Accepted at *Human Resource Management Journal*

HR Analytics:
An emerging field finding its place in the world alongside simmering ethical challenges.

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Introduction: A call to an emerging field

This article introduces the special issue on HR Analytics for the HRMJ. A key aim of this special issue is to showcase high quality analytic projects and cutting-edge analytic techniques to contribute to academic and practitioner capabilities in this emerging field of HRM. Ahead of considering the papers in the special issue, we reflect on what an ideal HR Analytics paper (for the Special Issue) would look like. Such a research paper would need to explore an important research-related business question (Guenole et al, 2017; Huselid, 2018). However, to publish in an academic journal, this sometimes creates a challenge. The integrity of the data and the potential measures on which the research project relies also need to be sufficiently reliable and valid to meet academic journal standards (Edwards and Edwards, 2019). In addition, appropriate projects for the special issue would apply modern analytic techniques that inspire new avenues for future research and practice. Thus, our call for innovative analytic approaches was intended to help widen examples of newer and more powerful methods that highlight the many exciting possibilities for HR Analytics projects and that uncover insights that may not be available to other methods.

Our experience working on this special issue brought to light several challenges that academic researchers face in publishing HR Analytics articles. Awareness of these challenges first emerged when we encountered a surprisingly low number of qualifying submissions. Why given the wide-spread interest in HR Analytics in both academic and practitioner HRM communities, is there a relatively low prevalence of research writing on HR Analytics? This puzzle led us to identify several challenges, which in making visible, we hope will help others to overcome them in future.

Challenge 1- HR Analytics is not a recognized key word.

HR Analytics research is conducted and published with reference to their substantive focus, whether that is employee engagement, job performance, performance related pay, voluntary and involuntary turnover and so on. In fact, the academic literature is replete with high quality work that might be considered HR Analytics but without being recognized as such. Indeed, a Google scholar search of HR Analytics tends to return reviews of the field rather than specific instances of HR Analytics that involve actual analysis. This is not to say that there are not good examples of HR related analytic projects published, indeed we pointed to some of these in our call. We mentioned as examples, Bidwell (2011) who looked at the retention and performance potential of internal versus external hires; Levenson et al (2006) who explored the relationship between managerial competencies and performance; and Madariaga et al (2018) who utilised discrete choice and survival analyses to explore the relationship between socio-economic characteristics and turnover. Furthermore, as indicated by Larsson and Edwards (2021), there are also a range of HR Analytics projects published in other fields (e.g. insider econometrics; nursing and healthcare, ergonomics, management science and operations management) that may not be immediately accessible to HR researchers because the keywords in these disciplines are not well known to HR researchers. So without making a specific effort to learn similar keywords that are used

in different fields (e.g. economics), these studies will not be identified in a standard search. To begin to remedy this challenge, in this special issue we hope to encourage academic researchers in particular domains of HRM to consider how their work contributes to the application of HR Analytic techniques to HRM practice and to include HR Analytics as a keyword.

Challenge 2-Too many reviews and not enough to review

Whilst a number of academics have been discussing HR Analytics for almost two decades (e.g. Huselid and Becker, 2005; Lawler, Levenson and Boudreau, 2004), since around 2015/16 we have witnessed an accelerated growth in interest in the topic (Marler, Cronemberger & Tao 2017). This includes, for example a number of books that discuss how analytic approaches can be applied to people/HR related data (e.g. Edwards and Edwards, 2016 & 2019; Guenole, Ferrar and Feinzig, 2017). In addition, a number of journal special issues were published. One of these was published in the Journal of Organisational, Effectiveness: People and Performance in 2017, introduced by Dana Minbaeva (2017) and another was Published in HRM in 2017, introduced by Huselid (2018). Around the same time both Angrave et al (2016), Marler and Boudreau (2017) and Tursunbaueva, Di Lauro & Pagliari (2018) took a step back and looked at the field; only to identify that there was a long way to go before it could be considered mature. Angrave et al (2016) indicated that HR needed to "wise up" and rise to the big data challenge and Marler and Boudreau (2017) and Tursunbayeva et al. (2018), who reviewed the published academic published literature, concluded that there was a scarcity of examples of good HR Analytics research projects in the published literature.

