

HR analytics-as-practice: a systematic literature review

HR analytics-
as-practice

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Abstract

Purpose – Human resource analytics (HRA) is an HR activity that companies and academics increasingly pay attention to. Existing literature conceptualises HRA mostly from an objectivist perspective, which limits understanding of actual HRA activities in the complex organisational environment. This paper therefore draws on the practice-based approach, using a novel framework to conceptualise HRA-as-practice.

Design/methodology/approach – The authors conducted a systematic literature review of 100 academic and practitioner-oriented publications to analyse existing HRA literature in relation to practice theory, using the “HRA-as-practice” frame.

Findings – The authors identify the main practices involved in HRA, by whom and how these practices are enacted, and reveal three topics in nomological network of HRA-as-practice: HRA technology, HRA outcomes and HRA hindrances and facilitators, which the authors suggest might actualize enactment of HRA practices.

Practical implications – The authors offer HR function and HR professionals a basic ground to evaluate HRA as a highly contextual activity that can potentially generate business value and increase HR impact when seen as a complex interaction between HRA practices, HRA practitioners and HRA praxis. The findings also help HR practitioners understand multiple factors that influence the practice of HRA.

Originality/value – This systematic review differs from the previous reviews in two ways. First, it analyses both academic and practitioner-oriented publications. Second, it provides a novel theoretical contribution by conceptualising HRA-as-practice and comprehensively compiling scattered topics and themes related to HRA.

Keywords Human resource analytics, HR analytics, Practice theory, HR practices, HR practitioners, HR praxis, Review

Paper type Research paper

1. Introduction

Human resource analytics (HRA) is a human resource (HR) activity that has recently attracted growing interest among companies and public organisations. HRA has broadly been seen as the collection, analysis and reporting of data to inform people-related decisions and improve individual and organisational outcomes (Fernandez and Gallardo-Gallardo, 2021).

The interest in HRA has evolved mainly through HR management (HRM) experts and business consultants, who portray HRA as creating numerous advantages for organisations and the HR profession. These advantages include, e.g. improved rigour of HR decisions, increased credibility and strategic value of the HR function, enhanced competitive advantage and business success that can be achieved through a better understanding of the organisational workforce (Davenport *et al.*, 2010; Huselid, 2018; Deloitte, 2021).

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However, despite the enhanced popularity of the topic, the academic field of HRA is still reported as nascent, the research, though growing, is rather scarce, lacking a unifying understanding of HRA practice, possibly due to the continuously increasing development and evolution of the HRA scope (van den Heuvel and Bondarouk, 2017; Margherita, 2022). HRA literature remains scattered, with too few consistent frameworks, and its current state can be described as “wild, wild west” (Levenson and Fink, 2017).

In an attempt to grasp the scope of HRA and reflect on its early development, several literature reviews have been conducted in the field (Marler and Boudreau, 2017; Tursunbayeva *et al.*, 2018, 2022; Ben-Gal, 2019; Fernandez and Gallardo-Gallardo, 2021; Margherita, 2022; Qamar and Samad, 2022; McCartney and Fu, 2022; Jiang and Akdere, 2022; Giermindl *et al.*, 2022). Despite the difference in purposes and research questions, these literature reviews are similar in their understanding of HRA from an objectivist perspective, namely, as something – process or tool – that organisations have or lack. This view is, however, useful but somewhat deficient and fragmented in its depiction of the complexity of organisational reality and focuses more on what should be done to succeed with HRA rather than on the actual activities within organisations. Thus, as also indicated by Jiang and Akdere (2022), there is a clear need for theoretical development in the field as it stands at the present.

The purpose of this paper is therefore to draw on the alternative perspective originated in the practice-based ontology and reconceptualise HRA using a new framework of HRM-as-practice. This conceptualisation has three dimensions: HRA practices, HRA praxis and HRA practitioners.

HRM-as-practice framework was proposed by Björkman *et al.* (2014) as a holistic and more dynamic approach to understand and innovatively examine the general practice of HRM. The framework addresses intersections between the three components of general HRM practice – practices, praxis and practitioners – by asking, “*What*” general practices does HRM involve? “*Who*” are the HRM practitioners? “*How*” do HRM practitioners enact HRM practices? Applying this approach, we intend to answer the following research questions: (1) What practices constitute HRA? (2) How are these practices enacted in organisations? (3) What actors are involved in the enactment of the practices? And, finally, (4) What connects HRA practices, their enactment and HRA practitioners into a coherent model of HRA-as-practice?

To answer the research questions, we conducted a literature assessment of academic and practitioner-oriented articles. Considering the general lack of empirical academic research in the field (Edwards *et al.*, 2022), this methodological approach allows for a wider coverage of material for the analysis, particularly with our special focus on the practice of HRA.

