The Ethics of People Analytics

The Ethics of People Analytics: Risks, Opportunities and Recommendations

Authors: **Aizhan Tursunbayeva**; Stefano Di Lauro, Gilda Antonelli, **Claudia Pagliari**

Journal:	*Personnel Review*
Manuscript ID	PR-12-2019-0680.R2
Manuscript Type:	Review Article
Keywords:	Human Resource Management, People analytics, HR analytics, Workforce analytics, Human Resource Information Systems (HRIS), Ethics
Methodologies:	Mixed Methodologies

Abstract

Purpose: This research analyzed the existing academic and grey literature concerning the technologies and practices of People Analytics (PA), to understand how ethical considerations are being discussed by researchers, industry experts and practitioners, and to identify gaps, priorities and recommendations for ethical practice.

Design/methodology/approach: An iterative 'scoping review' method was used to capture and synthesize relevant academic and grey literature. This is suited to emerging areas of innovation where formal research lags behind evidence from professional or technical sources.

Findings: Although the grey literature contains a growing stream of publications aimed at helping PA practitioners to 'be ethical', overall, research on ethical issues in PA is still at an early stage. Optimistic and technocentric perspectives dominate the PA discourse, although key themes seen in the wider literature on digital/data ethics are also evident. Risks and recommendations for PA projects concerned transparency and diverse stakeholder inclusion, respecting privacy rights, fair and proportionate use of data, fostering a systemic culture of ethical practice, delivering benefits for employees, including ethical outcomes in business models, ensuring legal compliance, and using ethical charters.

Originality/value: By using a scoping methodology to surface and analyze diverse literatures, this study fills a gap in existing knowledge on ethical aspects of PA. The findings can inform future academic research, organizations using or considering PA products, professional associations developing relevant guidelines, and policymakers adapting regulations. It is also timely, given the rise in employee analytics since the start of the Covid-19 pandemic.

Research implications: This research adds to current debates over the future of work and employment in a digitized, algorithm-driven society.

Practical implications: The research provides an accessible summary of the risks, opportunities, trade-offs, and regulatory issues for PA, as well as a framework for integrating ethical strategies and practices.

Introduction

People Analytics (PA) is an emerging area of innovation which, although it draws on traditional principles of human resources management (HRM), represents a seismic shift in the power of organizations and their leaders to understand, shape and strategically optimize their workforce (e.g. Fitz-Enz and Mattox II, 2014). This shift arises from the use of digital and data science methods to harvest, analyze and visualize complex information about individual employees, teams, divisions and the workforce as a whole, to provide actionable insights. Such approaches, which may be applied at the level of discrete applications or enterprise-wide information and communications infrastructure, can enable greater transparency about individuals' performance, skills, aptitudes, weaknesses, threats and future potential and may be useful throughout the employee lifecycle, from talent acquisition to retirement (e.g. Edwards and Edwards, 2016). They can also be used to profile team dynamics and communication networks, to understand their effects on organizational resilience and outcomes (e.g. Cross *et al*., 2010). Recently, machine learning and artificial intelligence (AI) have begun to feature in these innovations to analyze complex performance data, screen potential employees, develop personalized training recommendations, enable smart scheduling, predict future performance, infer employee satisfaction, or gear payments to employee 'value' (e.g. Nunn, 2018).

Increasingly, PA techniques are extending beyond in-work metrics to new areas hitherto outside the reach of Human Resource (HR) departments or managers, including the monitoring of employees' personal emails, social media activity and interactions with digital devices, and apps. These may be presented as a means of supporting the employee experience or enhancing 'workplace wellness' whilst, in fact, also providing 24/7 intelligence about location, activity, mood, health and social life (e.g. Ajunwa *et al*., 2017). Employee data is also being used to train algorithms to modify or 'shape' behavior in and outside of the workplace, such as through gamifying tasks and incentives (e.g. Cardador *et al*., 2017).

Although relatively new, PA innovations are slowly, and often silently, working their way into routine practice in many organizations. Indeed, 84% of respondents in the 2018 Global Human Capital Trends survey (Deloitte Insights, 2018) reported PA as being important or very important, making it the second highest ranked HR trend. While it is unsurprising, and to some extent encouraging, that organizations are keeping up with new technologies and seeking to improve their effectiveness and resilience through better use of data, few are meaningfully engaging with the important ethical challenges and risks these present for employees' privacy, autonomy, and future work opportunities (Tursunbayeva *et al*., 2018). Conversely, organizations may be unaware of the potential of PA to shine a light on unethical practices, such as corporate gender bias, fraudulent expense claims or intellectual property theft, which could help to improve accountability and integrity in the workplace (e.g. Holeman *et al*., 2016). Balancing these ethical requirements is challenging (Delios, 2010) and magnifies existing ethical dilemmas for HRM professionals faced with the need to produce efficiency gains without demoralizing the workforce (e.g. Ekuma and Akobo, 2015). Nevertheless, grasping this nettle is imperative, given changes in the social, regulatory and policy environment over the last decade, as described in Box 1:

Box 1. The changing context of accountability

- The public has become more critical and less forgiving of corporate misbehaviour (Rivera and Karlsson, 2017)
- Regulations and laws on the protection of personal data have become more proactive and punitive in many countries (e.g. European Commission, 2020)
- More companies are pursuing growth in emerging markets where ethical risks may be heightened or relying on extended global supply chains that increase counterparty risks
- Digital communication has become the norm, exposing companies, and the executives who oversee them, to new information risks
- The 24/7 news cycle and social media can rapidly spread and amplify reputationally damaging stories
- Employee lawsuits are on the rise, with personal data abuse set to join gender and racial bias as top trends (e.g. Fernandez-Campbell, 2018)

Two academic scoping reviews focused on PA systems and practices have recently been published (Marler and Boudreau, 2017; Tursunbayeva *et al*., 2018). The former draws on the scholarly literature, while the latter draws also on a wide range of online sources to map the emergence of the term PA, the value propositions offered by vendors of PA tools and services and the PA skillsets being sought by professionals. Amongst other findings, these revealed that there has been little academic research on the topic of PA, despite the mushrooming market penetration of vendor solutions and widespread corporate interest in engaging with these innovations. An important observation arising from one of these reviews was the "***near absence of ethical considerations in the corpus of academic, grey and online literature, despite the significant risks to privacy and autonomy these innovations present for employees"*** (Tursunbayeva *et al*., 2018), suggesting a need for further investigations.

The European General Data Protection Regulation (GDPR), has begun to orient vendors and users of PA innovations to their vulnerabilities and potential liabilities (e.g. Politou *et al*., 2018), but leaves gaps for which ethical guidelines are needed (Sodeman and Hamilton, 2019). This includes the new types of risk presented by predictive algorithms and biometric data, which have implications for choice, control, and identity in the context of work.

Although no research-driven framework of ethical considerations for PA so far exists, the literature on HR ethics offers high-level principles which are relevant to this discussion. For example, the Chartered Institute for Personnel and Development (CIPD) considers a range of different 'lenses', for HR ethics, at the heart of which is the concept of fairness, which is grounded in moral philosophy (Clark, 2015) and principles around work as a force for good, respect for employees and the importance of integrity for the 'people profession' (CIPD, 2020). The specialist community of practice involved in the development and implementation of PA systems, has also recently started to take ethical issues more seriously, giving rise to an untapped literature in need of synthesis (Mixson, 2019).

This rapid scoping review aimed to respond to this gap through a targeted examination of the ethical issues described within existing academic and professional discourse on PA. The objectives were to map the risks/opportunities and recommendations expressed in these communities, alongside related literature and real-world examples. As such, it complements existing socio-legal analyses on topics such as workplace surveillance and the gig economy (e.g. Ajunwa *et al*., 2017; Wood *et al.,* 2019) and contributes to emerging discourses on the future of work. It uses plain English to summarize and synthesize the issues in a way that can be easily interpreted by our target audiences (see Figure 1) and used in practice.

Insert Figure 1. Key stakeholder groups in PA

Method

Scoping review methods are suited to emerging areas of innovation, where formal research may be sparse but sources of relevant evidence and knowledge are nonetheless accumulating (Arksey and O'Malley, 2005). Rather than attempting to be exhaustive and replicable, as with systematic evidence reviews, these reviews are designed to rapidly understand the scope, key considerations and maturity of an area, typically to inform research or policy.

Search strategy and article screening and selection

Scoping academic literature: Seven HR-related keywords from recent HRIS and PA literature reviews (Tursunbayeva *et al*., 2016; Tursunbayeva *et al*., 2018) were combined with ethics-related keywords to iteratively search the Web of Science Core Collection (WoS) for literature published prior to 31/12/2019, as shown in Figure 2. WoS is an interdisciplinary online literature database covering publications from the sciences, social sciences, arts, and humanities. Snowballing from qualifying article reference lists was used to find other relevant works.

Scoping socially-curated grey literature: Seven PA hashtags were created from the seven HR-related keywords used to search the academic literature, and then combined with the #ethics hashtag (Figure 2). Twitter's "advanced search" function was then used to identify tweets linking to relevant articles, studies, industry reports or other information sources, which we refer to as "socially curated" grey literature. The preliminary search period was 21/03/2006 - the date when Twitter was created - and 31/12/2019. The full texts of articles identified via the Twitter hashtag searches were located and analyzed. Additional articles identified through "snowballing" from these publications and recent relevant papers known to the authors were also integrated during the synthesis and interpretation phase.

