Save the planet, but do not leave people behind: an interdisciplinary data-driven approach to Social Sustainable Operations and HR Management

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Framing of the research. *After a long period of sustained economic growth, the concern about wealth disparity and natural resource depletion has been escalating in the last decades (Dao et al., 2011; Abbasi et al., 2021). In order to cope with dynamic market changes, firms have to use and manage their resources in a sustainable manner (Singh and El-Kassar 2019), as addressing environmental and social sustainability issues to attract, satisfy, and retain customers is becoming always more challenging (Longoni and Cagliano 2016; Christopher, Martin and Gaudenzi, Barbara 2018).*

Back in 2008, Jabbour and Santos highlighted that a standard of development equally favouring economic, social and environmental sustainability was needed. In fact, the three of them constitutes essential aspects of the business (Raut et al., 2019) which have been demonstrated to extend beyond organizational boundaries, denoting that sustainability initiatives across the supply chain are of great relevance (Mani et al., 2016). However, even if economic and environmental sustainability of the supply chain have largely been considered by scholars and practitioners (Massaroni et al., 2015), its social aspect has mostly been neglected (Mani et al., 2016). According to Carter and Rogers (2008) the reason behind this phenomenon lies in the fact that the 1987 Brundtland Commission's definition of sustainability (World Commission on Environment and Development 1987, p.8) («development that meets the needs of the present without compromising the ability of future generations to meet their needs»), the most widespread one, is rather broad, making it hard for companies to understand and concretely apply it. Contextualizing this definition in order to apply it to supply chain sustainability, Mani et al., (2016) define corporate sustainability as meeting the needs of today's direct and indirect stakeholders without compromising the ability to meet the needs of future stakeholders. This entails that social sustainability allows the managing of social issues regarding the supply chain in a way that ensures the survival of the company in the long-term.

Nevertheless, sustainability research and practice have mostly focused on the environment, neglecting people-related aspects, particularly employee well-being. This is a relevant social issue, as adopting socially sustainable practices minimises workers' agitation and increases suppliers' production quality and ability to meet buyers' requirements (Mani et al., 2016). In particular, most companies disregarded social sustainable operations practices, which are usually aimed at improving employees' working conditions, health, and safety (Gimenez et al., 2012). These are of particular relevance as they may influence human resources (HR) benefits, namely «the mechanisms through which a workforce contributing to the firm's goals and strategy is developed» (Longoni and Cagliano 2016, p.1728). This is particularly true for employee motivation and retention, which many research empirically demonstrated to be positively related to organizational performance (e.g. Dobre 2013). The reason behind this situation is that companies usually do not consider the HR department when dealing with sustainable operations, as it is often isolated from other departments due to externalization (Bissola and Imperatori 2014) or to its scarce strategic relevance and influence (Dahlbom et al., 2019). Furthermore, it is still common belief that HR managers base their decisions on gut feelings and sensations (van den Heuvel and Bondarouk 2017; Chalutz Ben-Gal 2019), despite the trend of organizations to increasingly rely on a data-driven decision-making process (Holsapple et al., 2014; Polese et al., 2019) and to increasingly use big data and analytics in their activities (Chong and Shi 2015). On the contrary, HRs are now broadly adopting a data-based approach and they rely always more on new digital technologies (Minbaeva 2017; Chalutz Ben-Gal 2019; DiClaudio 2019). Among these lasts, one of the most promising seems to be HR analytics, which Falletta and Combs (2021, p. 54) define as «a proactive and systematic process for ethically gathering, analyzing, communicating and using evidence-based HR research and analytical insights to help organizations achieve their strategic objectives». This is especially relevant, as recent research found that HR departments can exploit some HR activities - including communication, employee engagement, training and development, hiring and selection and reward systems - in order to implement corporate sustainability (Langwell and Heaton 2016). As several previous studies found that all mentioned activities can be carried out and improved on the basis of HR analytics (Patre 2016; van den Heuvel and Bondarouk

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2017; Tursunbayeva et al., 2018; Chalutz Ben-Gal 2019; Falletta and Combs 2021), it is reasonable to assume that HR analytics may enable the adoption of a more data-driven approach in relation to social operations practices.

Moreover, the studies on the relationship between digital transformation and environmental sustainability are growing (Feroz et al., 2021) and organizations are increasingly deploying digital technologies such as big data analytics (BDA) and Internet of Things to cope with environmental sustainability, a trend which is likely to continue (Feroz et al., 2021). However, a major research gap can be found regarding the adoption of a data-driven approach in relation to social sustainable operations management. This has often been considered as relevant for companies' sustainable strategies (Dao et al., 2011; Massaroni et al., 2015; Longoni and Cagliano 2016; Raut et al., 2019; Mani et al., 2020; Del Giudice et al., 2021; Feroz et al., 2021) but, practically, almost totally neglected in the literature. In fact, the impact of digital transformation in other related sustainability fields - apart from the environmental one - has to be further explored in order to identify a common research agenda (Feroz et al., 2021). In addition, many researchers highlighted the necessity of a more holistic understanding of the consequences of the use of big data in the decision-making process (e.g. Del Giudice et al., 2021). Although several research found a positive association between organizational performance and BDA, just a few papers examined BDA potential contribution to sustainable operations management (Raut et al., 2019), as organizations still struggle to assimilate big data when implementing sustainable practices both internally or externally with their supply chain partners (Singh and El-Kassar, 2019).