This study thus provides an overview of the HRA field from a practice perspective and aims to contribute to the theoretical understanding of HRA by constructing it as a coherent and holistic concept. Moreover, it also compiles a nomological network of HRA-as-practice, adding more recent and ample findings to the topics and concepts that exist around the practice of HRA and influence and are influenced by it. Practically, it offers HR functions and HR professionals an overview of how HRA operates as a practice within organisations. It also provides a basis for evaluating the conditions enabling and moderating HRA as a possible solution to generate business value and increase HR impact due to a better understanding of the important features of HRA and what is implied for its useful enactment.

The paper is structured as follows: first, the practice theory is briefly introduced, followed by a description of the methodology. Next, the results of the literature review are presented and discussed.

2. Theoretical approach: HRA-as-practice

For our analysis, we have chosen to elaborate on a framework proposed by Björkman *et al.* (2014) and their concept of HRM-as-practice, which in turn leans on the strategy-as-practice

discourse (Whittington, 2006; Jarzabkowski *et al.*, 2007). By arguing that organisational phenomena do not exist until they are enacted in practice, practice theory particularly aims to overcome the structure-agency dualism, implying that both individual doings and structural influences only acquire meaning when they manifest themselves in practice (Nicolini, 2012). These ideas emerged from seminal works in sociology (e.g. Giddens, 1984) underpinning all practice theories and have lately been used for studying different areas of business administration and management, such as organisational learning and knowing (Tsoukas, 1996), strategy (Whittington, 1996), technology (Orlikowski, 2000), accounting (Ahrens and Chapman, 2006) and HRM (Björkman *et al.*, 2014).

Central to the ideas of strategy-as-practice are three interrelated concepts suggesting that studying social practice should focus on *practices*, *praxis*, *practitioners* and intersections between them (Whittington, 2006; Jarzabkowski *et al.*, 2007). Integrating these three concepts allows for a coherent depiction and understanding of a social phenomenon and how it evolves. The conceptualisation is ontologically rooted in the duality identified by Giddens (1984), when structures and actors simultaneously influence and are influenced by each other.

The HRM-as-practice draws on these ideas and adapts the concept to the HRM field. The conceptualisation involves the three basic categories, contextually defining them as HRM practices, HRM praxis and HRM practitioners (Björkman *et al.*, 2014). The “three Ps” are thus in line with the general practice theories, seen as inseparable, interconnected and difficult to distinguish since practices are “pertinent” when enacted by practitioners in a certain context (Whittington, 2006). The model calls for an extended assessment of what links these elements in their intersections, constituting the practice of HRM as it is enacted. According to the underlying theory, particular practices are entangled with other practices, creating the problem of making clear distinctions between them. In other words, the practice theory tradition emphasises that practices are entangled in bundles, embodied in practitioners and enacted by them (Jarzabkowski *et al.*, 2016). Thus, the distinction used in this article is basically an exercise of abstraction from a wider context of practices. It is an analytical choice intended as a necessary simplification for a better understanding of the practice of HRA.

The definition of *practices* varies in practice literature depending on the field of application. Björkman *et al.* (2014) understand practices as tools, norms, processes and procedures and traditionally exemplify HRM practices as HRM routines and techniques that ensure implementation of HRM policies, e.g. high-performance HRM practices. Since there is no traditional agreement on HRA practices due to the current evolution and development of such activities, we choose to depict them in line with the more broad understanding in the strategy-as-practice tradition as something that is “done” (Whittington, 2006), the supposed or routinised activities that can be “diverse and variable” and combined and adjusted depending on their utilisation in a particular context (Jarzabkowski *et al.*, 2007). In other words, HRA practices are seen as recognised abstract general activities that principally construct HRA.

Enacted HRA practices are situated activities, which we call *HRA praxis*. Jarzabkowski *et al.* (2007) discuss praxis as the flow of actual activities that are situated, socially accomplished and consequential. In line with this definition, we understand HRA praxis as an actual activity, representing how people “go about things” when they perform HRA practices. If HRA practices are more generally recognised patterns and principles about what is included in HRA work, HRA praxis is the actual work, representing how the abstract activities are enacted in real situations.

HRA practitioners are the actors who enact, construct and reconstruct HRA practices through their actual activities. The practitioners are seen as the “prime movers” who perform the actual work (Whittington, 2006). In this study, we understand HRA practitioners as those who are directly involved in the enactment of HRA practices. The strategy-as-practice approach, although recognising both internal and external actors who impact strategy-making, often tends to focus on the individual actors and their agency. Instead, Björkman *et al.* (2014)

follow HRM tradition, distinguishing between individual and collective actors. In this exploratory study, we adhere to a broader perspective and are interested in revealing all possible practitioners involved in HRA, both individual and collective, to get a holistic picture.

Finally, we are also interested in how the above-mentioned “three Ps”, HRA practices, HRA praxis and HRA practitioners, are actualised and connected into one whole practice of HRA. According to Björkman *et al.*'s (2014) model, the three Ps are de facto entangled, and their interconnections are of prime importance for the model because HRM-as-practice manifests itself in these intersections. Björkman *et al.* (2014), although stressing importance of the interconnections, neither provide any detailed descriptions of what exactly happened there nor introduce any defined entities that influence and are influenced by the practice of HRA and its elements. Instead, Björkman *et al.* (2014) suggest several potentially interesting research questions that arise from the intersections without being rigid guidelines and might be modified by future HRM research. Based on the elusive and, to a certain degree, obscure nature of the interconnections, we are interested in revealing what topics and concepts in the nomological network of HRA-as-practice might actualise intersections between HRA practices, HRA praxis and HRA practitioners and integrate them into a coherent whole.