More recently, we have begun to see a number of reviews of HR Analytics papers emerge (e.g. Larsson and Edwards, 2021 and Margherita et al 2021). These reviews have been useful in highlighting papers in the areas. These reviews necessarily discuss the challenging issue how HR Analytics is defined. When conducting reviews of the literature these things become particularly important; for example Margherita et al (2021) search for papers with the words "People Analytics" "Human Resource Analytics" "HR Analytics" "Workforce Analytics" "Talent Analytics" "Human Capital Analytics". Many practitioners have discussed the issue of what to call the field, with arguments that HR Analytics is too restrictive and workforce analytics enables the use of insights and data from other non-HR related fields. However, perusing the published research, and looking at the papers included in various reviews, the same conclusions made by Minbaeva (2017) and Marler and Boudreau (2018) seem to stand today. The field is still in need of more examples of HR Analytics projects that can be drawn on by academics and practitioners as guiding examples.

The existing scientific research often falls short of providing a broad array of analytics examples because it misses stages of the HR Analytics process that are critical in practice. These stages are: 1) the process through which a business problem comes to be seen as a question that HR Analytics research might be able to provide an answer to. 2) The processes through which the HR Analytics analysts decide on the data they need to answer the question and the ways in which these data are gathered and processed prior to analysis. 3) The analytic stage where the analyst/s carry out

analyses and interpret the results to consider what is meaningful. 4) an action and intervention stage where analysis common to academic research articles is transformed into insight that leads to managerial action. 5) The subsequent evaluation of the success of HR Analytics projects, which are areas we highlight as needed as the field of HR Analytics evolves.

What is interesting is that the practitioner field seems to be presenting a number of examples of HR Analytics projects and applications of statistical and data science methods that very much give the impression that the field is in a mature state. For example, in recently published practitioner focused books by Khan and Millner (2020) and Ferrar and Green (2021) offer a number of examples of different projects and case studies that highlight the potential of HR Analytics. It is also clear from the practitioner literature and social media that the field of HR Analytics has pockets of very sophisticated teams running HR Analytics at very high level. Some of these are flagged in books (e.g. Ferrar and Green, 2021), some are discussed at global and local conferences, for example PAFOW (People Analytics and the Future of Work), where numerous examples of analytics projects are presented. These projects utilise techniques ranging from passive and active Organisational Network Analyses to attrition modelling using regression and machine learning. It is highly likely that many of these projects would be considered gold standard projects that, were they published in journal articles would have a big impact in both academic and practitioner fields. There are a number of challenges however, that reduce the likelihood of these projects being published. In particular, the organisations and analytics experts who present this information at conferences are not highly motivated to write these projects up to submit to academic journal outlets because the process to publication is so long. It is much easier (and quicker) to produce a white paper and post it to their own website. As academics know, academic peer review is a long process and often leads to rejection (even after many revisions have been submitted). Practitioners are not necessarily motivated to go through this process because most do not need peer reviewed publications in order to achieve career success.

Political Sensitivities and Liability

Aside from practitioners lacking the motivation to engage in the peer review process to transfer their analytic projects to academic publication there are likely to be a number of other reasons why such projects may not be seen in academic journals. One of which is likely to be the political sensitives in the organisations that some of the projects may uncover. All four of the guest Editors have been involved in sophisticated HR analytics practitioner collaborations on projects that have not been considered commercially or politically acceptable to publish widely by the organisations. It may be that they feel the risk of exposing a problem that could impact the organisation's reputation or expose the organisation to potential legal exposure and the risk is too great.

The practice of HR Analytics is affected by power dynamics and organisational politics within organisations. Arguably, the organisations where HR Analytics has become best established are those with a normative commitment to data informed management and decision-making, Google (Bock, 2015) would be an emblematic example. But even at

Google, when engaging in HR Analytic research, their analyses uncovered an exposure to potential disparate impact charges. An ambitious HR Analyst working in an organisation like this, where there is demand for HR Analysis, may risk their career and the company's legal liability by conducting such analyses. Similarly, HR analysts struggling to get established in organisations that have multiple stakeholders who are more sceptical of the value of HR Analytics, will in accordance with best practice guidance (e.g. Guenole et al., 2017) want to identify "quick wins" that demonstrate the value of their work. Sometimes these "quick wins" may result in embarrassing senior managers by exposing their poor decisions. In other situations, the analyses may be subject to typical research limitations. For example, the analyst who goes to a meeting to pitch their findings by cautioning, "well, we have some quite interesting results, but it isn't clear that we have established causal relationships and the predictive accuracy of the model isn't that great, so I am not sure it provides us with much of a guide to action" is unlikely to flourish.