Data analysis

The *disciplinary affiliation* of academic journals publishing PA research was assessed with reference to their classification in the Scimago Journal Ranking Portal (SJR) (2019). Seven articles were classified manually, as the journals were not covered by SJR. Finally, we checked the number of *citations* appearing for each article in Google Scholar, to identify the most impactful ones, and extracted and grouped the *key concepts* covered in the included articles.

In the absence of a theoretically informed framework for classifying PA ethical risks, we used open-coding to identify themes in the eligible academic and curated grey literature, to create a set of categories for organizing the findings.

Results

Publication characteristics

Academic research and commentary

Searching WoS yielded 226 articles, 204 of which were in English. After screening by title, 51 of these articles were judged as potentially relevant and their full texts reviewed, together with a further nine articles identified through snowballing from the reference lists (see Figure 2).

Articles that simply mentioned the need to consider ethical issues in PA (e.g. Mesko *et al*., 2018) or did not focus specifically on both PA and ethics (e.g. Newman *et al*., 2017) were excluded, leaving a total of 14 articles in the final sample of relevant academic papers (see Appendix A).

Seven of these publications appeared in the last couple of years, peaking in 2017 (n=5), although the first relevant article was published in 2005. Four of the articles published in journals available in SJR (n=5) appeared in multi-disciplinary journals.

Fourteen of the papers' authors are affiliated with academic institutions in the US. The remaining authors are affiliated with academic institutions located in the UK, Germany, Ireland, Thailand, Singapore, Australia, Finland, and Sweden. Overall, ten relevant articles were discussion or conceptual papers, three were empirical papers, and one reported on an experiment.

Socially-curated grey literature

Three hundred ninety-nine tweets containing the hashtags of interest were identified (see Figure 2).

Insert Figure 2. Approach to identification, screening, and analysis of academic and grey literature

Of these, 323 contained "#peopleanalytics #ethics", 61 contained "#hranalytics #ethics", 14 contained "#workforceanalytics #ethics" and one contained "#talentanalytics #ethics" hashtags. The remaining keywords combinations, including "#employeeanalytics #ethics", "#humancapitalanalytics #ethics", and "#humanreseourcesanalytics #ethics" did not generate any results. Aside from the hashtags used for the search, the most commonly used hashtags were #HR (used 205 times) and #futureofwork (used 160 times).

271 tweets remained after removing duplicates. The first relevant tweet appeared in 2015, however, the majority were published in 2019 (n=126) (see Figure 3).

Insert Figure 3. Twitter results infographics

Conference live tweets, links to webinars, YouTube videos, other posts, non-working links or articles that we were unable to find were removed from further analysis, leaving 52 tweets containing links to unique articles, which were included for full text analysis alongside 16 additional grey literature publications that were snowballed or that the authors were familiar with based on the background readings (see Appendix B). Most of these publications (n=23) were published in 2019.

Analysis and discussion

Relevant issues identified in the PA literature fell into two broad categories – ethical risks (and conversely opportunities) and recommendations, with a range of specific themes evident within each of these, as summarized in Table 1.

Insert Table 1. Risks and recommendations emerging from the analysis

To aid contextualization and interpretation, we discuss these categories alongside other relevant literature and real-world examples in the following section. Eligible articles identified with our search strategy are marked with an asterisk, to differentiate them from other sources.

Ethical Risks

Operationalizing bias and discrimination.

Arguments favoring the use of PA solutions rely on the notion that they are objective; indeed, many are designed with the 'good' intention of enabling HR decisions based on data rather than flawed or biased human reasoning. Nevertheless, since these systems are designed by humans the potential for prejudice, misunderstanding, and bias to be encoded into their algorithms remains.

In 2015 Amazon discovered that its 'recruitment engine', used for screening and prioritizing potential software developers, had been systematically discriminating against female applicants. The system had been trained, using machine learning, to look for key patterns and terms in resumes submitted to the company over ten years, primarily from men. *"In effect, it had taught itself that male candidates were better"* (Dastin, 2018*). Although Amazon sought to correct this bias, it finally abandoned the system in 2018. The case illustrates how purely algorithmic PA systems can potentially have unintended discriminatory consequences, by using data about race, age, gender, sexual orientation and disability to sort candidates.

Such bias may also be purposefully designed; for example, Facebook's ad-targeting algorithms were implicated in a lawsuit filed by the Communications Workers of America on behalf of its 7000+ members. Originating with a complaint against T-Mobile by a job seeker who discovered that she was not seeing the same ads as her daughter, this has extended to a Class Action against hundreds of other companies that used Facebook's platform for allegedly ageist job advertising (Fernandez-Campbell, 2018). Writers such as Kim (2017*) point out that this type of 'classification bias', is not adequately covered in existing legislation, such as the US Age Discrimination in Employment Act. (In July 2019 Google settled a similar age discrimination lawsuit against Google's Alphabet, although it is unclear whether PA was implicated.)

Psychological or social profiling.

PA has its roots in psychometrics and may embed tests of personality and aptitude in its hiring and promotion algorithms. According to the Association of Graduates, 60-70% of prospective

employers in the US and the UK are using online personality tests in recruitment, which has been estimated as a $500 million business growing by 10-15% a year (O'Neil, 2016a*). Opponents of this form of human quantification argue that such tests can overlook moral character (Geller, 2018) and cultural or ethnic differences (Kirke, 2019). They might also identify differences that could be labeled as disabilities or mental health conditions, and thus be illegal under the Americans with Disabilities Act of 1990 (O'Neil, 2016a*), particularly if they are used as *"a mask for discriminating against a protected class"* (Anderson, 2018). Although few job applicants rejected on the basis of such tests contact a lawyer, incomplete feedback and lack of expert knowledge on sources of bias, means they are unlikely to be aware or empowered to do so (Kim, 2017*). Greater transparency is called for in this regard, particularly since personality tests could potentially be poor predictors of job performance and may thus be both unfair on candidates and inefficient for employers (e.g. O'Neil, 2016b*; O'Neil, 2018). Meanwhile, with some recruiters now harnessing cross-platform analytics to profile potential employees from their 'digital exhaust' trails, psychometric testing may soon be supplanted by passive data mining, presenting new ethical challenges around transparency, choice and privacy rights (Cappelli, 2019).

Behavior shaping.

Data on individual employees' performance patterns, combined with other data – such as mining sentiments in emails, responses to questionnaires, is also being used to feed algorithms that can send personalized messages, to *shape or "nudge" behavior*. Based on principles from behavioral economics and persuasive psychology, these aim to encourage the achievement of work-related goals, for the individual, team or organization. An example referenced in our grey literature results is the company Humu, founded by former Google executive Lazlo Bock. Humu's "nudge engine" can set up reminders, prompt questions during meetings, as well as encourage employee-centric activities like saving for retirement or opting for healthier snacks

(Wakabayashi, 2018*; High, 2019*). While the company has been keen to show its ethical credentials by emphasizing its respect for privacy and its ability to influence employees' personal job satisfaction (e.g. High, 2019*), critics have pointed to a lack of transparency around the purposes of nudges, and uncertainties over whether employees know they are being nudged, raising ethical questions around users information rights, effects on their personal autonomy and protection from manipulation (Wakabayashi, 2018*).

Reducing performance/people to numbers.

HR departments and senior managers are widely using PA tools to monitor, and measure (e.g. Guenole *et al*., 2018*) the performance of individuals, teams and their workforce as a whole, presenting a range of ethical challenges.

Individuals: In contrast to screening and recruitment, using PA for performance management and promotion requires a stronger emphasis on compliance with training, the achievement of targets and subjective ratings by managers. In the era of PA, these are becoming more automated, with enterprise software making it easier for HR managers to quantify and profile performance and time usage even at a distance. Proponents of PA argue that this can provide workers with objective insights about their performance, optimize their development and improve the objectivity of promotion decisions (Chowdhury, 2018*). Despite these worthy goals, reducing employee performance to numbers can devalue other important characteristics that are harder to measure and has also been criticized for lacking context (O'Neil, 2016b*). Technologies that allow keystrokes to be logged and work to be viewed by supervisors also create a panopticon effect, reducing workers' privacy and autonomy, with potentially negative effects on work satisfaction and mental health (Booth, 2019*). They have also been shown to affect employees' inclusion in and access to future training and development opportunities (Jeske and Calvard, 2019).

Teams: Advocates of PA also claim that it can bring insights about how teams are working, which can improve their productivity and engagement. For example, using PA to help basketball teams understand their players, and track and review mistakes, is reported to have had good results (O'Neil, 2016b*). Companies like Google and Microsoft are exploring how this can be achieved in business settings (Hogan, 2016), although preliminary evidence suggests that such analytics may offer limited value. For example, despite collecting multiple data points, Google's Aristotle project was unable to identify consistent characteristics of successful teams or team members (Bodie *et al.,* 2016). These approaches also run the ethical risk of reducing teams to the status of machines, in which 'suboptimal' components can be replaced, as well as ignoring the value of both diversity and synergistic working (O'Neil, 2016a*).