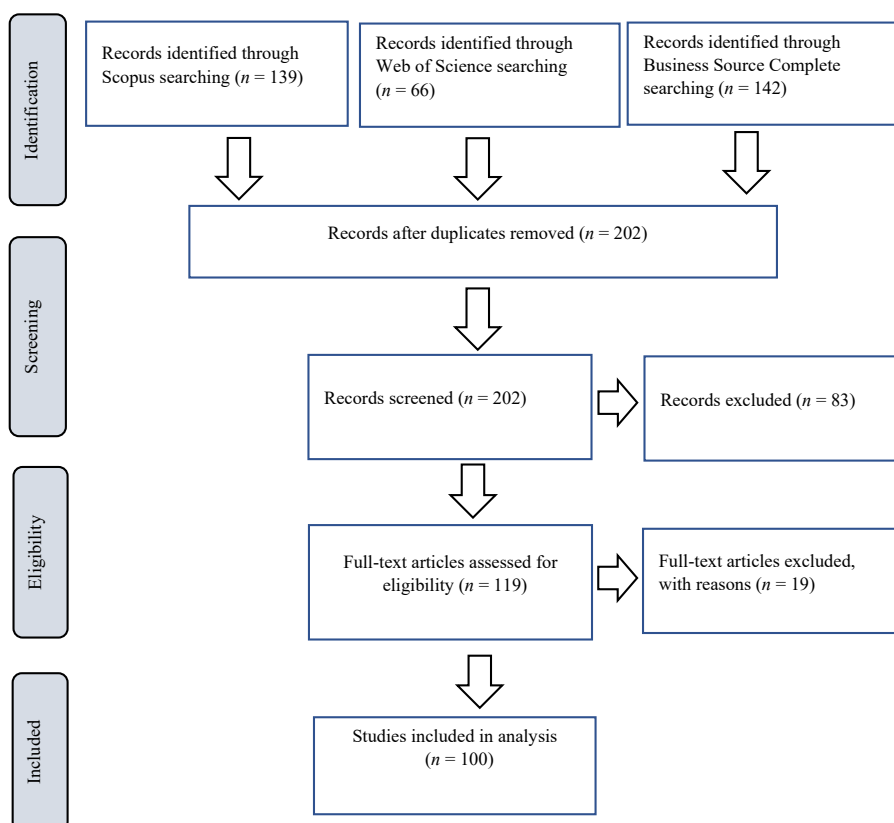
3. Methodology

A systematic literature review has been conducted to analyse relevant HRA literature. The literature review process used here followed the four steps: (1) developing a review protocol; (2) searching for the literature; (3) selecting the studies for review; and (4) summarising the evidence (Boell and Cecez-Kecmanovic, 2015). A PRISMA flow diagram was used to document the search and selection of the studies for the review (Moher *et al.*, 2009). A summary of this process is depicted in Figure 1.

According to the review protocol, three databases were searched to identify articles for the review: Scopus, Web of Science and Business Source Complete. Scopus and Web of Science were chosen as the two most well-known interdisciplinary research databases with a wide coverage of academic articles (Chadegani *et al.*, 2013). Scopus and Web of Science each provide access to more than 80 million records in more than 21,000 journals. The database Business Source Complete, as one of the leading databases in the field of business and management studies and with access to more than 4,000 high-profile journals, was chosen as a complementary source.

Although HRA is found to be the most frequently used term for the studied phenomena (Margherita, 2022), it is still not recognised as an exclusive search term in all academic disciplines (Edwards *et al.*, 2022). The existing literature reports numerous synonyms of HRA (Marler and Boudreau, 2017; Fernandez and Gallardo-Gallardo, 2021). In line with this condition, the following terms were applied when searching for source titles, abstracts and keywords: HR analytics, human resource analytics, talent analytics, workforce analytics, people analytics, human capital analytics and employee analytics. The usage of the different names is explained by the emergent nature of the HRA phenomenon (Margherita, 2022). This paper disregards the potential semantic differences among the different labels and uses HRA as a common term for all the synonyms. The three databases were searched in November 2021 for publications published between 2010 and 2021. The starting year was chosen based on the previously reported observation that the number of HRA articles noticeably increased after 2010 and were almost non-existent before that date (Marler and Boudreau, 2017).

