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Developing human resource data risk management in the age of big data

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ABSTRACT

In recent years, a great deal of attention has been devoted to trying to understand the risk challenges that arise in information management, and most recently, challenges that arise due to big data. In this article, the complexities of big data for employers are explored, drawing on a risk management on Human Resources (HR) perspective and normal accident theory (NAT) to illustrate the evolving characteristics of these complexities. The paper concludes with a series of recommendations that focus on education, design in data collection, and risk management, in the hope that these recommendations enable employers to better anticipate and address emerging big data challenges.

1. Introduction

Big data collections are increasingly being made open and available by government agencies (e.g. Data.gov; Krishnamurthy & Awazu, 2016) and Internet service providers (Guzzo, Fink, King, Tonidandel, & Landis, 2015). Commercial organisations are also contributing to the bigness of data, generating it via employees' and consumers' interactions with their systems. Summarising major definitions of big data provided by authors such as Gandomi and Haider (2015), McAfee and Brynjolfsson (2012), Boyd and Crawford (2012), Kitchin (2014), Guzzo, Fink, King, Tonidandel, & Landis, 2015, Mayer-Schönberger and Cukier (2012), and Zikopoulos, Eaton, deRoos, Deutsch, and Lapis, (2012), we can assert several key characteristics that set them apart from more traditional, organised, structured and often single-source datasets. Specifically, big data can be distinguished from 'small data' in at least several main ways. First, in terms of the technical properties of big data, several aspects of which are frequently mentioned in the literature. These centre on various 'V's' (Kshetri, 2014). For instance, bigness in terms of its huge volume (i.e. the number of observations and variables), its velocity (or the speed with which data points accrue in or near real-time, as in the case of live-streaming video; Kitchin, 2014), and its varied nature (structured and unstructured). Big data can also be discussed in terms of its considerable scalability (data may expand rapidly in size), and the exhaustive and comprehensive scope of what the data captures (e.g. behavioural traces from an entire population within an organisation or system). To consolidate the sharp rise in publications over the last ten years, some reviews have sought to organise the complex connections surrounding big data, and the potential risks and benefits concerning its use. In terms of BOLD (big open linked data), for example, as many as nineteen organisational and systemic variables are relevant to understanding whether innovations and improved policy-making can result (Dwivedi et al., 2017).

The promise of data, particularly in relation to its 'big' varieties, has been promoted rapidly and heavily in recent years by various firms, commentators, and consultancies. The promised benefits typically come in several forms. At the most ambitious societal level of application, big data has been considered as a means for: learning how communities, governments and regions develop (Kshetri, 2014), studying political communication and citizenship participation (Gil de Zuniga & Diehl, 2017), and driving or improving commercial successes (e.g. Nunan & Di Domenico, 2015). At an organisational level, employers are promised novel insights and solutions that might enable them to identify measurable ways of improving financial and employee outcomes (Bania, 2015). These data-driven insights are claimed to enable employers to optimise infrastructure, operational processes, and managerial and strategic practices (Wang, Kung, & Byrd, 2018). As well as describing existing patterns of outcomes, big data proponents also claim therefore that the results may also make it increasingly possible to anticipate and predict future workplace trends and solutions, prescribing appropriate courses of action (Lytle, 2016). Despite embodying these promises and hopes, big data has inevitably thrown up new critical questions for employers too.

1.1. Big data in organisations: Ethics, embeddedness, strategy and risk

To date, theoretical development of the ethical issues surrounding

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big data and organisations has been largely neglected (Nunan & Di Domenico, 2015). Nevertheless, a number of frameworks and theoretical starting points exist that may be instructive for researchers and practitioners, and are developed further here accordingly. In terms of the general opportunities, challenges and unintended consequences arising from big data's socio-technical embeddedness in organisations and societies, these can be theoretically recognised by principles of actor-network theory (Latour, 2007), socio-technical systems approaches (Davis, Challenger, Jayewardene, & Clegg, 2014), and other, related social constructivist perspectives on technology and organising (Leonardi & Barley, 2010).

In strategic and economic terms, the resource-based view of the firm (e.g. Grant, 1991) and other strategic frameworks may also be helpful to identify the costs and benefits for organisations associated with big data efforts, such as the degree to which their efforts will generate the hoped-for insights that could contribute to a sustained competitive advantage. However, here we will consider more specifically the possibility of big data risks and accidents, such as data leaks and other misuses and mishandlings of information by employers and organisations. Risk analysis, and how best to apply it to information systems security, has long been a concern in information management, along with the importance of considering risk from the perspectives of various organisational stakeholders (e.g. Jayaratna, 1994). Greater consideration towards HR, managers and employees as users of big data is therefore another iteration of this holistic relationship between risk management and information security management (Soomro, Shah, & Ahmed, 2016).

