items can receive a premium, maybe built more effectively, and can then be covered and retained over longer life cycles than traditional products and services (Zhang et al., 2017). Lastly, risk assessment is another area in which Big-data provides opportunities to optimize everyday environmental practices (Niesen et al . , 2016). Rain prediction, for example, is a famously data-intensive operation whose efficiency improves with greater volumes of knowledge. Predicting extreme climate change events progresses inexorably as Big-data becomes exponentially easier to produce, store and process, enabling government departments to respond faster to disasters and insurance providers to better manage risk (Choi et al., 2017). Boutique and generalist consultancies are also adopting sustainability-related data mining into consumer service services on climate mitigation, resource conservation, and energy consumption issues.

In reality, one of the most exciting ways to use Big-data is to cause positive behavioral alteration (Shah et al., 2017). Various studies and real-world interactions demonstrate the ability to present Big-data (e.g. comparing trends of individual energy demands with peers) to produce improvements in habits of performance. These results are backed by increasingly robust data (Asensio and Delmas, 2015), and Power, an organization that mediates the interaction between utilities and their clients, offers targeted nudges intended to unobtrusively persuade customers to minimize energy usage, is the key value proposition. Simply put, with the use of Big-data nudges, biodiversity can be measurably enhanced (Thaler and Sunstein, 2008). Managers or decision-makers in various divisions can now, from a new viewpoint, acquire more effective tools to incorporate sustainability in their numerous strategic responsibilities. It is extremely obvious that Big-data creates possibilities for more efficient management operations and strategic decision making by saving energy and money while fulfilling demands and regulations at the same time (Dasgupta et al., 2019). Those new prospects, though, come with obstacles. The inter-organizational structure of supply chains (or also of some business operations) and the decentralized structure of consumers would often entail the mutual use of data in the same company by various organizations and divisions.

Contribution on SDGs

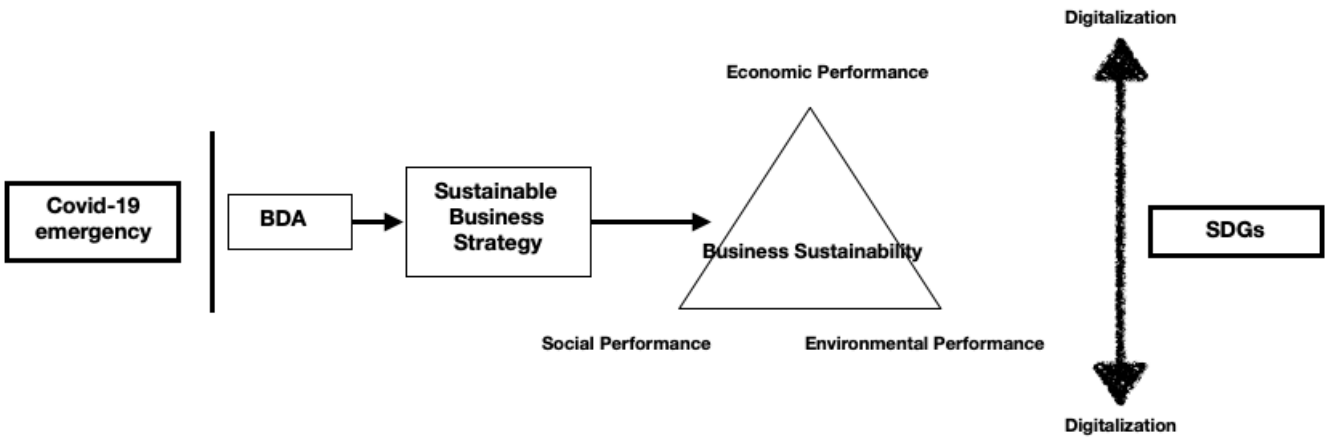

Figure 1: The impact of BDA focused sustainable business strategy on SDGs
Source: Formulated by author