The search was limited by type of publication, language and subject area. We included articles from journals written in English in the field of business and management. This led to the identification of 301 publications. After removing duplicates, 202 records remained. A screening process of abstracts at this point resulted in the exclusion of a further 83 records for the following reasons: the content was not relevant for the HRA topic (45); the content was of



Source(s): Adapted from Moher *et al.* (2009, p. 3)

Figure 1.
PRISMA flow diagram

questionable quality because it was published in a journal or by a publisher listed in Beall's list of potentially predatory journals and publishers (21); the article was an editorial (7), a book review (3), a summary of other studies (3), an internal university publication (2), an executive interview (1), or a review of conferences (1). After identification and selection, all the 119 full-text articles were read. An additional 11 were excluded based on their content because the focus was on other topics and HRA was only marginally mentioned in the text. Eight literature review articles were also excluded from the analyses because of the prime interest in empirical findings in connection to HRA. This resulted in a final total of 100 articles, which formed the basis for our analysis. A full list of articles is included in [Appendix](#).

Among the 100 articles selected for analysis, it is possible to clearly distinguish between two broad groups. The first one comprises 53 traditional academic articles. The other group comprises 47 articles, mostly aimed at the practitioner audience. They are shorter than academic publications, do not necessarily deploy scientific methods, often have a viewpoint character or are case studies and are often published by practitioners in trade journals. We labelled these articles "practitioner-oriented". The reason we have included practitioner-oriented publications is because they are directly related to the topic of HRA-as-practice and cover relevant contextual details as regards HRA usage, experiences of HRA practitioners and cases of successful HRA implementation. They also reflect the ideas of actors involved in

HRA more directly and have been published with less delay than the academic articles, thus potentially mirroring important HRA developments before the topic appeared in traditional academic journals.

4. Analysis

The analysis started with identifying content in each examined article consistent with the three main categories of the HRA-as-practice framework – HRA practices, HRA practitioners and HRA praxis. We assessed the articles to reveal what fits under these categories, namely what practices are discussed as a part of HRA, how they are enacted and what actors are involved. We also paid attention to other interesting topics and concepts covered in the articles in connection to the three main categories. The analysis revealed three broad topics, i.e. HRA technology, HRA outcomes and HRA hindrances and facilitators, which we call topics in the nomological network of HRA-as-practice. We discuss them below, after the main categories. These topics and their content are of particular interest for addressing the question of what connects the “three Ps” in a nomological network of HR-as-practice and what creates coherence in understanding of practice of HRA. In the analysis, the content of the articles was also synthesised into several subcategories under the three main and three related nomological categories. A complete overview of the categories and subcategories with examples can be found in [Table 1](#).

The results regarding the number of articles discussing the basic categories – HRA practices, HRA practitioners and HRA praxis – and additional related topics – HRA technology, HRA outcomes, and HRA hindrances and facilitators – are illustrated in [Table 2](#). It clearly shows that all articles analysed in one way or another address practices involved in HRA and HRA outcomes. However, the findings show that not all reviewed papers deal with HRA practitioners, HRA technology, and HRA hindrances and facilitators. Interestingly, even in the practitioner-oriented group, not all papers address these categories. It often occurs in either technical papers that focus on providing a certain statistical method for HRA or publications of a promotional character that treat companies as competing actors in the market.

HRA praxis was found to be the category addressed least in the reviewed literature. Only 44 out of the 100 articles addressed the question of how HRA practices are enacted. This number is even lower for articles within the academic group, where only 19 out of 53 articles address HRA praxis.

4.1 HRA practices

In the analysis, we aimed for a wide coverage of possible HRA practices discussed in the literature with a focus on general activities, something that is done by practitioners. We could identify several sub-practices that are seen to construct HRA. To categorise the content of the articles as a HRA sub-practice, we were looking for what is done in the organisations when they say to be involved in HRA, e.g. activities such as data collection and extraction, producing different types of analyses and reporting of results.

The multiple HRA sub-practices extracted from the analysed literature have been synthesised into four separate but related groups. The first group includes HRA practices linked to *data usage*, such as data management and governance. The category includes practices connected to both HR and other business data and data from external sources, such as market or industry data (e.g. [Jacobus, 2015](#); [Hamilton and Sodeman, 2020](#)). Practices of constructing and following different measures, also called metrics or indicators, that might be relevant for HR and business strategy are included (e.g. [Brown, 2020](#); [Buttner and Tullar, 2018](#)).

Examples

Dimensions of HRA-as-practice

HRA practices

data usage	internal HR- and other business data (e.g. Jacobus, 2015) external market and industry data (e.g. Hamilton and Sodeman, 2020) data management and governance (e.g. Andersen, 2017 ; Jacobus, 2015 ; Hamilton and Sodeman, 2020)
data analysis	constructing metrics and indicators (e.g. Brown, 2020 ; Buttner and Tullar, 2018) descriptive (e.g. Jones and Sturtevant, 2016) predictive (e.g. Brand and Herzberg, 2020) prescriptive (e.g. Rasmussen and Ulrich, 2015) autonomous (e.g. Gal et al., 2020)
data-based insights	visualisation (e.g. Andersen, 2017) storytelling (e.g. Welbourne, 2015) communication of results (e.g. Lipkin, 2015)
decision support	evidence-based (e.g. Hirsch et al., 2015) user tailored (e.g. DiClaudio, 2019) action oriented (e.g. Jörden et al., 2022) strategy driven (e.g. Minbaeva, 2018)