Purpose of the paper. *In accordance with the outlined research framing, the objective of this paper is to empirically investigate the effect of an HR analytics data-driven approach guiding the adoption of social sustainable operations practices on the employees of an organization. In particular, this will be done by investigating the effect of social sustainable operations practices on HR benefits, namely employees' motivation and retention, and by assessing the effect of these last on organizational performance. Furthermore, and more interestingly, we will investigate the moderating effect of HR analytics on the relationship between social sustainable operations practices and HR benefits. Drawing on instrumental stakeholder theory (Jones 1995), which claims that both parties are benefited when the organization takes into account the interests of its employees, and on the contingency theory (Harney 2016), which implies that HR management activities will obtain better results if they are tailored on the specific context of the organization, we hypothesize that:*

H1 (baseline): The adoption of social sustainable operations practices is positively related to HR benefits;
H2: HR analytics activities moderate the relationship between social sustainable operations practices and HR benefits;
H3: HR benefits are positively related to organizational performance.

Our model and hypothesis are summarized in figure 1.

Fig. 1: Research model and hypotheses
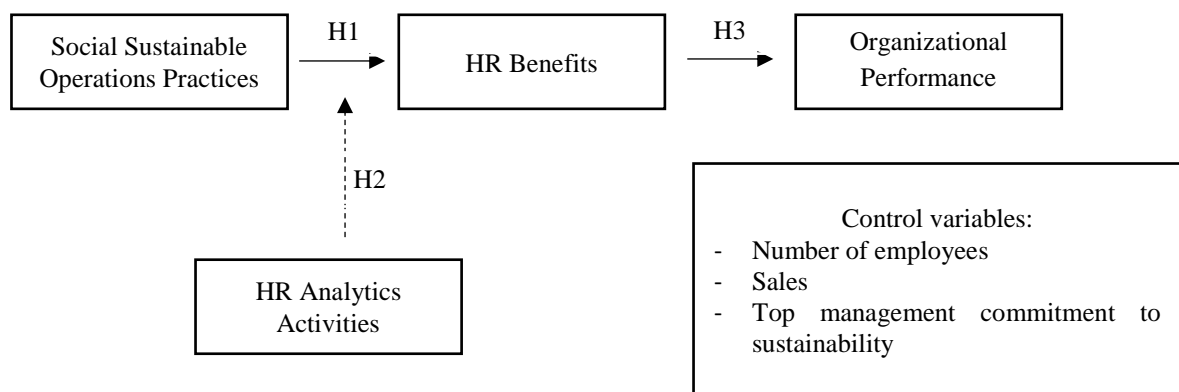
Methodology. *A quantitative approach will be used, as this will be an empirical, survey-based research. Questionnaires will be completed by operations managers, supply chain managers or senior managers with responsibility for sustainability development of European organizations which have been implementing HR analytics activities in the last 3 years. Companies will be selected using the Orbis Database, by looking for companies with an active status, with at least 10.000 employees, a production value of at least €100 million, of very large dimension, constituted before 2018 and having an e-mail address. The main variables included in our model will be social sustainable operations practices, HR benefits, HR analytics activities and organizational performance.*

Social sustainable operations practices will be our independent variable. It will be measured by using a total of 20 items belonging to 9 main dimensions, namely organizations' equity, health and safety, ethics, labour rights, human rights, wages, education, society and regulatory responsibility. All items will be taken by Mani et al., (2016) and will be measured through a 5-points Likert scale ranging from 1 = not at all to 5= very much.

HR benefits will be our mediator. It will be composed by two items, employees retention and motivation, taken by Longoni and Cagliano (2016). Respondents will be asked to assess changes in the two items after the implementation of social sustainable operations practices based on 5-points Likert scale ranging from 1 = much worse to 5 = much better.

HR analytics will be used as a moderator of the relationship between the independent variable and the mediator. It will be constituted of 13 items belonging to 3 dimensions, namely high quality data, analytical competency and strategic ability to act, all taken by McCartney and Fu (2022) All items will be measured based on a 5-points Likert scale ranging from 1 = strongly disagree to 5 = strongly agree.

Organizational performance will be our dependent variable. It will be analysed based on two dimensions. The first one, operational performance, will be composed of two sub-dimension, service and product quality, which will in turn be composed by three items each, all taken by Akhtar et al., (2019); the second one, financial performance, will include three items taken by Kyrgidou and Spyropoulou (2013) and Real et al., (2014). All items will be measured based on a 5-points Likert scale ranging from 1 = much worse to 5= much better.

Finally, our model will include three control variables, which will be firm size (measured as the logarithm of sales) (Gimenez et al., 2012; Longoni and Cagliano 2016), top management commitment to sustainability (Longoni and Cagliano 2016; Singh and El-Kassar 2019), and the number of employees of the organization (Akhtar et al., 2019).