Populations: Some PA projects have been criticized for targeting organizational populations more than teams and individuals, creating the potential for data and machine learning to over-prioritize and incentivize prototypically ideal characteristics, at the risk of creating a vanilla workforce that fails to reap the benefits of individuality (O'Neil, 2016a*).

Creating inconvenience or income insecurity.

Some PA tools have also been blamed for causing inconvenience to employees, particularly by automatically altering work schedules in sectors with fluid workforces. For example, Starbucks used diverse types of data - from the weather to pedestrian patterns - to feed its scheduling software, resulting in uncertainty about available shift work (O'Neil, 2016b*). Data compiled by the US government suggests that two-thirds of food service workers consistently get short-term notice of scheduling changes. Following an exposé in the New York Times, legislation was introduced in Congress to rein in scheduling software, but its progress has been stalled (O'Neil, 2016b*). In the on-demand 'gig' workforce, this problem is likely to become more prominent, adding to income insecurity (Crerar, 2018). For example, a study of Uber drivers, highlighted in our grey literature results, found that while they are *theoretically* in control of

their work, deviating from the company's algorithms could result in being banned from the platform (Mohlmann and Henfridsson, 2019*). Some governments are seeking to tackle this with expectations of guaranteed-hours employment and equal pay (e.g. UK) but competition and globalization of the labor market are likely to make this hard to implement (e.g. Amazon Turk).

Threatening privacy or autonomy through tracking and surveillance.

Issues around privacy and surveillance dominated the ethical considerations examined in both the academic and grey literatures. PA is often promoted as a means of enabling managers and organizations to track and monitor their employees, both in the workplace and, in some cases, even in their personal lives; for example, where these are linked to mobile phones or social media accounts. Some scholars have speculated that the global variation in levels of workplace monitoring reflects technological more than ethical differences (Pitesa, 2012*), while others point to the role of political and cultural influences (Guenole *et al*., 2018*).

A number of academic articles have analyzed the diverse methods through which employees can be monitored or surveilled. These can include pre-employment checks including credit reports, driving records, criminal records, and drug testing data checks; as well as on the job monitoring including electronic performance monitoring, e-mail monitoring, audio, video (Pitesa, 2012*), and location surveillance (Kaupins and Minch, 2005*).

Recently, the research firm Gartner found that more than 50% of the 239 large corporations it surveyed are using “nontraditional” monitoring techniques, including scrutinizing who is meeting with whom; analyzing the text of emails and social media messages; scouring automated telephone transcripts; and even gleaning genetic data (Wartzman, 2019*). Other research revealed similar results, reporting that leading PA users are monitoring people data from diverse sources, including surveys (76%), integrated data from HR and financial systems (87%), and social media (17%) (Agarwal *et al*., 2018*). CareerBuilder’s independent survey of

2,300 hiring managers reported that 70% of respondents in 2017 also use personal information obtained from social media to screen candidates, while 54% reported finding information on social media that led them not to hire a prospective candidate for an open role (Mann *et al*., 2018*). The most commonly cited factor for this was the candidate posting provocative or inappropriate content. The survey also reported that third-party data brokers are often used to acquire this information, raising additional challenges for governance and accountability (Mann *et al*., 2018*).

In contrast, narratives in the grey literature (mostly industry sources) suggest that most employees are acceptive of digital monitoring. For example, in a blog for the Academy to Innovate HR, Mann and colleagues (2018*) cite a survey by ExecuNet suggesting that 82% of employees expect prospective employers to 'google' them, although only 33% bother to google themselves. It has been argued that this acceptance is a result of organizations' success in persuading employees that sharing personal information is in their interest, thus shifting perceptions of workplace monitoring away from "authoritarian regimes" and towards something that "evinces an ostensibly participatory character" (Wartzman, 2019*) or to "participatory surveillance" (Marchant, 2019*).

Employee tracking and monitoring projects were mentioned as particularly risky in the creative and innovative industries, where people can require time-out for brainstorming ideas, which might be measured by PA software as time spent not working (Booth, 2019*). Likewise, as noted by Kim (2017)*, a system cannot know when an employee has an upset stomach and needs to be away from their desk - it just senses that they are not currently working.

Not only might monitoring tools and programs provide organizations with *incomplete or low-quality data*, as in the examples above, surveillance may have unintended negative effects on work. One academic experiment revealed that the prospect of active monitoring reduced potential employees' impressions of an organization's ethics as well as the likelihood of job

acceptance and job satisfaction (Holt *et al*., 2017*). While higher pay significantly increased the likelihood of job acceptance, it only marginally increased perceived job satisfaction. The same experiment also revealed that none of the potential justifications given by an employer for monitoring changed participants' perspectives on its ethicality or their willingness to work at such a company (Holt *et al*., 2017*).

Employee *'wellness programs*', represent a particular class of workplace monitoring, which may require staff to share their medical data, wear a biometric monitoring device, or even to be microchipped. An employee survey on wearables by PwC reported that 37% did not trust their employer not to use the data against them in some way (Jacobs, 2017*). Nevertheless, many organizations are still in the process of adopting wellness programs, despite little evidence of their effectiveness. The Illinois Workplace Wellness Study (Jones *et al*., 2019) enrolled 5,000 employee volunteers in a randomized controlled trial of a program involving biometric health screening and online health risk assessment, linked to health and wellness classes and financial incentives. The results revealed no impact on employee health outcomes, productivity or company medical spending, and there was a strong self-selection effect, with healthier employees more likely to participate. From an ethical perspective, this suggests that such programs may inadvertently widen health inequalities. Such programs have also been criticized for placing undue responsibility for health on the individual, and for penalizing those who cannot comply, such as the disabled (Carroll, 2018*). Moreover, while they are typically framed as benign and helpful, they are often designed more to reduce corporate costs than benefit workers (Kellar-Guenther, 2016).

Even strong opponents of workplace monitoring, such as the American Civil Liberties Union, acknowledge that employers have a right to undertake some monitoring (Kim, 2017*), although it calls for ethical standards. Indeed, the academic literature already contains proposals on how to make workplace monitoring less stressful. This can include, for example, informing

employees about the monitoring system; setting fair performance benchmarks; and using documentation, or records, for benign purposes rather than for sanctions Moussa (2015*). Educating and communicating with employees about monitoring are also identified as the best ways to attain their consent and agreement (Kim, 2017*).

Ethics as a point of risk for PA projects.

A theme seen in the grey literature concerned the role of ethics as a challenge for PA projects, reflecting a growing acknowledgment in the profession that successfully implementing these innovations is highly dependent on their privacy and acceptability. In an Insight222 survey of 57 companies, 81% of respondents reported that their workforce analytics projects were sometimes or often jeopardized by data ethics/privacy concerns (Petersen, 2018*). Some organizations have been criticized for spending money on PA systems but failing to act on the insights they bring about unproductive work (Smith, 2015*), creating a gap between leaders and laggards in PA adoption (Fleming *et al*., 2018*).

PA projects are relatively new, so *organizations currently lack an extensive history of legal, ethical or risk precedents to consult*. It has been claimed that existing risk management strategies are not fully applicable to PA projects because organizations may be unable to recognize indicators of potential failure (Calvard and Jeske, 2018*).

Other concerns, reflected in both the academic and grey literature, relate to *employees' lack of trust in PA proje*cts or their outcomes. A recent study concluded that 63% of employees believe that their employer is tracking or gathering sensitive data about them, and 72% believe their companies are not telling them what data they are collecting (Pease, 2018*). Employees who do not trust their employers are less likely to provide relevant, truthful information. Knowing one is being observed and judged or ranked on a second-by-second basis, can also lead to people gaming the system (Jacobs, 2017*).

Organizations are also reportedly putting PA projects on hold due to uncertainty over their regulatory compliance; particularly with the high-profile GDPR. Despite this, in the run-up to its enforcement in May 2018, only 53% of companies reported that they had been getting ready for GDPR and only 22% that they had excellent safeguards to protect employee data (Green, 2018*). The penalties for breaching GDPR can be severe, with organizations failing to safeguard or misusing personal information facing fines of up to €20m or 4% of annual worldwide turnover (Mann *et al*., 2018*). However, while GDPR represents a significant advancement of employee rights in the digital era, its primary focus on protecting personally identifiable information leaves open questions around the uses of anonymized or non-identifiable data. More significantly, it only applies to EU citizens, albeit also to companies processing their data overseas. Australia and New Zealand are also reported to have comprehensive regulations to protect employees' privacy (Pitesa, 2012*). However, there is a regulatory deficit in other regions, particularly in developing countries. Nevertheless, even in the EU, legislation on diverse types of privacy is not equally mature. For example, the right of an individual (whether an employee or not) to location privacy has not been established anywhere in the world, albeit this is implicitly covered by broader laws on personal data in several countries. As an illustration, the Finnish Personal Information Law and Law about Privacy and Security of Telecommunications are said to apply to location privacy although "there are no laws in Finland that concern location information" (Sami, 2004 as cited in Kaupins and Minch, 2005*). Conflicting rules on the data rights of employers and employees also create complications when it comes to PA, with the invocation of 'legitimate interest' under GDPR giving rise to ambiguity when it comes to privacy rights (Petersen, 2018*).