The 2030 Sustainable Development Agenda of the UN is a reflection of 'a new coherent way of thought' about the basic environmental, social, and economic dimensions (Nilsson et al., 2016). SDG 3 strives to ensure safe lives and encourage well-being for everyone at everyone ages, including the unique SDG 3.3

aimed at ending AIDS, tuberculosis, malaria, and neglected tropical diseases epidemics and combating hepatitis, waterborne diseases, and other communicable diseases by 2030 (Kumar et al., 2016). The Covid-19 outbreak explicitly challenges the accomplishment of the aforementioned health targets and also impacts the accomplishment of economic and social improvement objectives. However, if implemented under a sustainable business strategy, new data sources such as satellite data, emerging technology, and new analytical techniques can allow more flexible, effective, and evidence-based decision-making and can help assess progress towards the Sustainable Development Goals (SDGs) in a way that is both inclusive and egalitarian. This SDG-aligned Big-data movement also means the data usability by even more usability and transparency, and thereby encouraging more people for better corporate practices, better choices, and greater engagement and accountability, leading to positive results for people and the world that are sustainable.

Theoretical contribution and practical implication

The present study connects learning from the crisis (Covid-19 emergency) with the BDA facet sustainable business strategy approach. Via systematic analysis, the actual need for Big-Data Analytics is discussed on a crisis triggered business sustainability context. BDA capacities are surely data-driven (Anwar et al., 2018). Unlike other computational approaches such as descriptive and predictive analytics, prescriptive analytics requires a minimal amount of contextual intervention that can improve the decision-making process. The research thus has a remarkable contribution to the theory and practical implication. Alternatively, to advance the sustainability research agenda ahead, Big-Data can need different theoretical lenses. This research paper will help researchers appreciate the BDA for sustainable business configuration in depth. By exploring how a disaster situation will facilitate a competitive market outline by digitalization, this research advances existing sustainability literature. The findings show that BDA applications can enable businesses to build sustainable strategic arrangements that contribute to competitive advantage based on successful information management (Shan et al., 2019). This paper again leads to the analysis of DC (Dynamic Capabilities) by analyzing the sustainable business approach in a BDA context (Drnevich and Kriauciunas, 2011). The conceptualization strongly supports the assumption that sustainable business strategies can be activated by BDA technologies and that competition can be influenced in two ways (via processes or globally). Moreover, the integration of BDA in sustainable business configuration creates the scholastic foundation for two categories of innovation abilities: a) radical, and b) incremental. This study also contributes to the point of view of the Quadruple Helix Innovation Model (QHIM) by introducing a philosophical framework from a BDA platform caused by the Covid-19 crisis. At this point, collaborations between academia, industry, government, and civil society are important in order to establish the requisite technical, structural, and psychological conditions for progress in a knowledge-based society (Pappas et al., 2018), which generates and uses Big-data for sustainable business achievements.

The study shows practitioners how best to exploit the recent expertise contained in BDA programs and projects and attain skills that can help sustain competitive advantages. The outcomes of the paper offer help to validate BDA investments and sustainability achievement programs. At many points, BDA's oriented sustainable market model will have value: (1) awareness; (2) diverse potential (organizational agility); (3) business process; and (4) competitive efficiency (Raut et al., 2019). On the other hand, top managers and decision-makers should appreciate BDA's importance to increasing their firms' corporate efficiency. Top management engagement is an important consideration for enhanced company success. In this sense, the organization's top management should be oriented towards long-term economic growth. In addition, the findings of this paper suggest that BDA's sustainable business strategy can be an important boost to survival in competitive markets, particularly by promoting production and operations or improving product and service.

Conclusion

Our systematic analysis successfully conceptualized a configuration for BDA focused sustainable business strategy considering the influence of the Covid-19 emergency. In fact, the core value of digital innovations or digitalization associated with sustainable achievements that emerge from Big-data Analytics is a field that will draw more interest in the times to come. In doing so, it is necessary to consider first the multiple players, the data they produce, and how they communicate, and second the skills required to be built to exploit the ability. An initiative in this path is the analysis BDA focused sustainable business configuration affected by the crisis. Here, formulating a data-oriented framing within business premises, investing in suitable

technologies, fostering technological and managerial expertise, and encouraging an environment of corporate learning are a critical element in recognizing value. It is therefore important to note that meaning can occur by various means, and can thus be captured by various steps. While some organizations or entrepreneurs may concentrate on improving market success and remaining ahead of rivals, others may aim to promote social progress, thereby creating value that impacts both them and society at large.