HRA practitioners

HRA producers	HR professionals (e.g. Boudreau and Cascio, 2017) HR analysts (e.g. McCartney et al., 2020) external IT and management consultants (e.g. Fredriksen, 2017) academics (e.g. Simón and Ferreira, 2018) internal and external experts (e.g. Hamilton and Davison, 2022)
HRA users	HR professionals (e.g. Levenson, 2018) top managers (e.g. Shet et al., 2021) line managers (e.g. Nicolaescu et al., 2020) business professionals (e.g. Barrette, 2015)

HRA praxis

HRA processes	a set of sequential steps such as formulating question, collecting data, building models, analysing data, reporting results, evaluating actions (e.g. Garvin, 2013 ; Green, 2017 ; McIver et al., 2018 ; McCartney et al., 2020)
HRA mechanisms	customisation (e.g. Jörden et al., 2022) alignment to decision makers' perceptions of business reality (e.g. Ellmer and Reichel, 2021) building of relationships and networks (e.g. Collins, 2015) establishment of HRA's credibility and legitimacy (e.g. Hirsch et al., 2015) exercise of strategic commitment (e.g. Belizón and Kieran, 2022) demonstration of ethical and legal compliance (e.g. Hamilton and Davison, 2022) encouragement of employee involvement (e.g. Lipkin, 2015)

Topics in nomological network of HRA-as-practice

Technology

general technology	automation (e.g. Van den Heuvel and Bondarouk, 2017) computerisation (e.g. Murphy, 2016) cloud technology (e.g. Feinzig, 2015) social media (e.g. Leonardi and Contractor, 2018) big data (e.g. Wang and Cotton, 2018) robotics (e.g. Jones, 2015) artificial intelligence (e.g. Hamilton and Davison, 2022) algorithms (e.g. Gal et al., 2020) facial recognition (e.g. Hamilton and Sodeman, 2020) Internet of Things, biometric technology, sensors and wearables (e.g. Holwerda, 2021)
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(continued)

Table 1.
Categories and
subcategories in
analysis

	Examples
HRA tools	HR- and other organisational IS (e.g. Dahlbom et al., 2020 ; McCartney et al., 2020) statistical soft: Excel, SPSS, R, Stata, Python (e.g. King, 2016 ; Ryan, 2021) reporting and visualisation tools (e.g. Buttner and Tullar, 2018 ; Welbourne, 2014)
HRA techniques	benchmarking (e.g. Jones, 2015) data mining (e.g. Rombaut and Guerry, 2018) sentiment analyses (e.g. Gelbard et al., 2018) machine learning (e.g. Yuan et al., 2021) mathematical modelling (e.g. Pessach et al., 2020)
<i>Outcomes</i>	
business benefits	improved business decisions (e.g. Lunsford and Philips, 2018) improved firm performance (e.g. Larsson and Edwards, 2022) revenue and ROI (e.g. Holwerda, 2021) time and cost savings (e.g. Hickman et al., 2021) effectiveness (e.g. Levenson, 2018) efficiency (e.g. Zuo and Zhao, 2021) competitive advantage (e.g. DiClaudio, 2019) increased productivity (e.g. Lal, 2015) reduced uncertainty (e.g. Frederiksen, 2017) facilitation of strategic change (e.g. Hamilton and Sodeman, 2020) effective strategy execution (e.g. Levenson, 2018)
HR-related outcomes	Improved HR decisions (e.g. Boudreau and Cascio, 2017) HR impact and strategic influence (e.g. King, 2016) operational effectiveness of HR function (e.g. Walford-Wright and Scott-Jackson, 2018) improved HR processes (e.g. Staney, 2014 ; Lam and Hawkes, 2017) credibility and the professional legitimacy of HR (e.g. Belizón and Kieran, 2022) increased individual job performance of HR professionals (e.g. Kryscynski et al., 2018) accuracy, fairness and employee commitment (e.g. Sharma and Sharma, 2017) just workplace (e.g. Hamilton and Davison, 2022) effective HRM (e.g. Hamilton and Davison, 2022)
<i>Hindrances and facilitators</i>	
individual	analytical and statistical skills (e.g. DiCaludio, 2019) HR professional knowledge (e.g. Jones, 2014) business acumen (e.g. Dahlbom et al., 2020) communication skills (e.g. Welbourne, 2015) relationships (e.g. Lam and Hawks, 2017) managerial buy-in and trust (e.g. Lam and Hawkes, 2017) employees' buy-in (e.g. Lipkin, 2015) attitudes and mindsets (e.g. Rasmussen and Ulrich, 2015)
technological	data availability and quality (e.g. Dahlbom et al., 2020) infrastructure and IT systems (e.g. Leonardi and Contractor, 2018)
organisational	organisational structure (e.g. Angrave et al., 2016) organisational culture (e.g. Ellmer and Reichel, 2021) resource allocation (e.g. Simón and Ferreiro, 2018) operational processes (e.g. Howes, 2014) leadership support (e.g. Hamilton and Sodeman, 2020)
environmental	privacy (e.g. Gelbard et al., 2018) ethical and legal concerns (e.g. Hamilton and Davison, 2022) gap between academia and industry (e.g. Rombaut and Guerry, 2018)