The broad point is that those who practice HR Analytics within organisations have multiple incentives not to engage with the academic publication process and to work with academics only on terms that they control, which often preclude full and frank public openness about their work. Nonetheless, if these challenges can be overcome, we encourage HR analytics teams to attempt to publish in scientific journals. The publication process subjects the thinking of authors of HR analytics manuscripts to the highest standards of (hopefully constructive) technical criticism, enabling them to hone their skills. Ultimately, the field of HR analytics benefits overall if the manuscript is published and the HR analytics community can read about the work.

HR Analytics and ethical challenges: projects requiring critical reflection

One of the interesting experiences that the guest editorial team has reflected on, and this has been reinforced from the review process of this special issue, is that HR Analytics projects have the potential to raise significant ethical challenges for the organisations and teams carrying out these activities. Ethics refers to the use of values to guide behaviour in organisations. The HRMJ has a long history of including papers that include an ethical reflection of HR activities. Some seminal work (e.g. Winstanley and Woodall, 2000) takes a number of ethical lenses and demonstrates how important it is to consider an ethical position when reflecting on HR activities given the potential for highly negative impact that bad management practices can have on many thousands of employees. HR Analytics is not immune from this issue and the Guest Editors have all highlighted some of the ethical challenges with HR Analytics in previous work (Angrave et al, 2016; Edwards and Edwards, 2016; Edwards, 2019; Guenole et al 2017, Meijerink, Boons, Keegan and Marler, 2021). However, the more sophisticated HR Analytics projects become and the more they draw on employee data, interpret, and make recommendations from analytics, the greater potential these projects will trigger ethical concerns. These concerns range from privacy concerns, data governance, individual autonomy, and consent concerns, to discriminatory outcomes associated with selective distribution of resources to different groups of workers based on analytic outcome recommendations, see Speers in this issue.

Whilst the area of ethics and HR Analytics is being discussed (e.g. Peters et al 2020; Tursunbayeva et al 2021), this area still is under researched and in this fast-changing field more work in this is needed. For example, given how recently the application of AI and machine learning has emerged, this has only become a key topic of discussion in recent material (e.g. Martin, 2018, Dattner et al., 2019; De Cremer 2020). Thus, the academic field is yet to explore fully the ethical challenges that are surfacing with the greater use of analytics and technology. Many recent authors are raising these ethical challenges or mentioned these issues as an important area that needs considering in the field of HR Analytics (e.g. Margherita et al 2021; Gal, Jensen and Stein, 2020). In the current special issue, there are clear examples where ethical issues are raised.

For example, the paper by Speer specifically raises the potential for discriminatory outcomes resulting from machine learning algorithms and suggests techniques to deal with this. However, the ethical ramifications of analytics projects go beyond what is usually obvious. Two of the papers introduce new analytic techniques that can be applied to qualitative data in order to make judgments on employees (e.g. personality) with a view to provide potential time-saving for organisations. However, although the application of these techniques raise no more challenging issues than existing quantitative approaches to forming judgments on potential employees, the potential for these analytic approaches to be automated or applied with little human intervention, oversight or transparency to its subjects, is increasingly becoming an area for concern. Without forethought and expertise in ethical thinking, unwary organisations may quickly and unconsciously get into trouble.

These ethical issues, and the importance of critically reflecting on why an organization might be carrying out analytics and what the downstream implications of these activities might be, came to the fore during the review process of this special issue. Given critical ethical reflection on the impact and intent of HR practices is a tradition in the HRMJ, it was interesting that not all authors who submitted papers to the special issue were comfortable including some critical ethical reflection on the analytic projects that they were writing about or recommending. This is a potential blind-spot in the field that needs addressing. Some organisations may be keen to conduct and encourage particular HR Analytic projects simply because they can or because it may help further a cause or help lead to financial savings or profit/shareholder return. We would argue that the ethical dimension *always* needs to be considered when undertaking HR Analytics projects and analytics teams need to always question whether their projects raise ethical challenges. A very positive development in the practitioner field however, is that despite earlier silence on the issue as the field emerged, these ethical issues have recently become a key focus and the motto “people analytics for good” is a tag line being used at many HR Analytic practitioner events. Importantly however, the role of academics and journals like the HRMJ, who do not have a business stake in the HR Analytic projects undertaken, is vital to ensure that a critical eye is cast on developments in the practitioner field.