The lack of robust legal protections in diverse parts of the world, including the US, has been exacerbated by the declining role of trade unions as a force to advocate for workers' rights (including privacy rights). In the US, this has been made worse by "at-will" employment

contracts, in which employees can be fired for any reason, giving employers greater coercive powers over their employees (Suk, 2007), including through surveillance.

Judging what is acceptable and what is possible was mentioned as another huge dilemma for HR and PA professionals. Many authors mentioned not only legal but also moral or ethical dilemmas. One observation was that the agenda in PA projects is often left to technologists, computer scientists or PA vendors, when what is really needed are experts in human behavior and ethics (Calvard and Jeske, 2018*).

Increasingly, employees are putting pressure on corporate leaders to be more ethical, in some cases staging protests and walkouts in response to perceived misuses of data or algorithms (e.g. Helmore, 2019). State-sponsored programs applying PA-like tools to workers are also raising concerns. For example, secretive data-mining company Palantir was recently found to have covertly installed an app on manual workers' phones, to monitor their movements, social networks, and communications. The project, conducted in association with the US immigration authorities, resulted in multiple sackings and deportations of undocumented migrants (Joseph, 2019).

Recommendations

In addition to the concerns raised in the academic and grey literatures, a number of suggestions and recommendations for managing the ethical risks of PA projects were seen in the literature, which we have clustered into the categories shown in Table 1 and are discussed below.

Transparency and Fairness.

Transparency was identified as being one of the most critical considerations for PA projects. Diverse articles recommend that organizations communicate their reasons for pursuing PA projects, and the kind of benefits employees should expect from them, rather than only describing what they will involve. PA projects lacking transparency may be perceived by

employees as unfair and thus encounter resistance to participation or acceptance, although there is also a lack of clarity in how to define or measure fairness (Manyika, 2019).

Legal compliance.

Adherence with legislation is an essential building block of all HR data policies. A survey by Privacy International and freedominfo.org found that 57 countries, mostly from Europe and North America, have passed privacy legislation, while a further 37 countries, mostly in Africa and South America, have pending efforts (Kim, 2017*).

Many authors referred to the introduction of GDPR as an opportunity for European organizations to review their compliance with relevant laws and regulations. It was also recognized that technology is rapidly evolving in ways that may be difficult to anticipate, and a pressing question for HR practitioners is what to do in new situations that are not covered adequately by legislation, bearing in mind that what may be legal is not automatically ethical.

Ethical guidelines and charters.

Reports in the grey literature strongly recommend that organizations develop and publish clear guidance in the form of an ethical charter, potentially in collaboration with other organizations. A recent survey revealed that almost half of respondents do not have a PA-related ethical charter in place yet (Petersen, 2018*). Aligning the charter with the social norms of the country in which the organization is located was also seen as important, since attitudes towards personal data collection and analysis can vary between countries and cultures (e.g. Guenole *et al*., 2018*). The PA-related guidance recently developed by consulting firm Insight222 (Green, 2018*) was cited as a useful resource, while it was also noted that HR professionals are bound by broader Professional Standards (e.g. CIPD) that should guide their ethical standards of practice also related to PA (Green, 2019) .

Proportionality and Protection.

Articles in our review emphasize that PA practitioners need to understand which approaches to data storage, access or analysis are permitted in their jurisdiction, who their stakeholders are and their access rights, and who 'owns' the data on employee-held devices such as laptops and mobile phones (Jones, 2017*). They call for a better mapping of the data types and methods used in PA, recognizing that *"the ethical issues with big data lie not so much with its collection but with the weaknesses in organizational processes and systems that enable it*" (Nunan and Di Domenico, 2015, p. 10 as cited in Calvard and Jeske, 2018*). They also acknowledge the co-dependencies between technologies, laws and social attitudes about what data should be protected and what should not (e.g. as for employees with disabilities, where data may potentially be used both to discriminate and to prevent discrimination).

It is strongly recommended that data collected for PA projects should be strictly job-related, though it is acknowledged that it is not easy to draw a line between what is personal and what is job-related, especially where data is collected from employer-owned cell phones or notebooks (Bersin, 2019*).

The use of aggregated, non-identifying data is recommended where possible, to demonstrate to employees that the purpose behind PA projects is to capture larger organizational trends. For small teams, it is recommended to present a generic overview of the results, ensuring that no single response can be attributed to a specific employee (Kumar, 2018*). Moreover, data that is not permitted or no longer useful should be deleted, as it is claimed that about 60% of organizations possess such data and HR departments are among the worst offenders (Jacobs, 2017*).

As employees' awareness of PA grows, they will start exercising their rights and may request that HR correct or erase their data, increasing the need for transparency and security on the part of HR/PA software providers and teams (Haim, 2018*). Blockchain is suggested as one opportunity for good governance, enabling digital verification of employees' profiles, as well

as allowing potential new-hires to own and manage their data during the recruitment process (Spence, 2018*). Approaches to 'privacy by design' are also advocated, both when creating procedures for the use of legacy HRIS and developing new digital platforms (Lingard, 2018*), with a requirement to review their compliance on a regular basis. When selecting PA solutions organizations also need to follow ethical procurement processes and supplier management procedures (Haim, 2018*).

It was also proposed that organizations should adopt the best practices already used for the governance of algorithms in other sectors, such as healthcare and pharmaceuticals, as well as standards for data collection, integrity, preservation, and model validity (Kim, 2017*).

Data rights and consent.

Aside from the legal requirements, it is recommended that organizations inform employees of their right to opt-out of relevant data collection processes and give them the opportunity to do so. For example, employees' right to informed consent is part of the privacy guidelines from the Organisation for Economic Co-operation and Development (Kaupins and Minch, 2005*). Organizations also need to consider whether employees are making choice to participate freely (Mann *et al*., 2018*) or because they fear negative consequences. It is also recommended that consent be renewed regularly (e.g. once every quarter).

Inclusion of stakeholders.

There is an agreement, across the grey and academic literatures, that diverse stakeholders need to be consulted and involved in PA projects to ensure these are sustainable and successful (Calvard and Jeske, 2018*). Stakeholder-specific recommendations include the following:

HR and PA professionals should execute only PA projects which they can be proud of, can communicate openly about, and which are compliant with the company's privacy comfort zone (Guenole *et al*., 2018*). They are also encouraged to engage with work councils where these exist. The specific recommendation for HR teams was to take control of the PA agenda, rather

than letting it be led by suppliers, and to rigorously monitor "machine-related" decisions to make sure they are reasonable and unbiased, while also evidence-based (Agarwal *et al*., 2018*). Consulting *legal and/or compliance officers* is important for ensuring compliance with data anonymization policies and regulations, since *"HR teams cannot know everything about data privacy, legal requirements or ethics"* (Green, 2018*).

Employees are critical stakeholders in PA projects and should never feel afraid to speak up about their concerns (Leong, 2017*). Listening to employees' opinions can elucidate questionable practices that management has potentially not considered (Kumar, 2018*) and may be collected via anonymized surveys. For employees to feel safer in PA projects it is important to let them maintain a sense of ownership of the data that is being gathered (Jones, 2017*). The need to ensure that employees experience the benefits of PA projects, and not just the organization, is also seen as critical (Marritt, 2016).

Managers are also seen as crucial in creating a safe space for employees to discuss corporate ethics, to maximize transparency and minimize the dangers of whistleblowing (Leong, 2017*).

New organizational roles such as Chief Data Officer, Chief Information Governance Officer or Chief Privacy Officer, alongside information governance committees, are seen as ways of protecting employee privacy while staying in line with corporate objectives (Leong, 2017*).

Ethicists are seen as valuable consultants by some commentators, helping decision-makers and PA professionals to ensure the integrity of new projects (West, 2018*).

International organizations and governments have a macro-role to play in PA projects, as they are responsible for the creation of and monitoring of adherence to the policies related to PA practices (Kim, 2017*).

People skills and culture.

Several qualifying articles from the grey literature mentioned the importance of PA skills and talent. It was recommended that employers should ideally try to fill PA roles with internal

candidates, who can have extensive company knowledge and serve as translators in communicating the results of PA projects (Fleming *et al*., 2018*). Desirable characteristics of PA leaders noted in the articles included patience, innovation, holistic thinking, project and process management, adaptive leadership, ability to catalyze or broker analytics, and being a good brand ambassador (Green and Chidambaram, 2018*). However very few authors specified ethics amongst these soft skills. Of those that did so, it was recommended that ethics should not only be included in PA training activities but also in daily work, so employees operationalize ethical considerations (West, 2018*).

Evaluation.

Monitoring and evaluation are key considerations for PA projects, and communicating 'quick wins' can encourage buy-in. It is recommended that in addition to their benefits for employers tied to the organization's strategic challenges and broader transformational initiatives, decisions about future analytics investments can be made more ethical by taking into account their impacts on "people outcomes", and that decisions should be made by HR professionals and the company management rather than left to suppliers. In making these decisions potential harms to employees, risk management strategies for PA projects, as well as strategies for preventing or remediating any potential unintended consequences from PA should also be considered (Pease, 2018*).