Sustainable business configuration based on Big-data provides an ability to be more citizen-oriented in policy formation and delivery, taking into account the needs, expectations, and real experience of public services of people, as reported on social media and other channels (Agaba et al., 2014). It has the power to change the relationships between states and citizens. However, it is critical that diverse issues are discussed in a comprehensive way in order to achieve the full value (Holistic) Big-data provides to the policymaking process and sustainable growth. High-level stakeholder arrangements as well as access to technologies and capacity building are included in these areas. The role of development-oriented actors as facilitators, brokers of information, and convening forces will also include this. On the other part, managers or decision-makers in numerous divisions can now acquire more efficient instruments to incorporate sustainability in their numerous duties from a distinct operational viewpoint. Challenges arrive with those fresh possibilities. Furthermore, a comparatively secure bet is that sustainability reporting will become more data-oriented, using a broader scope of real-time, data-rich inputs to examine sustainability success in the organization. Big-data Analytics is expected to create more possibilities for businesses to collect both environmental and social data and to gain accuracy and time resources at the same time (Barnaghi et al., 2015).

An interesting fact is that the Covid-19 emergency triggered Big-data Analytics focused sustainable architecture provides a confounding framework for academics who typically live or die by explaining the environment through lenses of theory since it can involve theoretical reasoning in an anti-theoretical or agnostic framework. It's enticing to conceive of Covid-19 induced Big-data Analytics (BDA) as an observational cornucopia for administrative and sustainability researchers. With so many usable records, so many different items can be calculated and compared with something else. However, like most, we are wary of automatically giving in to this lure. Theorization is what scholars, not unalloyed number-crunching expertise, add to the table.

Again, as people around the world struggle from the catastrophic effects on their lives, economies, and cultures of the Covid-19 emergency, scholars from diverse backgrounds are steadily determined to make contributions to the battle against current and possible pandemics. In solving potential global challenges aligned with sustainable business achievements, learning from this pandemic and gaining information is critical (Bergman, 2020). We hope that this conceptualization offers guidance for researchers to identify strategies to answer the latest global problem, as we embark on an increasingly important quest as a group to tackle SDGs by improving the philosophy and practice of digital sustainability. However, as this is a review analysis document, no evidence is obtained to generalize to other countries or territories. On top of that, the framework of this analysis relative to prior literature is self-constructed. Also, generalization is not sufficient for the application. The position of Covid-19 for business sustainability can theoretically be evaluated through future research activities via the inclusion of AI elements. Furthermore, when exploring a broader variety of BDA technologies in the product lifecycle for renewable results, researchers can also concentrate on opportunities to enhance the conceptualization addressed.

References

Addo-Tenkorang, R., & Helo, P. T. (2016). Big data applications in operations/supply-chain management: A literature review. *Computers & Industrial Engineering*, 101, 528-543.

Agaba, G. B., Akindès, F., Bengtsson, L., Cowls, J., Ganesh, M. I., Hoffman, N., ... & Meyer, E. (2014). *Big data and positive social change in the developing world: a white paper for practitioners and researchers.* Oxford Internet Institute. https://assets.rockefellerfoundation.org/app/uploads/20140507222100/Big-Data-and-Positive-Social-Change-in-the-Developing-World.pdf

Agarwal, R., & Dhar, V. (2014). Big Data, Data Science, and Analytics: The Opportunity and Challenge for IS Research. *Information Systems Research*, *25*(3), 443-448.

Agbehadji, I. E., Awuzie, B. O., Ngowi, A. B., & Millham, R. C. (2020). Review of Big Data Analytics, Artificial Intelligence and Nature-Inspired Computing Models towards Accurate Detection of COVID-19 Pandemic Cases and Contact Tracing. *International Journal of Environmental Research and Public Health, 17*(15), 1-16.

Ajah, I. A., & Nweke, H. F. (2019). Big data and business analytics: Trends, platforms, success factors and applications. *Big Data and Cognitive Computing, 3*(2), 1-30.