1.2. Risk management and big data in human resources

In human resources (HR) practice, risk management and (big) data management intersect in a number of areas, most notably in terms of how HR and data risks and practices may result in or mitigate corresponding reputational or legal risks (Becker & Smidt, 2016). We wish to extend the arguments of Becker and Smidt (2016) by urging that they be applied more specifically to how big data is collected, managed and stored. From a risk management perspective, the use of big data may be related to levels of unpredictability in business contexts and the priorities around managing organisational and environmental uncertainty. Becker and Smidt (2016) do not explicitly pick up on big data as a source of risk or how HR practices could help mitigate big data risks in their review. However, several of their conclusions are pertinent to managing risks around big data in at least three main ways.

First and foremost, we suggest that big data actually reinforces the need for an overall informed risk management strategy and appropriate HR practices for preventing certain risks to individuals, employers and the organisation at large. HR functions and professionals have a key role to play here, due to the data they are responsible for managing internally. Through their responsibility for employee data, HR can participate in risk management and ensure the development and adoption of best practices when dealing with big data challenges that arise due to internal as well as external stakeholders and interdependencies (e.g. with data storage providers and consultants). Performance management and effective communication are two HR mechanisms noted by Becker and Smidt (2016) as ways of reducing risks associated with unethical or illegal behaviour. These risk management responses will unfold in important ways in the future, given that the monitoring of employees will far exceed previous levels due to simultaneous increases in both the breadth and depth of monitoring engendered by big data. Along these lines, ethical lapses in data sharing and curation, and the relationship of big data monitoring practices to whistleblowing and data leaks will likely be worthy topics of future research on big data, information management and HR (Kayes, Stirling, & Nielsen, 2007).

Second, HR has traditionally been at the forefront of ensuring employee health and safety, as reflected most recently in employee well-being agendas. Accordingly, Becker and Smidt (2016) recognize labour turnover and burnout as major HR risks, due to the negative impacts they can have on the individual and organisation. We would therefore argue that big data efforts within organisations represent an emergent risk factor in this area, as they may undermine employees' health and ability to maintain a healthy work-life balance, due to continuous and pervasive monitoring and the increased performance pressures and work intensification that could arise. Such outcomes can be reasonably assumed by extrapolating from the negative effects demonstrated by research conducted on electronic performance monitoring over the last thirty years (Jeske & Santuzzi, 2015; Karim, Willford, & Behrend, 2015). Currently, however, it is unclear how absenteeism versus presenteeism, or counter-productive work behaviours (e.g. manipulation of systems or recording devices by employees), relate to the implementation of internally-focused big data efforts. Future research should therefore certainly try to establish whether big data employee monitoring reinforces and exacerbates presenteeism and work-life conflict, and through which mechanisms and under which contextual conditions.

Third, Becker and Smidt (2016) also note risks arising in relation to staffing decisions, such as the decision to outsource HR or reduce headcount. Such decisions may then lead to new provider risks, disappointing costs savings due to the provider not delivering the predicted savings, and the loss of confidential information (Becker & Smidt, 2016). All of these outsourcing and workforce risks are inherently reproduced in big data collection efforts, which involve both internal and external stakeholders in the form of entities that replace internal analysts, data management services, and so on. Furthermore, as has been the case with the implementation of HR information systems (HRIS), associated risk analysis might need to cover security, legal and financial risks (Becker & Smidt, 2016). It is unclear, however, whether or not this approach is actually being adopted by organisations who pay third parties to collect data on their behalf from a number of different sources.

In sum, there appears to be greater risk cognizance in HR research building up over time (Becker & Smidt, 2016); however, it is currently unclear to what extent this is feeding into big data initiatives and the digital ecosystems of providers involved in these efforts.

2. Theoretical perspective

Normal accident theory (NAT; Perrow, 1984) is a conceptual framework we wish to draw on in the context of risk management. The focus of this framework is not on risk prevention; rather it deals with and is applied to the outcomes of 'data accidents', a phrase coined by Nunan and Di Domenico (2015) that extends NAT to reflect the heightened levels of complexity, tight coupling and catastrophic potential of big data ecosystems.

Like normal accidents but more so, these data accidents are defined in terms of their being less tangible, less predictable in terms of long-term consequences, more likely to remain unknown unless carefully detected, and due to the way in which they may emerge, impossible to prevent. The use of NAT is helpful here to understand the *inevitable* challenges employers may face when trying to regulate the use of big data in their organisations. Key to the theory is the recognition that accidents will eventually arise as a function of complex systems responsible for collecting big data. The 'system' here concerns the distribution and storage of big data, which may be enabled by multiple entities internal and external to the organisation, as well as various technologies. Nunan and Di Domenico (2015) therefore explicitly emphasize the importance of more proactive, careful design of data management mechanisms within organisations: "the ethical issues with big data lie not so much with its collection but with the weaknesses in organisational processes and systems that enable it" (Nunan & Di Domenico, 2015, p. 10).

Many physical and virtual work environments, for example, are

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