Ethical business models.

It was noted in the grey literature that PA leaders are beginning to realize that *"risk may be a bigger strategic issue than growth"* and are adjusting their business models to include not only financial profits but also ethical aspects of doing business (Bersin, 2018*). As remarked in one of the grey literature publications *"thankfully, with each new data scandal, helped by GDPR rules, a new [HR technology] product is launched with a different business model"* (Spence, 2018*). This recognition is reflected in the growing interest in ethics amongst global technology

companies, including the partnership between Amazon, Apple, Facebook, Google, IBM, and Microsoft aimed at studying and advancing public understanding of AI and its influences on people and society, including ethical influences (Bersin, 2018*).

Conclusions and implications

Interest in digital ethics has risen at an exponential rate in the last few years, with governments, academics and the technology industry racing to create new ethical principles, manifestos, guidelines, and frameworks. This is reflected in the results of recent meta-review of AI ethics guidelines, published in the *Nature* journal (Jobin *et al*., 2019) whose authors remark on the variation in interpretation and the difficulty of translating principles into regulations and practices. Despite this activity, ethical considerations for PA have received relatively little attention, compared to other areas with a strong focus on data analytics, such as education or medicine.

This study set out to identify, map and describe the existing published academic and grey literature covering ethical considerations for PA, up to the end of December 2019. Our analysis indicates that discussion of ethical issues in PA has appeared in the academic and grey literature mainly (although not extensively) in the last three years; more than a decade after the first PA articles were published (Tursunbayeva *et al*., 2018). Searching the academic literature revealed little formal research into ethical aspects of PA, although searching social media exposed a growing stream of grey literature aimed at helping managers to recognize the ethical issues and adopt more ethical practices (e.g. Green, 2018). These literatures touched on philosophical, legal, societal, and data security considerations, as well as risks and potential benefits.

The majority of articles revealed by the searches were discussion papers, technical descriptions, subjective case reports, blog posts and educational resources, rather than empirical studies. Despite this apparent evidence gap, many organizations are developing, planning or already

using PA, exposing employees to potential risks for their privacy, autonomy, career options, income and wellbeing. The accuracy of the data underpinning PA and the algorithms it drives, also create new questions around error and bias, while the legality of PA practices - in terms of employment law and data protection regulations, remains unclear, particularly in relation to definitions of personal data, consent and legitimate interest under the EU's GDPR. A shift in the emphasis of PA projects, from managing individuals to managing larger organizational populations, suggests a desire to avoid these uncertainties.

While similar issues associated with rights, fairness and power dynamics have been discussed for many years in relation to HR and employment ethics (Ekuma and Akobo, 2015), the 'datafication' of work and the workforce, aided by predictive analytics and connected digital devices casts a new light on these. The literature exposed by our review points not only to increased monitoring and surveillance, but also to the automation of processes in recruitment, talent analytics, performance assessment, and the shaping of behavior, aided by developments in behavioral economics and AI, adding to concerns about work-by-numbers and the demise of choice, opportunity and fairness.

Despite these concerns, the literature yielded by our searches typically casts PA in a positive light, more so in the case of content posted via Twitter, where the majority of references to PA ethics were found, reflecting professional communities of practice. The optimistic view promotes the ethical use of data and automation to eliminate human bias from hiring, promotion and remuneration decisions, such as through eliminating gender discrimination. It nonetheless acknowledges that such approaches can backfire if the source data is skewed, as in the case of Amazon's hiring algorithms, which had been trained using data primarily from male applicants. The value of PA for exposing unethical practices such as absenteeism or intellectual property theft is framed as a way of protecting organizations. In addition, while wellness apps and

cellphone tracking could be seen as a form of backdoor surveillance, if used benignly they may potentially support employees' health and security.

The articles appearing in our search results also highlight the challenges involved in implementing PA projects in organizations while ensuring they are ethical and legally compliant, as well as recommendations for addressing them. This is seen as particularly problematic for international organizations operating in diverse contexts with multiple regulations and differing cultural or political expectations. It is also acknowledged that PA is an emerging innovation with as-yet-unknown consequences, and organizations need to envision and mitigate potential risks as PA projects are happening. This need for what might be termed 'anticipatory ethics', is embodied within frameworks for responsible innovation, such as the one proposed by the European Union (RRI Tools Consortium, 2016) or the UK's Engineering and Physical Sciences Research Council (2016).

It is interesting to contrast the way in which ethical issues are discussed in the PA-specific literature, compared with broader academic discourse on data ethics and the future of work, seen in the legal, social and political sciences. These meta-narratives are dominated by concerns about privacy, rights, power and fairness, particularly in relation to the rise of the platform-driven 'gig economy', the algorithmic shaping of behavior and the role of AI in replicating and replacing the human workforce (e.g. Dastin, 2018*). In contrast, much of the PA-specific literature derives from industry sources and tends to express more optimism about the potential of PA, although it is recognised that adherence with ethical practices is needed to realize this potential. Ethical issues and recommendations described in the broader literature on data/digital ethics were nevertheless reflected in PA narratives, including the need for Transparency and Fairness in PA projects, Proportionality and Protections in the use of data, respect for the participants' Rights and choices (e.g. through obtaining consent), and Inclusion of diverse stakeholders into PA initiatives (see Table 1). Other ethical recommendations arising in this

literature include the need to ensure legal compliance whilst also covering areas overlooked by existing regulations within ethical charters; providing training in PA ethics; fostering a systemic culture of ethical practice, ensuring that PA provides reciprocal benefits for employees (e.g. data for personal development), evaluating PA projects, and including ethical outcomes in business models.

This exploratory scoping review makes several important contributions to theory, practice, and policy on PA. As academic research on PA is still in its infancy, this review can help to inform and guide future work. It provides an accessible summary of the risks, opportunities, trade-offs, and regulatory issues for PA, as well as a framework for integrating ethical strategies and practices, and could thus help organizations to avoid potentially catastrophic unintended consequences, not only for their employees but also for their resilience and reputation. Finally, this paper can provide a channel through which to inform and engage relevant policymakers.

The rise of PA raises new questions for interdisciplinary management science and adds to current debates over the future of human work and employment in a digitized, algorithm-driven society. Such innovations present a dilemma for organizations seeking to optimize their workforce and maximize their effectiveness while also risking employee surveillance, depersonalization, and dissatisfaction, alongside new legal vulnerabilities. Using the scoping review method has provided an opportunity to go beyond the nascent academic literature on PA ethics to explore how industry, the consulting sector and PA professionals themselves are discussing these issues. Although the PA literature remains optimistic and somewhat technocentric, we were able to discern ethical themes around risk, regulation and people factors, that reflect similar considerations in the wider literature on digital ethics. Uses of data and analytics also offer opportunities to enhance organizational ethics, through reducing human bias or increasing wellness and safety, which can be lost in both sociopolitical and technocentric discourses. These dilemmas call for a new social contract between employers and employees,

which could help organizations to avoid catastrophic unintended consequences for their resilience, reputation and bottom line. New legal and policy research is also needed to accommodate the changing technological and regulatory and cultural contexts of PA (e.g. Duggan *et al*., 2019).

While PA practitioners and analysts have recently proposed a set of ethical principles (Green, 2018*), concerted academic effort is needed to develop evidence-based and inclusive frameworks to guide regulators, industry and practitioners in how to respond to these innovations, particularly given their steady penetration into scaled enterprise software and platforms.

As we have noted in the methodology section, no theoretically-driven, PA ethics guidelines exist, and for this reason we chose to be guided by the data, rather than a specific framework. One of our recommendations is that such guidelines should be developed, which our results can help to inform. There is a need for primary research to understand how these methods are changing work within different types of organization to understand their intended and unintended impacts on employees. As more research is published, the case for using systematic review methods, in preference to the scoping approach adopted here, will grow. For the reasons explained in the methods section, the present analysis is the natural first step in what is an emerging field and builds directly from observations about the lack of ethical discourse seen in our published review on the value propositions of PA.

Postscript: PA in the era of Covid-19

The searches undertaken for this review extend to the end of 2019 and thus pre-date the beginning of the Covid-19 pandemic. The results are nevertheless timely, given the rapid rise in working from home, creating greater dependencies on technology and bringing people's professional and personal lives much closer together. In addition to generating new organizational requirements for managing workers remotely, this has ramped-up the use of

methods for monitoring, assessing and shaping the behavior and performance of workers and teams, some of which could be ethically problematic (Hern, 2020). These include covert keystroke logging, communications monitoring, and harnessing employees' device cameras and microphones, in some cases without consultation or consent (Gifford, 2020). The risks and benefits are likely to vary between settings, types of work, and countries with different legislation; for example, workers' privacy rights are somewhat less protected in the US compared to the EU (Dale, 2017). Nevertheless, the growing use of 'bossware' is presenting new risks that even HR departments may not be fully aware of (Schwartz, 2020). Concerns have also been raised about the potential for such technologies to unfairly stigmatize women having to balance work with childcare responsibilities, to 'gamify' productivity using digital rewards, and to decrease people's ability to decouple work from leisure time (Nguyen, 2020). Given the long-term threat of new outbreaks, it is also likely that technologies such as facial recognition cameras, biometric scanners and mobile tracking apps will begin to enter physical work environments, alongside analytical tools integrated into computers or networks. These will inevitably create closer links between measures of wellbeing and performance, magnifying the types of ethical dilemma already discussed in relation to workplace wellness programs (Pagliari, 2020). So far, ethical debates around PA and worker surveillance have been relatively undifferentiated but it is likely that more research focused specifically on PA methods will emerge in the coming months, helping to shape new frameworks for ethical practice as organizations and workers transition to the 'new normal' in a post-pandemic world.