Akerkar, R. (Ed.). (2013). *Big data computing*. Crc Press.

Anwar, M., Khan, S. Z., & Shah, S. Z. A. (2018). Big data capabilities and firm's performance: a mediating role of competitive advantage. *Journal of Information & Knowledge Management, 17*(04), 1-28.

Arunachalam, D., Kumar, N., & Kawalek, J. P. (2018). Understanding big data analytics capabilities in supply chain management: Unravelling the issues, challenges and implications for practice. *Transportation Research Part E: Logistics and Transportation Review, 114*, 416-436.

Asensio, O. I., & Delmas, M. A. (2015). Nonprice incentives and energy conservation. *Proceedings of the National Academy of Sciences, 112*(6), E510-E515.

Barnaghi, P., Bermudez-Edo, M., & Tönjes, R. (2015). Challenges for quality of data in smart cities. *Journal of Data and Information Quality (JDIQ), 6*(2-3), 1-4.

Benke, K., & Benke, G. (2018). Artificial intelligence and big data in public health. International *Journal of Environmental Research and Public Health, 15*(12), 2796.

Bergman, M. M. (2020). The World after COVID. *World 2020, 1*(1), 45-48.

Bertino, E., & Ferrari, E. (2018). *Big data security and privacy. In A Comprehensive Guide Through the Italian Database Research Over the Last 25 Years* (pp. 425-439). Springer, Cham.

Bofinger, P., Dullien, S., Felbermayr, G., Trebesch, C., Schularick, M., & Südekum, J. (2020). Europa muss jetzt finanziell zusammenstehen. *Frankfurter Allgemeine Zeitung, 21*.

Bouffanais, R., & Lim, S. (2020). Cities — try to predict super-spreading hotspots for COVID-19. *Nature, 583*(7816), 352-355.

Boulos, M. N. K., & Geraghty, E. M. (2020). Geographical tracking and mapping of coronavirus disease COVID-19/severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) epidemic and associated events around the world: how 21st century GIS technologies are supporting the global fight against outbreaks and epidemics. *International Journal of Health Geographics, 8*(2020), 1-12.

Boyd, D., & Crawford, K. (2012). Critical questions for big data: Provocations for a cultural, technological, and scholarly phenomenon. *Information, Communication & Society, 15*(5), 662-679.

Bragazzi, N. L., Dai, H., Damiani, G., Behzadifar, M., Martini, M., & Wu, J. (2020). How Big Data and Artificial Intelligence Can Help Better Manage the COVID-19 Pandemic. *International Journal of Environmental Research and Public Health, 17*(9), 3176 (1-8).

Buckee, C. (2020). Improving epidemic surveillance and response: big data is dead, long live big data. *The Lancet Digital Health, 2*(5), e218-e220.

Chen, H., Chiang, R. H., & Storey, V. C. (2012). Business intelligence and analytics: From big data to big impact. *MIS quarterly,* 1165-1188.

Choi, T. M., & Lambert, J. H. (2017). Advances in risk analysis with big data. *Risk Analysis, 37*(8), 1435-1442.

Choi, T. M., Wallace, S. W., & Wang, Y. (2018). Big data analytics in operations management. *Production and Operations Management, 27*(10), 1868-1883.

Collin, S. O., Johansson, U., Svensson, K., & Ulvenblad, P. O. (1996). Market Segmentation in Scientific Publications: Research Patterns in American vs European Management Journals1. *British Journal of Management, 7*(2), 141-154.

Côrte-Real, N., Ruivo, P., & Oliveira, T. (2020). Leveraging internet of things and big data analytics initiatives in European and American firms: Is data quality a way to extract business value?. *Information & Management, 57*(1), 103141.

Curry, E. (2016). The big data value chain: definitions, concepts, and theoretical approaches. In *New horizons for a data-driven economy* (pp. 29-37). Springer, Cham.

Dai, W., Qiu, L., Wu, A., & Qiu, M. (2016). Cloud infrastructure resource allocation for big data applications. *IEEE Transactions on Big Data, 4*(3), 313-324.