Table 1. Source(s): Authors' own creation

The second group includes HRA sub-practices linked to *data analysis*. The examined literature suggests the application of different statistical analyses at different levels of sophistication, distinguishing between descriptive (e.g. Jones and Sturtevant, 2016), predictive (e.g. Brandt and Herzberg, 2020), occasionally prescriptive (e.g. Rasmussen and Ulrich, 2015) and even autonomous analytics, such as in the context of autonomous algorithms (e.g. Gal et al., 2020). Much attention was found to be paid to the practice of prediction: predicting valuable HR and organisational outcomes, such as employee retention or individual and organisational performance (e.g. Zuo and Zhao, 2021; Speer, 2021).

The third group includes practices related to producing *data-based insights*. Insight generation is mentioned by almost all reviewed articles as the central practice of HRA (e.g. Ames, 2014; Dahlbom et al., 2020). Insight generation is seen to include visualisation (e.g. Andersen, 2017), storytelling (e.g. Welbourne, 2015) and communication of results produced by data analysis (e.g. Lipkin, 2015). It is these practices that are argued to be of great importance for successful HRA users' buy-in.

Finally, the fourth group includes HRA practices of *decision support*. Since improved HR and business decisions are assumed to be the goal of HRA, most of the analysed publications discuss sub-practices that pay particular attention to evidence-based (e.g. Hirsch et al., 2015), user-tailored (e.g. DiClaudio, 2019), action-oriented (e.g. Jörden et al., 2022) and often strategy-driven (e.g. Minbaeva, 2018) decisions.

4.1.1 HRA practitioners. The analysis revealed two broader groups of HRA practitioners: HRA producers and HRA users. *HRA producers* are the practitioners who are directly involved in the everyday activities of producing HRA, such as managing and collecting data, producing analyses, visualising results and communicating insights. *HRA consumers* are the practitioners who use HRA results as a basis for decision-making. HRA producers and HRA users represent both individual and collective actors, e.g. various individual professionals, groups, teams, departments, organisations and even the whole HR profession.

The most discussed HRA producers are HRA teams and their members, sometimes also called *HR analysts*. Such groups often include specialists from different functional and organisational areas: HR, IT and data science. There is no consensus regarding the exact organisational position where such teams are placed; placement both inside and outside HR departments is possible (e.g. Peeters et al., 2020; Van den Heuvel and Bondarouk, 2017). Together with discussing the organisational belonging of HRA teams, the analysed articles also focus on the competences, knowledge and skills of team members and how these connect to the different areas linked to HRA. The role of an HR analyst, for example, is still in development, but several articles discuss the required competences, which are said to include technical and data knowledge, ability regarding statistical analysis, visualisation and communication and business and HR knowledge (e.g. Kryscynski et al., 2018; McIver et al., 2018; Minbaeva, 2018; Van der Togt and Rasmussen, 2017; Feinzig, 2015). A competency

	Academic articles	Practitioner-oriented articles	Total
<i>Components of HRA-as-practice</i>			
HRA practices	53	47	100
HRA practitioners	37	40	77
HRA praxis	19	25	44
<i>Topics in the nomological network of HRA-as-practice</i>			
HRA technology	43	37	80
HRA outcomes	53	47	100
HRA hindrances and facilitators	42	36	78

Source(s): Authors' own creation

Table 2.
HRA-as-practice
concepts and number
of articles

model already exists for the emerging role of HR analysts (McCartney *et al.*, 2020). “HR analyst” is the label most frequently used to depict HRA producers. However, Gal *et al.* (2020) suggest another title, that of “algorithmists” or auditors of algorithms, named after the algorithmic technology they are supposed to apply in their HRA work.

Other categories of HRA practitioners as producers are also discussed in some of the analysed articles, such as IT and management consultants, researchers and academics and external experts. These types of practitioners, though represented by external actors, have direct influence on HRA making within organisations. IT and management consultants, for instance, commodify and sell similar technical solutions accompanied by business models and processes to several organisations, popularising HRA and making it a HR “best practice” (Angrave *et al.*, 2016). Researchers and academics, when involved in organisational HRA projects, might directly contribute with their theoretical knowledge and rigorous social science research methods to complement and modify different HRA practices and their enactment (Simón and Ferreiro, 2018). Similarly, external experts might influence HRA activities in organisations by using their expert knowledge in, e.g. the artificial intelligence area, legal and ethical requirements and diversity and inclusion questions (Hamilton and Davison, 2022).