Declaration of interest statement

The authors declare no potential competing interests.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

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Appendix A. Academic articles analyzed

N	Reference [number of citations]	Academic discipline	Article type	Article focus	Concepts discussed
1	Bodie, M.T., Cherry, M.A. and McCormick, M.L. (2016), "The law and policy of People analytics", *University of Colorado Law Review*. [44]	Law	Empirical/ Discussion	Risks	Psychological or social profiling Behavior shaping Reducing performance/people to numbers Operationalizing bias and discrimination
				Recommendations	Legal compliance Ethical guidelines and charters
2	Calvard, T.S. and Jeske, D. (2018), "Developing human resource data risk management in the age of big data", *International Journal of Information Management*, Vol. 43, pp. 159–164. [1]	Computer Science Social Sciences	Discussion/ Conceptual	Risks	Ethics as a point of risk for PA projects
				Recommendations	Proportionality and protection People skills and culture Transparency and fairness
3	Cherry, M.A. (2017), "People analytics and invisible labor", *Saint Louis University Law Journal,* Vol. 61 No. 1. [10]	Law	Discussion	Recommendations	Proportionality and protection
4	Faletta, S. (2013), "In search of HR intelligence: Evidence-based HR analytics practices in high performing companies", *People & Strategy*, Vol. 36 No.4, p. 28+. [33]	Business, Management and Accounting	Empirical	Risks	Threatening privacy or autonomy through tracking and surveillance
5	Holt, M., Lang, B. and Sutton, S.G. (2017), "Potential employees' ethical perceptions of active monitoring: The dark side of data analytics", *Journal of Information Systems*, Vol. 31, No. 2, pp. 107–124. [8]	Computer Science	Experiment	Risks	Threatening privacy or autonomy through tracking and surveillance
6	Hopkins, P.D. and Fiser, H.L. (2017), "This position requires some alteration of your brain: On the moral and legal issues of using	Arts and Humanities Business, Management and	Discussion/ Conceptual	Risks	Behavior shaping
				Recommendations	Inclusion of stakeholders Data rights and consent

	neurotechnology to modify employees", *Journal of Business Ethics*, Vol. 144 No. 4, pp. 783–797. [1]	Accounting Econometrics and Finance Social Sciences			
7	Kaupins, G. and Minch, R. (2005), "Legal and ethical implications of employee location monitoring", in *proceedings of the 38th Annual Hawaii International Conference on System Sciences*, in Big Island, HI, USA, pp.133a–133a. [71]	Computer Science Social Sciences	Discussion/ Conceptual	Risks	Threatening privacy or autonomy through tracking and surveillance Operationalizing bias and discrimination
				Recommendations	People skills and culture Data rights and consent Ethical guidelines and charters
8	Kim, P. (2017), "Data-driven discrimination at work", *William & Mary Law Review*, Vol. 48, pp. 857–936. [95]	Law	Discussion/ Conceptual/ Review	Risks	Operationalizing bias and discrimination
				Recommendations	Inclusion of stakeholders
9	Moussa, M. (2015), "Monitoring employee behavior through the use of technology and issues of employee privacy in America", *Sage Open*, Vol. 5 No. 2. [21]	Arts and Humanities Social Sciences	Discussion/ Conceptual	Risks	Operationalizing bias and discrimination
				Recommendations	Ethical guidelines and charters Inclusion of stakeholders Transparency and fairness
10	Palm, E. (2007), *The ethics of workplace surveillance* (Royal Institute of Technology). [13]	Philosophy	Discussion/ Conceptual	Risks	Threatening privacy or autonomy through tracking and surveillance
				Recommendations	Data rights and consent Ethical guidelines and charters
11	Pitesa, M. (2012), "Employee surveillance and the modern workplace", in O'Sullivan, P., Esposito, M. and Smith, M. (Ed.), *Business ethics: A critical approach: Integrating ethics across the business world*, pp. 206–219. [0]	Social Sciences Law	Discussion/ Conceptual	Risks	Threatening privacy or autonomy through tracking and surveillance
				Recommendations	Proportionality and protection
12	Simbeck, K. (2019) "HR analytics and ethics", *IBM Journal of Research and Development,*	Computer Science	Discussion/ Conceptual	Risks	Operationalizing bias and discrimination

	Vol 63 No. 4/5, pp. 9:1-9:12. [1]			Recommendations	People skills and culture Data rights and consent Ethical guidelines and charters
13	Yerby, J. (2013), "Legal and ethical issues of employee monitoring", *Online Journal of Applied Knowledge Management*, Vol. 1 No. 2, pp.44-55. [32]	Social Sciences	Discussion/ Conceptual	Risks	Threatening privacy or autonomy through tracking and surveillance Ethics as a point of risk for PA projects
				Recommendations	Data rights and consent Inclusion of stakeholders
14	Vidgen, R., Shaw, S. and Grant, D.B. (2017), "Management challenges in creating value from business analytics", *European Journal of Operational Research,* Vol. 261, pp.626-639. [221]	Computer Science Decision Science	Discussion/ Conceptual	Recommendations	Inclusion of stakeholders Transparency and fairness

Appendix B. Grey literature publications analyzed

№	Reference	Authorship/Source (Corporate affiliation)	Publication type	Article focus	Concepts discussed
1	Agarwal, D., Bersin, J., Lahiri, G., Schwartz, J. and Volini, E. (2018), "People data: How far is too far?" *Deloitte Insights*, 20 July.	Consulting sector Industry professionals (Deloitte)	Magazine article	Risks	Ethics as a point of risk for PA projects Threatening privacy or autonomy through tracking and surveillance
				Recommendations	Proportionality and protection Transparency and fairness Inclusion of stakeholders
2	Ajunwa, I. (2019), "Beware of automated hiring", *NY Times*, 8 October.	Academic scholar (Cornell University)	Newspaper article	Risks	Operationalizing bias and discrimination
				Recommendations	Transparency and fairness Legal compliance Inclusion of stakeholders

3	Belton, P. (2019), "How does it feel to be watched at work all the time?", *BBC*, 12 April.	Journalist (BBC)	Newspaper article	Risks	Threatening privacy or autonomy through tracking and surveillance
4	Bersin, J. (2018), "The ethics of artificial intelligence: It's trickier than you think", *Josh Bersin,* 20 August.	Consulting sector Industry professional (Deloitte)	Blog post	Risks	Operationalizing bias and discrimination
				Recommendations	Ethical guidelines and charters Ethical business models
5	Bersin, J. (2019), "People analytics and AI in the workplace: Four dimensions of trust", *Josh Bersin*, 4 May.	Consulting sector Industry professional (Deloitte)	Blog post	Risks	Operationalizing bias and discrimination Threatening privacy or autonomy through tracking and surveillance Ethics as a point of risk for PA projects
				Recommendations	Proportionality and protection
6	Bogen, M. (2019), "All the ways hiring algorithms can introduce bias", *Harvard Business Review.*	Legal sector Industry professional (Upturn)	Journal article	Risks	Operationalizing bias and discrimination
7	Booth, R. (2019), "UK businesses using artificial intelligence to monitor staff activity", *The Guardian*, 7 April.	Journalist (The Guardian)	Newspaper article	Risks	Threatening privacy or autonomy through tracking and surveillance
				Recommendations	Inclusion of stakeholders Ethical guidelines and charters
8	Business Times (2019), "Big brother is watching you at work - and his name is AI", *The Business Times*, 25 June.	(The Business Times)	Newspaper article	Risks	Threatening privacy or autonomy through tracking and surveillance
9	Chowdhury, R. (2018), "How human-centric AI can help your employees love	Consulting sector Industry professionals (Accenture)	Newspaper article	Risks	Operationalizing bias and discrimination Psychological or social profiling