Das, T. K., & Kumar, P. M. (2013). Big data analytics: A framework for unstructured data analysis. *International Journal of Engineering Science & Technology, 5*(1), 153-156.

Dasgupta, A., Gill, A. Q., & Hussain, F. (2019, July). A Review of General Data Protection Regulation for Supply Chain Ecosystem. In International Conference on Innovative Mobile and Internet Services in Ubiquitous Computing (pp. 456-465). Springer, Cham.

Dey, M., & Loewenstein, M. A. (2020). How many workers are employed in sectors directly affected by COVID-19 shutdowns, where do they work, and how much do they earn?. *Monthly Labor Review*, 1-19.

Donthu, N., & Gustafsson, A. (2020). Effects of COVID-19 on business and research. *Journal of Business Research, 117*, 284-289.

Drnevich, P. L., & Kriauciunas, A. P. (2011). Clarifying the conditions and limits of the contributions of ordinary and dynamic capabilities to relative firm performance. *Strategic Management Journal, 32*(3), 254-279.

Duan, L., & Xiong, Y. (2015). Big data analytics and business analytics. *Journal of Management Analytics, 2*(1), 1-21.

Dubey, R., Gunasekaran, A., Childe, S. J., Luo, Z., Wamba, S. F., Roubaud, D., & Foropon, C. (2018). Examining the role of big data and predictive analytics on collaborative performance in context to sustainable consumption and production behaviour. *Journal of Cleaner Production, 196*, 1508-1521.

Dubey, R., Gunasekaran, A., Childe, S. J., Wamba, S. F., & Papadopoulos, T. (2016). The impact of big data on world-class sustainable manufacturing. *The International Journal of Advanced Manufacturing Technology, 84*(1-4), 631-645.

Elkington, J. (1997). *Cannibals with forks: the triple bottom line of twenty-first century business*. Capstone.

Etzion, D., & Aragon-Correa, J. A. (2016). Big data, management, and sustainability: Strategic opportunities ahead.

Evenett, S. J. (2020). Sicken thy neighbour: The initial trade policy response to COVID-19. *The World Economy, 43*(4), 828-839.

Fagerberg, J., Landström, H., & Martin, B. R. (2012). Exploring the emerging knowledge base of 'the knowledge society'. *Research Policy, 41*(7), 1121-1131.

Garvey, M. D., & Carnovale, S. (2020). The rippled newsvendor: A new inventory framework for modelling supply chain risk severity in the presence of risk propagation. *International Journal of Production Economics*, 107752.

Giritli Nygren, K., & Olofsson, A. (2020). Managing the Covid-19 pandemic through individual responsibility: the consequences of a world risk society and enhanced ethopolitics. *Journal of Risk Research*, 1-5.

Graves, L., & Karabayeva, A. (2020). Managing Virtual Workers—Strategies for Success. *IEEE Engineering Management Review*, *48*(2), 166-172.

Grover, V., Chiang, R. H., Liang, T. P., & Zhang, D. (2018). Creating strategic business value from big data analytics: A research framework. *Journal of Management Information Systems*, *35*(2), 388-423.

Hancox-Li, L. (2020, January). Robustness in machine learning explanations: does it matter?. In Proceedings of the 2020 Conference on Fairness, Accountability, and Transparency (pp. 640-647).

Hart, C. (2001). *Doing a literature search: a comprehensive guide for the social sciences.* Sage.

Holmberg, J., & Sandbrook, R. (2019). Sustainable development: what is to be done?. In Policies for a small planet (pp. 19-38). Routledge.

Hu, H., Wen, Y., Chua, T. S., & Li, X. (2014). Toward scalable systems for big data analytics: A technology tutorial. *IEEE access*, 2, 652-687.

Jeble, S., Dubey, R., Childe, S., Papadopoulos, T., Roubaud, D., & Prakash, A. (2018). Impact of big data and predictive analytics capability on supply chain sustainability. *The International Journal Of Logistics Management*, *29*(2), 513-538.

Kanda, W., & Kivimaa, P. (2020). What opportunities could the COVID-19 outbreak offer for sustainability transitions research on electricity and mobility?. *Energy Research & Social Science*, 68, 101666 (1-5).