Reflecting on papers in the special issue

Below we summarise the main themes from this special issue and then provide a brief summary of each paper. The first three papers in this issue highlight the trade-off between the efficiency of automating HR decision-making versus the benefits of involving human judgement particularly with respect to biases that may be inadvertently automated. The first paper by Speer is a very important contribution. It speaks directly to the ethical challenges of utilising particular analytic techniques that may end up including an inherent bias in recommendations based on analytics, raising the danger of the algorithms producing adverse impact towards particular groups (Gal, Jensen and Stein, 2020) of employees especially where selective investments are made on the basis of the output of algorithms. The following two papers (Hickman et al. 2021, and Feng et al., 2021) both demonstrate applications of language based analyses of qualitative textual material. Interestingly both include analytic techniques that make evaluations and judgments about participants' (i.e., 'interviewees') personality and test these models against quantitative ratings. This is an innovative use of language-based analytics and has some potential for utility going forward. However, from an ethical point of view – the validity of these analyses in making judgments of candidate personalities would need to be carefully assessed if these approaches were used in the workplace. As the Hickman paper shows, using self-versus-other ratings of personality do not always lead to agreement, and the predictive validity of the language-based models at predicting either of the two rating methods varies. Thus, if applied to the workplace the validity of such an approach is not a given, raising both validity and ethical concerns if not used carefully.

The fourth paper compares personality ratings taken in an in situ HR context either in a face-to-face or via virtual video; the researchers find that the different settings seem to produce quite different ratings and the order of the media used (when repeated) can also be linked with changes in personality ratings. Although this paper is not strictly speaking "HR Analytics as we defined it in the call for papers, it provides an important backdrop to the previous paper (Feng et al., 2021) that examines automated algorithms that rate personality from written interview transcripts; potentially the media of the interview setting itself may have an influence on personality ratings. The next 2 papers deal with analysing data correctly to produce valid information. The paper by Yuan et al (2021) explores the importance of identifying and analysing correctly multi-level nested data, which is very common in organizational settings. Often HR data in HR Analytics projects will be multi-level or grouped (e.g. in divisions, functions, or teams) in nature. How this issue is treated and incorporated into analyses will be an important consideration that HR Analytic teams need to consider. We also include a paper by Liu and Raghuram, which utilises latent profile analyses to identify profiles of (actual and potential) leavers within an organisation. Accounting for and predicting turnover is a bread and butter analytics project that many HR Analytics teams may consider (Edwards and Edwards, 2019), but this approach uses a combination of survey data and HRIS performance data to create profiles. This approach adds a new aspect to the area of turnover analyses in organisations and can serve as an innovative analytic technique that HR Analytic teams may consider using.

Our final paper (Belizon and Kieran, 2021) explores the processes through which HR Analytics leaders and teams might build legitimacy. Although the other papers can be thought of as using analytic activities that might be considered by HR Analytics teams, the final paper provides important lessons for those hoping to advance an HR Analytics agenda in organisations.

Summary of the papers as part of the Special Issue

Speer, A. B. "Empirical Attrition Modelling and discrimination: Balancing validity and group differences."

This paper is a very good example of an analytics procedure that an in-house HR Analytics team would want to consider if they are interested in applying predictive models to determine who receives an intervention based on an algorithm producing probability based outcomes (e.g. such as the likelihood of leaving in an attrition model). With predictive models, an HR Analytics team may produce outcomes that lead to the recommendation of selective investment decisions across different groups. The danger with such a process is that these models may inadvertently produce output that has an adverse impact on particular groups of employees with protected characteristics (e.g. ethnic minorities or females). The paper walks through the potential problems where algorithmic output may lead to adverse impact or differential recommendations across groups. The author then utilized an HR dataset linked to 894 call centre workers to test an attrition model that produces output linked to the likelihood of leaving. The author then carefully explored the variation in the output of the algorithm across various different demographic groups (e.g. males versus females; white versus black employees; young versus old employees etc.) that an organization may wish to ensure are not adversely effected relative to the majority group. Once differences were identified, the author discussed how the algorithms could be adjusted to reduce the adverse impact of an algorithm and thus potential recommendations for selective investment.