	Mondays again", *Forbes*, 16 March.				Threatening privacy or autonomy through tracking and surveillance
10	Dastin, J. (2018), "Amazon scraps secret AI recruiting tool that showed bias against women", *Reuters*, 9 October.	Journalist (Reuters)	News article	Risks	Operationalizing bias and discrimination Ethics as a point of risk for PA projects
				Recommendations	Evaluation
11	D'Souza, D. (2017), "People analytics - is restraint a constraint?", *LinkedIn*, 18 December.	Industry professional (CIPD)	Blog post	Recommendations	Legal compliance Data rights and consent
12	Ferrar, J. (2017), "Ethics and privacy in Workforce analytics (The Power of People - article 6 of 7)", *LinkedIn*, 9 October.	Consulting sector Industry professional (Insight222)	Blog post	Risks	Threatening privacy or autonomy through tracking and surveillance
				Recommendations	Transparency and fairness Inclusion of stakeholders Ethical guidelines and charters Evaluation
13	Field, M. (2019), "Is your boss spying on you? How office 'snooptech' has become a £2.7bn industry", *The Telegraph*, 4 August.	Journalist (The Telegraph)	Newspaper article	Risks	Threatening privacy or autonomy through tracking and surveillance
14	Fleming, O., Fountaine, T., Henke, N. and Saleh, T. (2018), "Ten red flags signaling your analytics program will fail", *McKinsey Analytics*, 14 May.	Consulting sector (McKinsey)	Magazine article	Risks	Ethics as a point of risk for PA projects
				Recommendations	Inclusion of stakeholders People skills and culture Proportionality and protection Evaluation
15	Green, D. (2018), "Don't forget the 'H' in HR. Ethics & People analytics", *LinkedIn*,	Consulting sector Industry professional (Insight222, myHRfuture)	Blog post	Risks	Ethics as a point of risk for PA projects
				Recommendations	Legal compliance

	19 March.				Ethical guidelines and charters People skills and culture
16	Green, D. (2019), "Episode 2: Driving business performance with people data (Interview with Edward Houghton, Head of research and thought leadership at the CIPD)", *my HR future*, 21 May.	Consulting sector Industry professional (Insight222, myHRfuture)	Blog post	Recommendations	Ethical guidelines and charters
17	Green, D. (2019), "People analytics for good", *my HR future*, 25 March.	Consulting sector Industry professional (Insight222, myHRfuture)	Blog post	Recommendations	Transparency and fairness People skills and culture
18	Green, D. and Chidambaram, A. (2018), "The role of the People analytics leader - Part 2: Creating organisational culture & shaping the future", *LinkedIn*, 25 February.	Consulting sector Industry professionals (Insight222, myHRfuture)	Blog post	Recommendations	Inclusion of stakeholders Transparency and fairness Ethical guidelines and charter Evaluation
19	Guenole, N. (2018), "Resolving data privacy dilemmas in HR analytics", *IBM*, 25 June.	Academic scholar Consulting sector Industry professional (Goldsmiths University, IBM)	Blog post	Risks	Ethics as a point of risk for PA projects
				Recommendations	Legal compliance Ethical guidelines and charters People skills and culture
20	Guenole, N., Feinzig, S. and Green, D. (2018), "The grey area: Ethical dilemmas in HR analytics. Perspectives from the Global Workforce", *IBM*.	Academic scholars Consulting sector Industry professionals (Goldsmiths University, IBM)	Report	Risks	Ethics as a point of risk for PA projects
				Recommendations	Legal compliance Ethical guidelines and charters People skills and culture
21	Haim, L.S. (2018), "Will People analysts always be human?", *Littal Shemer Haim*,	Industry professional	Blog post	Risks	Ethics as a point of risk for PA projects
				Recommendations	Transparency and fairness

	8 May.				Proportionality and protection People skills and culture
22	Hames, A. (2019), "How to ethically secure People analytics", *HR technologist*, 25 September.	Industry professional (MHR)	Magazine article	Risks	Operationalizing bias and discrimination Threatening privacy or autonomy through tracking and surveillance
				Recommendations	Transparency and fairness Inclusion of stakeholders
23	Harris, J. (2017), "They call it fun, but the digital giants are turning workers into robots", *The Guardian*, 20 January.	Journalist (The Guardian)	Newspaper article	Risks	Threatening privacy or autonomy through tracking and surveillance Quantifying workforce, team and individual performance
24	Hasselbalch, G. and Tranberg, P. (2016), "Data ethics — The new competitive advantage", *Techcrunch*, 13 November.	Industry professionals (dataethics.eu)	Magazine article	Risks	Ethics as a point of risk for PA projects
				Recommendations	Transparency and fairness Proportionality and protection
25	High, P. (2019), "Former Google HR Chief Laszlo Bock aims to revolutionize people management with Humu", *Forbes*, 9 September.	Industry professional (Metis Strategy)	Newspaper article	Risks	Behavior shaping
26	Hogan, M. (2019) "The very real dangers of AI and how HR tech vendors can fight them", *Medium,* 9 January.	Industry professional (Red Branch Media)	Magazine article	Recommendations	Inclusion of stakeholders
27	Jacobs, K. (2017), "The ethics of gathering employee data", *HR Magazine*, 21 March.	Industry professional (CIPD)	Magazine article	Risks	Threatening privacy or autonomy through tracking and surveillance
				Recommendations	Inclusion of stakeholders Proportionality and protection
28	Jee, C. (2019), "Amazon's system for tracking its warehouse workers can	Contributor/Editor (MIT Technology Review)	Journal article	Risks	Quantifying workforce, team and individual performance

	automatically fire them", *MIT Technology Review*, 26 April.				
29	Jones, G. (2017), "Who's data is it anyway?", *LinkedIn*, 30 November.	Industry professional (People Ventures)	Blog post	Recommendations	Proportionality and protection
30	Joyce, C. (2019), "Ethics of behavioral science and People analytics", *LinkedIn*, 13 November.	Industry professional (Microsoft)	Blog post	Risks	Threatening privacy or autonomy through tracking and surveillance
				Recommendations	Transparency and fairness
31	Karlsson, P. O., Aguirre, D. and Rivera, K. (2017), "Are CEOs less ethical than in the past?" *Leadership*, Issue *87*.	Consulting sector Industry professionals (PWC)	Journal article	Recommendations	Legal compliance People skills and culture
32	Kirke, M. (2019), "AI in HR: the good, the bad and the scary", *The People Space*, 29 May.	Consulting sector Industry professional	Magazine article	Risks	Operationalizing bias and discrimination Psychological or social profiling
33	Kollewe, J. (2019), "Alarm over talks to implant UK employees with microchips", *The Guardian*, 11 November.	Journalist (The Guardian)	Newspaper article	Risks	Threatening privacy or autonomy through tracking and surveillance
34	Kumar, T. (2018), "Ethics and workforce data: Is legislation enough?", *Analytics in HR*.	Consulting sector Industry professional (Percipient Solutions Ltd.)	Blog post	Recommendations	Transparency and fairness Proportionality and protection Legal compliance Data rights and consent
35	Leong, K. (2017), "Is your company using employee data ethically?", *Harvard Business Review*.	Technology sector Industry professional (ZL Technologies, Inc.)	Journal article	Risks	Threatening privacy or autonomy through tracking and surveillance
				Recommendations	Inclusion of stakeholders People skills and culture Transparency and fairness

36	Lingard, S. (2018), "GDPR compliance: practical steps to take control of your HR data", *HRZone*, 13 February.	Technology sector Industry professional (Cezanne HR)	Magazine article	Risks	Ethics as a point of risk for PA projects
				Recommendations	Legal compliance Proportionality and protection Data rights and consent
37	Logg, J. M. (2019), "Using algorithms to understand the biases in your organization", *Harvard Business Review.*	Academic scholar (Georgetown University)	Journal article	Risks	Operationalizing bias and discrimination
38	Mann, H., Neale, C. and Kumar, T. (2018), "People analytics: Ethical considerations", *Analytics in HR*.	Industry professionals (Percipient Solutions Ltd.)	Blog post	Risks	Threatening privacy or autonomy through tracking and surveillance
				Recommendations	Proportionality and protection Transparency and fairness Data rights and consent People skills and culture Legal compliance
39	Mohlmann, M. and Henfridsson, O. (2019), "Algorithms, according to a study of Uber drivers", *Harvard Business Review*.	Academic scholars (Coventry University Warwick Business School)	Journal article	Risks	Creating inconvenience or income insecurity
40	Silberg, J. and Manyika, J. (2019), "Tackling bias in artificial intelligence (and in humans)", *McKinsey*, 6 June.	Consulting sector (McKinsey)	Magazine article	Risks	Operationalizing bias and discrimination
				Recommendations	Transparency and fairness Ethical guidelines and charters
41	Marchant, G.E. (2019), "What are best practices for ethical use of nanosensors for worker surveillance?", *AMA Journal of Ethics*, Vol. 21, No. 4, pp. E356-362.	Academic scholar (Arizona State University)	Journal article	Risks	Threatening privacy or autonomy through tracking and surveillance Quantifying workforce, team and individual performance
				Recommendations	Transparency and fairness Proportionality and protection