Kaur, H., & Singh, S. P. (2018). Heuristic modeling for sustainable procurement and logistics in a supply chain using big data. *Computers & Operations Research*, 98, 301-321.

Kim, H. (2020). Field Experiments on the Barriers Firms Face in Realizing Gains From Data (Doctoral dissertation).

Kuckertz, A., Brändle, L., Gaudig, A., Hinderer, S., Morales Reyes, C., & Prochotta, A. et al. (2020). Startups in Times of Crisis – A Rapid Response to the COVID-19 Pandemic. *Journal of Business Venturing Insights*, *13*(1), e00169 (1-13).

Kumar, S., Kumar, N., & Vivekadhish, S. (2016). Millennium development goals (MDGS) to sustainable development goals (SDGS): Addressing unfinished agenda and strengthening sustainable development and partnership. *Indian journal of community medicine: official publication of Indian Association of Preventive & Social Medicine*, *41*(1), 1-4.

LaDeau, S. L., Han, B. A., Rosi-Marshall, E. J., & Weathers, K. C. (2017). The next decade of big data in ecosystem science. *Ecosystems*, *20*(2), 274-283.

Lee, J., Yi, S. S., Jeong, M., Sung, M., Yoon, W., Choi, Y., ... & Kang, J. (2020). Answering questions on covid-19 in real-time. arXiv preprint arXiv:2006.15830.jj

Lin, L., & Hou, Z. (2020). Combat COVID-19 with artificial intelligence and big data. J*ournal of travel medicine*, *27*(5), taaa080 (1-4).

Mishra, S. (2018). Financial management and forecasting using business intelligence and big data analytic tools. *International Journal of Financial Engineering*, *5(*02), 1850011 (1-16).

Monitor, I. L. O. (2020). COVID-19 and the world of work. Retrieved from https://www.ilo.org/global/topics/coronavirus/lang—en/index.htm.

Moore, J. F. (1996). The Four Stages Of A Business: Life Cycle Lessons From Nature. *Online. http: llww. strategyebusiness. com/strategyl2305.(22 Apr. 1999)*.

Niesen, T., Houy, C., Fettke, P., & Loos, P. (2016, January). Towards an integrative big data analysis framework for data-driven risk management in industry 4.0. In 2016 49th Hawaii International Conference on System Sciences (HICSS) (pp. 5065-5074). IEEE.

Nilsson, M., Griggs, D., & Visbeck, M. (2016). Policy: map the interactions between Sustainable Development Goals. *Nature, 534*(7607), 320-322.

Ozili, P. K., & Arun, T. (2020). Spillover of COVID-19: impact on the Global Economy. Available at SSRN 3562570.

Panigutti, C., Perotti, A., & Pedreschi, D. (2020, January). Doctor XAI: an ontology-based approach to black-box sequential data classification explanations. In Proceedings of the 2020 Conference on Fairness, Accountability, and Transparency (pp. 629-639).

Papadopoulos, T., Baltas, K., & Balta, M. (2020). The use of digital technologies by small and medium enterprises during COVID-19: Implications for theory and practice. *International Journal Of Information Management, 55*, 102192 (1-4).

Pappas, I., Mikalef, P., Giannakos, M., Krogstie, J., & Lekakos, G. (2018). Big data and business analytics ecosystems: paving the way towards digital transformation and sustainable societies. *Information Systems And E-Business Management, 16*(3), 479-491.

Raut, R. D., Mangla, S. K., Narwane, V. S., Gardas, B. B., Priyadarshinee, P., & Narkhede, B. E. (2019). Linking big data analytics and operational sustainability practices for sustainable business management. *Journal of Cleaner Production*, 224, 10-24.

Saggi, M. K., & Jain, S. (2018). A Purvey towards an integration of big data analytics to big insights for value-creation. *Information Processing & Management, 54*(5), 758-790.

Sandhu, R., & Sood, S. K. (2015). Scheduling of big data applications on distributed cloud based on QoS parameters. *Cluster Computing, 18*(2), 817-828.