Results. *The research is still in the preliminary phase, as data still have to be collected. However, we can discuss about our expected results.*

First of all, we expect the adoption of social sustainable operations practices by organizations to be positively related to HR benefits. In fact, several previous studies demonstrated this to be true (e.g. Wagner 2013; Longoni and Cagliano 2016), particularly with regard to employees' motivation. Conversely, Wagner (2013) could not obtain the same results with respect to employee retention. According to the author, the reason behind this lies in the fact that these practices are perceived always more as something necessary, as most firms now implement them. However, instrumental stakeholder theory (Jones 1995) claims that an advantage can be obtained for both companies and their employees when the formers take latter's interests into consideration. Furthermore, according to Longoni and Cagliano (2016) the external benefits obtained by sustainable operations may improve the relationship between an organization and its stakeholders, making it reasonable to assume that social sustainable operations practices will be positively related to HR benefits (Kobayashi et al., 2018).

Secondly, we expect that the use of HR analytics activities by organizations will positively moderate the relationship between social sustainable operations practices and HR benefits. As a matter of fact, the contingency theory (Harney 2016) argues that the effectiveness of HR management activities depends on their degree of consistency with the significant characteristics of the company and of the context in which it operates. Consequently, to be effective, social sustainable operations practices have to be brought into line with the environmental conditions faced by the organization (Harney 2016). As HR analytics is able to provide wide-ranging insight from an organizational point of view, it will enhance the decision-making process. This will consequently enable a more data-driven approach in relation to social sustainable operations practices, thus improving their effect on HR benefits.

Finally, several studies demonstrated the positive effect produced on organizational performance by the use of a big data-driven approach (Del Giudice et al., 2021; Zhu and Yang 2021) and of HR analytics (Tursunbayeva et al., 2018; DiClaudio 2019) from several perspectives (productional, financial, social and environmental) (Akhtar et al., 2019). As various studies demonstrated that the same can be stated for HR benefits (Iwu et al., 2016; van der Togt and Rasmussen 2017), as organizations can obtain a competitive advantage by increasing the effectiveness of their workforce (Longoni and Cagliano 2016), we believe that HR benefits will be positively related to organizational performance.

Research limitations. *This research has some limitations which could be used as hints for future studies. First of all, we decided to focus our attention on European companies. It may be useful to apply our research also in other contexts, as the United States, or the Asian market. Secondly, we decided to take into considerations only organizations of great dimension, in terms of both number of employees and production value. It could be interesting to replicate our investigation in small and medium enterprises to verify if any difference exists. It may also be interesting to investigate if some difference exists in terms of sectors, as we did not apply any distinction. Future studies may also address questionnaires to the employees of the organizations, including their perspective to provide a more comprehensive framework regarding social sustainability.*

Managerial implications. *This research will support managers and practitioners from two main perspectives. First, it will provide useful insights regarding the adoption of social sustainable practices, giving relevant information to organizations that already are or are willing to implement these solutions. As a matter of fact, most organizations claim sustainability to be among their priorities; still, social sustainability is mostly being neglected (Mani et al., 2016). However, by demonstrating that social sustainable activities can start a virtuous cycle, we will increase the awareness and the reputation of these solutions. In fact, they are beneficial for both the organization, as they may improve the organizational performance, and the employees, which will show increased motivation and retention. Secondly, we will contribute to further increase the acceptance of HR analytics both within HR departments and in the rest of the company. In fact, even if the reputation of this practice among practitioners has been constantly growing (Minbaeva 2017), it remains relatively unknown in most organizations (van den Heuvel and Bondarouk 2017). By demonstrating its impact on organizational sustainability and thus, indirectly, on organizational performance, we will further increase its adoption, as it will be demonstrated its impact not only within the HR department, but on the whole organization.*

Originality of the paper. *The originality of this paper is threefold. First, we will contribute to sustainable operations management literature by adopting a multidisciplinary approach, including evidence from HR management literature. This will enable us to concentrate on the social side of sustainability, which has largely been regarded as important, but still mostly disregarded by previous research (e.g. Amrutha and Geetha 2020). Secondly, we will supply further insight on the contribution of a data-driven decision-making approach guiding the adoption of social*

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sustainable operations. In particular, we will assess HR analytics' moderating effect on the relationship between social sustainable operations practices and HR benefits. To the best of our knowledge, no previous studies on the topic were conducted. Lastly, we will contribute to HR management literature related to HR analytics in a recently new domain, e.g. supply chain and sustainability. As a matter of fact, previous studies regarding HR analytics typically adopted a theoretical approach, not taking into account empirical evidence (Peeters et al., 2020) or relying just on authors' own opinion and experiences, not presenting a systematic approach (Andersen 2017). Furthermore, these studies usually focused exclusively on the HR point of view (Falletta and Combs 2021), neglecting the opinions of other stakeholders which could benefit from HR analytics as, in this particular case, supply chain or operations managers.

Keywords: *social sustainable operations management; HR analytics; HR benefits; data-driven approach*

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