Not surprisingly, however, the most common category of HRA practitioners discussed in the assessed literature is HR departments and HR professionals. Interestingly, HR departments and HR professionals such as HR managers, HR business partners and HR specialists are considered both producers and consumers of HRA. Many articles suggest that HR professionals, especially HR managers responsible for HR decisions, are important users of HRA (e.g. Levenson, 2018; Nicolaescu *et al.*, 2020; Pessach *et al.*, 2020). Some articles argue that HR professionals are the ones who also should produce HRA (e.g. Boudreau and Cascio, 2017; Howes, 2014; Vargas *et al.*, 2018). Other publications do not support this idea, arguing that traditional HR professionals and the whole HR profession generally lack the appropriate analytical skills and business acumen, which makes them incapable of producing HRA (Angrave *et al.*, 2016).

Another group of HRA users who also attract a good deal of attention, apart from HR professionals, are top managers, including CEOs (Shet *et al.*, 2021), line managers (Nicolaescu *et al.*, 2020) and other types of managers and business professionals (Barrette, 2015).

As a complement to the analysis, it is important to note that some of the analysed articles address broader groups of actors that have some connection to the general topic of HRA, including external actors or stakeholders such as the general public, key opinion leaders, customers, suppliers and regulatory agencies (e.g. Hamilton and Sodeman, 2020; Belizón and Kieran, 2022). Although these actors are seen as only indirectly involved in the enactment of HRA practices in organisational settings, they are important for understanding the topic of HRA, especially from a multi-level institutional perspective. For instance, such institutional actors are involved in forming general public opinion and building legitimacy of HRA practices, influencing other actors, e.g. organisations, organisational leaders and HR professionals, in their decisions regarding HRA usage (Belizón and Kieran, 2022).

Employees are another interesting group mentioned in some of the articles (Khan and Tang, 2016; Giermindl *et al.*, 2022). While their role is certainly worth considering as an important aspect, especially in connection to the ethical and legal requirements regarding HR data ownership, the analysed literature is still limited in addressing the employee perspective and the employees’ role in the enactment of HRA practices.

4.1.2 HRA praxis. It has been more difficult to identify HRA praxis in the reviewed articles in comparison to the more stable and defined concepts of HRA practices and HRA practitioners. This might partly be explained by the elusive character of praxis, grounded as it is in actual activities, which is, thus, challenging to capture in the text, especially in non-empirical articles. We therefore based our analysis on the definition of praxis as actually

situated activities when practices are enacted in context. In other words, from the assessed literature, we attempted to extract what exactly happens in organisations when HRA practices are “done” by practitioners and how abstract practices of data usage, analysis, insight generation and decision support are unfolded in the context. We further attributed such individual situated activities to a broader category in order to provide a general picture of HRA praxis. We, however, acknowledge that such operationalisation might inevitably limit the scope of multiple unique manifestations of HRA praxis that potentially exist in real life. We assume, although, that it is reasonable due to the nature of this study.

Based on this assumption, we attributed the HRA praxis described in the analysed literature either to a process of multiple steps or a particular mechanism that HRA practitioners use to enact HRA practices.

As the analysed literature indicates, a detailed *process* is often described as a set of logical and sequential steps that usually begin with question formulation and then move on to extracting or collecting data, building models and measures, conducting analysis, dissimilating results, acting on results and evaluating actions (e.g. [Garvin, 2013](#); [Green, 2017](#); [McIver et al., 2018](#); [McCartney et al., 2020](#)). The reviewed articles often contextualise these steps and provide rich descriptions of how, for example, questions for HRA are or should be formulated, analysis conducted and results acted upon. These steps are often seen to intertwine with HRA practices, which point to the interconnection of the two elements. Indeed, an abstract HRA practice, for example, data usage, is translated into praxis by its enactment in a process step of extracting relevant data from the database for a given question at hand.

To exemplify a possible HRA process in a typical firm, [Hamilton and Sodeman \(2020\)](#), for instance, illustrate several steps that happen in sequence: understanding firms value chain, determining significant questions and locations of data, coordinating with stakeholders, analysing data, screening for ethical concerns, making assessments for changes together with stakeholders, and, finally, implementing change together with line managers. Another example of possible HRA praxis in the form of a process is provided by [McIver et al. \(2018\)](#), who describe five iterative steps: prioritise issues with the greatest potential for organisational outcomes, decide on either a data-driven or theory-driven approach, prepare and validate data, apply multiple methods of analysis and finally transform insights into actions.

HRA praxis has also been described within the literature as comprising different *mechanisms* for the enactment of HRA practices, such as customisation ([Jörden et al., 2022](#)), alignment to decision makers’ perceptions of business reality ([Ellmer and Reichel, 2021](#)), building of relationships and networks ([Collins, 2015](#)), establishment of HRA’s credibility and legitimacy ([Hirsch et al., 2015](#)), exercise of strategic commitment ([Belizón and Kieran, 2022](#)), demonstration of ethical ([Gal et al., 2020](#)) and legal compliance ([Hamilton and Davison, 2022](#)) and encouragement of employee involvement and protection of their benefits ([Lipkin, 2015](#)).