Sarkis, J., Cohen, M., Dewick, P., & Schröder, P. (2020). A brave new world: Lessons from the COVID-19 pandemic for transitioning to sustainable supply and production. *Resources, Conservation And Recycling, 159*, 104894 (1-3).

Seuring, S., & Müller, M. (2008). From a literature review to a conceptual framework for sustainable supply chain management. *Journal of cleaner production, 16*(15), 1699-1710.

Shah, N., Irani, Z., & Sharif, A. M. (2017). Big data in an HR context: Exploring organizational change readiness, employee attitudes and behaviors. *Journal of Business Research*, 70, 366-378.

Shan, S., Luo, Y., Zhou, Y., & Wei, Y. (2019). Big data analysis adaptation and enterprises' competitive advantages: the perspective of dynamic capability and resource-based theories. *Technology Analysis & Strategic Management, 31*(4), 406-420.

Sivarajah, U., Kamal, M. M., Irani, Z., & Weerakkody, V. (2017). Critical analysis of Big Data challenges and analytical methods. *Journal of Business Research*, 70, 263-286.

Sun, Z., Sun, L., & Strang, K. (2018). Big data analytics services for enhancing business intelligence. *Journal of Computer Information Systems, 58*(2), 162-169.

Takaishi, D., Nishiyama, H., Kato, N., & Miura, R. (2014). Toward energy efficient big data gathering in densely distributed sensor networks. IEEE transactions on emerging topics in computing, 2(3), 388-397.

Thaler, R., & Sunstein, C. (2008). *Nudge: The gentle power of choice architecture.* New Haven, Conn.: Yale.

Vinuesa, R., Azizpour, H., Leite, I., Balaam, M., Dignum, V., Domisch, S., ... & Nerini, F. F. (2020). The role of artificial intelligence in achieving the Sustainable Development Goals. *Nature communications, 11*(1), 1-10.

Wamba, S. F., Gunasekaran, A., Akter, S., Ren, S. J. F., Dubey, R., & Childe, S. J. (2017). Big data analytics and firm performance: Effects of dynamic capabilities. *Journal of Business Research, 70*, 356-365.

Wang, C. J., Ng, C. Y., & Brook, R. H. (2020). Response to COVID-19 in Taiwan: big data analytics, new technology, and proactive testing. *Jama, 323*(14), 1341-1342

World Health Organization. (2020). WHO announces COVID-19 outbreak a pandemic. Retrieved from http://www.euro.who.int/en/health-topics/health-emergencies/coronavirus-covid-19/news/news/2020/3/who-announces-covid-19-outbreak-a-pandemic.

World Trade Organization. (2020). Trade set to plunge as COVID-19 pandemic upends global economy. Retrieved from https://www.wto.org/english/news_e/pres20_e/pr855_e.htm.

Wu, J. T., Leung, K., & Leung, G. M. (2020). Nowcasting and forecasting the potential domestic and international spread of the 2019-nCoV outbreak originating in Wuhan, China: a modelling study. *The Lancet, 395*(10225), 689-697.

Xu, Z., Frankwick, G. L., & Ramirez, E. (2016). Effects of big data analytics and traditional marketing analytics on new product success: A knowledge fusion perspective. *Journal of Business Research, 69*(5), 1562-1566.

Zhang, Y., Ren, S., Liu, Y., Sakao, T., & Huisingh, D. (2017). A framework for Big Data driven product lifecycle management. *Journal of Cleaner Production, 159,* 229-240.

Zhao, R., Liu, Y., Zhang, N., & Huang, T. (2017). An optimization model for green supply chain management by using a big data analytic approach. *Journal of Cleaner Production, 142,* 1085-1097.

Zhou, C., Su, F., Pei, T., Zhang, A., Du, Y., Luo, B., & Song, C. (2020). COVID-19: Challenges to GIS with big data. *Geography and Sustainability,1* (1), 77-87.

Zicari, R. V. (2014). Big data: Challenges and opportunities. *Big data computing, 564,* 103-105.

Zikopoulos, P., & Eaton, C. (2011). *Understanding big data: Analytics for enterprise class hadoop and streaming data.* McGraw-Hill Osborne Media.