Feng, G., Gallagher, C., Sun, T., Tavoosi, S., and Min, H. "Smarter people analytics with organizational text data: demonstrations using classic and advanced Natural Language Processing (NLP) models"

This interesting study sets out to demonstrate the potential for analytic techniques (Natural Language Processing – NLP) to be applied to qualitative textual data, of which organizations may collect a considerable amount. The examples that the authors refer to explain the utility of these techniques, including analyses of qualitative comments collected in an engagement survey and text based data of interview transcripts (this links with one of the other papers in our special issue by Hickman et al). One analytic example that they include in their paper involves analyses of qualitative comments from the Glassdoor website (where past employees rate and comment on their previous employers). They apply Natural Language Processing techniques to the text comments and identify text features that can be used to describe the employers (and construct an evaluation of the employers using the text features drawn from the qualitative comments). The second example the authors use is to conduct NLP on qualitative

answers linked to personality and again identify the degree to which the identified features from the NLP analyses of the text answers predict numerical rating scored on the big five personality. Importantly, whilst these methods are interesting and potentially useful, these models are not always found to be perfect and the benchmark of validity that is used to judge their utility involves numerical scores, which themselves are often subject to questions regarding validity.

Hickman, L., Saef, R., Ng, V., Woo, S.E., Tay, L., and Bosch, N. "Developing and Evaluating language based machine learning algorithms for inferring personality in video interviews"

This interesting study explores the potential validity of using automated analyses of interview language used by interviewees as a means of making algorithmic judgments of applicant personalities. The study conducted 441 simulated job interviews and automatically (using a computer software program) transcribed the language used by applicants. Linguistic analysis was then applied to these transcriptions using Linguistic Inquiry Word Counts (LIWC) across 75 different language features (e.g. where words were used associated with negative or positive emotions, where long words were used, where words linked to achievement were used etc.). Using machine-learning techniques, the metrics associated with these features for each applicant were then used to predict the applicants' self-ratings and "interviewer" ratings of personality using the 'big five' personality framework (extroversion, agreeableness, conscientiousness, emotional stability and openness to experience). The researchers showed that an automated process that scores applicants on the various linguistic features can predict interviewer rated personality judgments much better (sometimes twice well) than it could predict self-report ratings of personality. The study highlights a concerted effort to explore the potential for automated algorithmic applications to be used in selection processes. As an example, automated algorithms are already being used by online systems such as HireVue to help streamline automated selection recommendations in the hiring process. The study does show some potential utility in applying automated analytic techniques to swiftly provide information about applicants in an interview, and in this case, the LIWC algorithms could form part of a more extensive algorithmic judgment process. Such systems could either be used to provide an additional source of information that interviewers could consider in selection and such a system could do so quickly and with little cost in terms of interviewer time. The study also highlights a potential problem and bias in the system also as further testing in the study showed that the inaccuracy at predicting interviewer reports of personality was greater with female applicants than male applicants, raising a number of issues and questions around the adverse impact of such systems.

Michelotti, M., McColl, R., Puncheva-Michelotti, P., Clarke, R. and McNamara, T. "The effects of medium and sequence on personality trait assessments in face-to-face and videoconference selection interviews: Implications for HR analytics"

This paper focuses on the potential impact that the medium of personality assessment selection interviews (either face-to-face or virtual video interviews) has on the stability of

personality ratings assessed by HR representatives and interviewers. The context to the study is presented as raising challenges with the increasing use of virtual or video-based recruitment and selection techniques. In a real-life hiring setting, the study compares personality assessments of interviewees and compares ratings across a face-to-face versus a virtual medium. The researchers explore whether the ratings are stable (or differ/change) upon a repeated assessment in the alternative format; potentially showing that the personality ratings can change when the candidates are assessed in a different medium. As the authors highlight, this has implications for the increasing use of automated selection tools that involve assessing candidates (often utilising automated algorithms) through a principle medium of video. This paper is an example of research that may be conducted in situ to answer particular HR business questions in an HR setting. It also provides some interesting food for thought linked to the increasing use of automated selection and assessment methods that are conducted using video-based technologies. Whether these videos are judged by humans or computer algorithms, there is the potential that the video-based interface itself may influence judgments made about potential candidates in the first place.