					Data rights and consent
42	Marritt, A. (2016), "People analytics, what's in it for the employees?", *Analytics in HR*.	Consulting sector Industry professional (OrganizationView)	Blog post	Recommendations	Inclusion of stakeholders Evaluation
43	McNulty, K. (2019), "Five ways to reduce bias in your recruiting", *LinkedIn*, 26 February.	Consulting sector Industry professional (McKinsey)	Blog post	Risks	Operationalizing bias and discrimination
44	Mikel, B. (2019), "WeWork just made a disturbing acquisition. It raises a lot of flags about workers' privacy", *Inc.*, 17 February.	Consulting sector (Aveck)	Magazine article	Risks	Threatening privacy or autonomy through tracking and surveillance
45	O'Neil, C. (2016a), "How algorithms rule our working lives", *The Guardian*, 1 September.	Writer/Blogger (The Guardian)	Newspaper article	Risks	Operationalizing bias and discrimination
				Recommendations	Evaluation
46	O'Neil, C. (2016b), "Rogue algorithms' and the dark side of big data", Knowledge@Wharton, 21 September.	Writer/Blogger	Magazine article	Risks	Operationalizing bias and discrimination Creating inconvenience or income insecurity
47	Pease, G. (2018), "People analytics – privacy vs. transparency", *Best Practice in Human Resources*, 14 March.	Consulting/Technology sector Industry professional	Magazine article	Risks	Threatening privacy or autonomy through tracking and surveillance
				Recommendations	Transparency and fairness Evaluation People skills and culture
48	Petersen, D. (2018), "Data ethics: 6 steps for ethically sound People analytics", *Visier*.	Consulting sector Industry professional (Insight222)	Blog post	Risks	Ethics as a point of risk for PA projects
				Recommendations	Ethical guidelines and charters Proportionality and protection

					Inclusion of stakeholders Evaluation Legal compliance
49	Plüss, J.D. and Reusser, K. (2018), "Your employer might be watching you. Should you care?", *SWI*, 13 May.	Journalist (SWI)	Magazine article	Risks	Threatening privacy or autonomy through tracking and surveillance Ethics as a point of risk for PA projects
				Recommendations	Transparency and fairness
50	Rejouis, G. M. (2019), "Why is it OK for employers to constantly surveil workers?", *Slate*, 2 September.	Legal sector (Georgetown Law)	Magazine article	Risks	Threatening privacy or autonomy through tracking and surveillance
51	Rennie, J. (2019), "Can an algorithm eradicate bias in our decision making?", *Personnel Today*, 29 August.	Legal sector (TLT)	Magazine article	Risks	Operationalizing bias and discrimination
					Proportionality and Protection
52	Roper, J. (2016), "Is it ethical to track employee behaviour?, *HR Magazine*, 7 October.	Editor (HR magazine)	Magazine article	Risks	Threatening privacy or autonomy through tracking and surveillance
				Recommendations	Transparency and fairness Evaluation
53	Shook, E., Knickrehm, M., and Sage-Gavin, E. (n.d.), "Decoding organizational DNA", *Accenture.*	Consulting sector (Accenture)	Report	Recommendations	Ethical business models
54	Shook, E., Sage-Gavin, and Cantrell, S. (2019), "How companies can use employee data responsibly", *Harvard Business Review.*	Consulting sector (Accenture)	Journal article	Recommendations	Ethical guidelines and charters Inclusion of stakeholders

55	Sigal, S. (2019), "Some AI just shouldn't exist", *Vox*, 10 April.	Writer (Vox)	Magazine article	Risks	Operationalizing bias and discrimination
56	Smith, T. (2015), "The ethics of analytics: A look into the dark side", *LinkedIn*, 24 November.	Consulting sector Industry professional (Numerical Insights)	Blog post	Risks	Ethics as a point of risk for PA projects
				Recommendations	Inclusion of stakeholders Proportionality and protection
57	Smith, T. (2019), "People vs. machines: the ongoing ethical concerns of people analytics", *HRZone*, 4 July.	Consulting sector (Numerical Insights LLC)	Magazine article	Recommendations	Transparency and fairness Inclusion of stakeholders
58	Spence, A. (2016), "The quantified workplace: technology vs trust?", *HR Transformer Blog,* July 20.	Consulting sector Industry professional (Glass Bead Consulting)	Blog post	Recommendations	Transparency and fairness Evaluation Quantifying workforce, team and individual performance
59	Spence, A. (2018), "The personal data backlash — next up recruitment?", *Medium*, 30 September.	Consulting sector Industry professional (Glass Bead Consulting)	Magazine article	Risks	Ethics as a point of risk for PA projects
				Recommendations	Ethical business models
60	Strassle, C. (2018), "How workplace wellness programs harm people with disabilities", *Justice Everywhere,* July 20.	Guest author (Justice Everywhere)	Blog post	Risks	Threatening privacy or autonomy through tracking and surveillance Operationalizing bias and discrimination
				Recommendations	Evaluation
61	Styr, C. (2018), "The new rules of talent intelligence to take on the big brother burden", *Cognizant*, 28 December.	Consulting/Technology sector (Insight222)	Blog post	Risks	Threatening privacy or autonomy through tracking and surveillance
				Recommendations	Transparency and fairness Ethical guidelines and charters
62	Sumser, J. (2019), "AI risks,	Editor (HR Examiner)	Magazine article	Risks	Operationalizing bias and discrimination

	ethics, and liability. Part 1 of 2", *HR Examiner*, 12 May.			Recommendations	Data rights and consent Inclusion of stakeholders
63	Sumser, J. (2019), "AI risks, ethics, and liability. Part 2 of 2", *HR Examine*r, 23 May.	Editor (HR Examiner)	Magazine article	Recommendations	Inclusion of stakeholders
64	Wakabayashi, D. (2019), "Firm led by Google veterans uses A.I. to 'Nudge' workers toward happiness", *The New York Times*, 31 December.	Journalist (The New York Times)	Newspaper article	Risks	Behavior shaping
65	Wartzman, R. (2019), "Workplace tracking is growing fast. Most workers don't seem very concerned", *Fast Company*, 20 March.	Writer Industry professional (KH Moon Center for a Functioning Society)	Magazine article	Risks	Threatening privacy or autonomy through tracking and surveillance
66	West, D.M. (2018), "The role of corporations in addressing AI's ethical dilemmas", *Brookings*, 13 September.	Industry professional Academic scholar (The Brookings Institution)	Report	Risks	Operationalizing bias and discrimination
				Recommendations	Transparency and fairness Inclusion of stakeholders Ethical guidelines and charters Evaluation People skills and culture
67	Wheeler, K. (2015), "Big data & analytics in recruiting & learning", *LinkedIn,* 7 December.	Consulting/Technology sector Industry professional (AllyO)	Blog post	Risks	Threatening privacy or autonomy through tracking and surveillance Psychological or social profiling
68	Whelan, E., McDuff, D., Gleasure, R. and Brocke, J. (2018), "How emotion-sensing technology can	Consulting/Technology sector Industry professionals Academic Scholars (National University of Ireland	Journal article	Risks	Threatening privacy or autonomy through tracking and surveillance
				Recommendations	Transparency and fairness PA and ethical skills

	reshape the workplace", *MIT Sloan Management Review*, 5 February.	in Galway, Microsoft Corp., Cork University, University of Liechtenstein)			Proportionality and protection

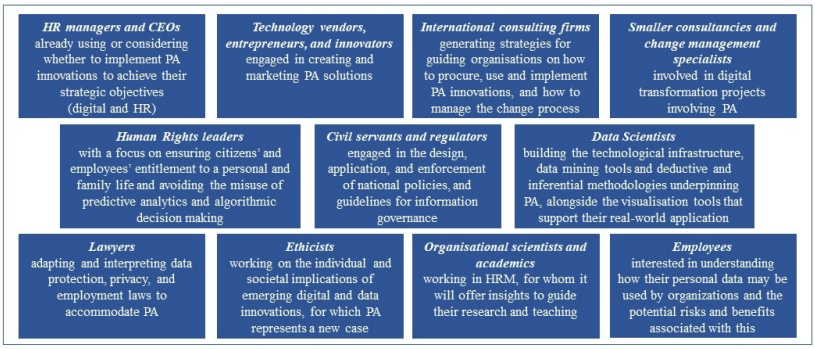

Figure 1. Key stakeholder groups in PA

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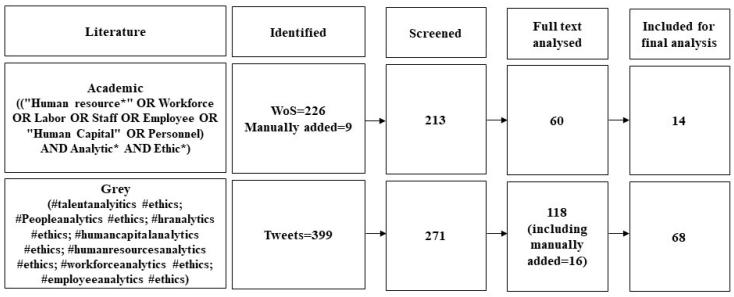

Figure 2. Approach to identification, screening, and analysis of academic and grey literature

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Figure 3. Twitter results infographics

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Table 1. Risks and recommendations emerging from the analysis

Risks for employees	**Risks for organizations**
Operationalizing bias and discrimination *Psychological or social profiling* *Behavior shaping* *Reducing performance/people to numbers* *Creating inconvenience or income insecurity* *Threatening privacy or autonomy through tracking and surveillance*	Ethics as a point of risk for PA projects
Recommendations	
Transparency and fairness *Legal compliance* *Ethical guidelines and charters* *Proportionality and protection* *Data rights and consent* *Inclusion of stakeholders* *People skills and culture* *Evaluation* *Ethical business models*	