Yuan, S., Kroon, B., and Kramer, A. "Building Predictive Models with Grouped Data: A Case study on the prediction of Turnover Intention"

This paper is one of the more technical papers of the special issues, but it addresses an important topic for HR Analytics as a field, which is what type of analytic modeling approach and setup should be considered when attempting to produce predictive models. It addresses the fact that the data available for an analytics team to incorporate into predictive machine learning models will generally be organized in a group structure (e.g. employees grouped into teams, departments and/or functions). The paper discussed some of the technicalities and implications of applying different grouped data models for predictive modeling. The implication of this article is that different grouped data structures will lead to varying levels of accuracy in the predictive modeling. The authors discuss some of the technicalities of these decisions in this application with a dataset of 1454 employees grouped into 199 enterprises where various predictive models are explored in predicting intention to leave the workforce. The paper will be useful for HR Analytics teams and HR researchers who intend to construct and test predictive models with (inevitably) group structured HR data.

Liu, X. and Raghuram, S. "The effects of latent withdrawal profiles on employee turnover, destinations and job performance"

The paper used latent profile analyses to identify four different groups of employees based on their likely proximal withdrawal states using survey questions about topics such as organizational commitment, perceptions of leader member exchange relationship and availability of job alternatives and archival HR records of previous performance ratings. Using this combination of measures the researchers identified profiles of employees with qualitatively different "proximal withdrawal states" (which the researchers theorise will be associated with very different motivation profiles). These profiles were "Reluctant Stayers"; "Enthusiastic Stayers"; "Enthusiastic Leavers" and

“Reluctant Leavers”. The researchers went on to use these profiles to predict subsequent performance ratings (of those who stayed in the organisation) and the destinations of those who left. This study serves as an analytic example of the kind of analyses that would be possible in an HR Analytics team in situ. It would be perfectly possible for an HR Analytic team to collect some perceptual or attitudinal survey data from employees and link the data from these surveys to HR archival data to begin to understand different features and profiles of their work force and the potential implications of the different profiles. Therefore, this paper serves as an example of possible uses of this novel and powerful technique (Latent Profile Analyses).

Belizon, M. J., and Kieran, S. “HR Analytics: A legitimacy process”

Whilst this paper is not an HR Analytic project, it is a research project that specifically looks at the development of HR Analytics as a Human Resources offering to organisations. Given this, the guest editors, and the journal editors of the HRMJ felt that the paper fits nicely into the HRMJ special issue on the topic. Specifically, the project explores how HR Analytics as a management/HR activity may either gain legitimacy or face barriers to legitimacy as the offering develops within organisations. The broader discussion of the degree to which HR as a function has struggled to gain legitimacy is a topic of discussion and debate that has been present for many decades (e.g. Guest, 1987; Legge, 1995; Ullrich, 1996; Guest and King, 2004). In this paper, the authors specifically focus on HR Analytics (which might be considered a subset of a broader HR offering) and possible processes that may help explain whether an HR Analytics offering can gain legitimacy. The authors found that the three organisations that they focused on demonstrated variation in paths to legitimacy (or not); and in the process they help explain key features that may help us understand whether HR Analytics as an offering gains legitimacy. Examples include: having top management backing; being able to showcase HR Analytic projects; integrating the service with other (central) analytics teams/functions; highlighting and framing the importance of data protection and ethical codes; and successfully integrating technological (e.g. HRIS and dashboards) initiatives and developments into the offering.

Conclusion

As we noted at the beginning of our introduction, when we put out the call for this special issue, we were interested in addressing a gap we saw in existing HR Analytics published research. We were interested in putting together a set of papers that showed how HR Analytics was or could be used to explore an important research-related business question (Guenole et al, 2017; Huselid, 2018). While the papers in this special issue contribute our knowledge of HR Analytics in relevant and specific ways, there is still a need for HR Analytics research to be published to showcase how it contributes of solving important business problems. We have identified specific challenges to why this gap remains, the lengthy peer review process, the integrity of the data and the potential measures on which the research project relies also need to be sufficiently reliable and valid to meet academic journal standards (Edwards and Edwards, 2019) and political consideration. Despite these challenges we encourage future researchers to be

motivated to overcome these challenges and contribute to the future development of the HR Analytics field.

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