[Ellmer and Reichel \(2021\)](#), for example, describe how HRA practitioners produce HRA outputs by aligning to the decision-makers’ perception of business reality. Such alignment to the final users’ needs includes speaking the language of numbers, customising dashboards and boundary spanning. Thus, in this case, HRA practices are enacted through using certain numbers, particularly financial indicators, which is a common language for decision-making managers, adapting figures and diagrams for the visualisation of HRA results, and establishing relationships across diverse functional departments. Another example of HRA mechanisms is suggested by [Belizón and Kieran \(2022\)](#), who argue that HRA enactment happens through the legitimacy establishment process, where strategic commitment, data infrastructure decisions and focus on HRA projects explain how HRA unfolds in practice. In this case, HRA praxis is made evident via HR practitioners’ commitment to HR and business strategy, decisions on HRA data storage, whether inside HR function or as part of a companywide data warehouse, and focus on small-scaled HRA projects.

We again acknowledge that it is naturally impossible to identify all mechanisms that might be used by HRA practitioners to enact HRA practices in reality, as they are context-dependent and individual in every situation. Thus, the mechanisms extracted from the analysed literature represent only a few examples of HRA praxis described in the articles. Presenting them, however, provides an indication of how HRA practices are enacted in real life. For example, it is feasible to assume that, e.g. the practice of producing data-based insights can be enacted by the mechanism of aligning to the final users' needs. HRA producers can engage in meetings and talks with their HRA users, in this case, business managers. This allows them to better understand their managers' needs and produce insights accordingly.

4.1.3 Topics in the nomological network of HRA-as-practice. Along with identifying what practices constitute HRA and how and by whom they are enacted, this study is also interested in understanding how these three elements are connected in a coherent model and what topics exist around them in a nomological network. The analysis of the reviewed articles has revealed three topics that are widely discussed in the assessed literature. We have labelled them: HRA technology, HRM outcomes and HRA hindrances and facilitators. These categories and their content have a very clear connection to HRA practices, their implementation and their development, but they do not fall directly under any of the three main categories in Björkman *et al.*'s (2014) model. We see it as reasonable and natural to bring forward these entities and conditions as clear candidates for the topics in the nomological network of HRA-as-practice. Mapping these topics and their content in the network of HRA-as-practice creates coherence between the main categories, helping to understand the practice of HRA holistically.

Accordingly, *HRA technology* is discussed in almost all reviewed articles, which is not surprising because the phenomenon of HRA is often linked to technology and is enabled by it. The depth of the discussions regarding HRA technology varies, however. Some articles mention technology in general terms (e.g. Vargas *et al.*, 2018; Karwehl and Kauffeld, 2021; Andersen, 2017), and some focus on one type of technology, such as artificial intelligence (e.g. Gal *et al.*, 2020; Roberts, 2017).

We divided HRA technology into three subcategories: general technology, HRA tools and HRA techniques. Articles dealing with *general technology* discuss topics of automation (Van den Heuvel and Bondarouk, 2017), computerisation (Murphy, 2016), cloud technology (Feinzig, 2015), social media (Leonardi and Contractor, 2018), big data (Wang and Cotton, 2018), robotics (Jones, 2015), artificial intelligence (Hamilton and Davison, 2022), algorithms (Gal *et al.*, 2020), facial recognition (Hamilton and Sodeman, 2020), as well as the internet of things, biometric technology, sensors and wearables (Holwerda, 2021). *HRA tools* include data storage and management tools, such as different organisational information systems, databases and data warehouses, with a particular focus on HR information systems as an important source of HR data (e.g. Dahlbom *et al.*, 2020; McCartney *et al.*, 2020). Another example covers tools that can carry out different data analyses or perform statistical calculations, such as Excel, SPSS, R, Stata or Python (King, 2016; Ryan, 2021), and those examining the reporting and visualisation tools, such as dashboards and PowerPoint (Buttner and Tullar, 2018; Welbourne, 2014). Lunsford and Phillips (2018) identify more than 300 different HRA tools and provide a detailed list of the most popular tools used by a broad range of organisations. The articles dealing with *HRA techniques* are focused on carrying out different statistical descriptive, predictive and prescriptive analyses, such as benchmarking (Jones, 2015), data mining (Rombaut and Guerry, 2018), sentiment analyses (Gelbard *et al.*, 2018), machine learning (Yuan *et al.*, 2021) and mathematical modelling (Pessach *et al.*, 2020). There are thus clear links from general HRA technology, tools and techniques both to HRA practices, HRA praxis and also to HRA practitioners.

The next topic that all the articles address is *HRA outcomes*. We divided them into two broad groups: business benefits and HR-related outcomes. Articles dealing with *business benefits* focus on issues, such as improved firm performance (Larsson and Edwards, 2022), revenue and ROI (Holwerda, 2021), time and cost savings (Hickman *et al.*, 2021), effectiveness (Levenson, 2018), efficiency (Zuo and Zhao, 2021), competitive advantage (DiClaudio, 2019), increased productivity (Lal, 2015), reduced uncertainty (Frederiksen, 2017), facilitation of strategic change (Hamilton and Sodeman, 2020) and effective strategy execution (Levenson, 2018). Articles dealing with *HR-related outcomes* examine phenomena such as HR impact and strategic influence (King, 2016), operational effectiveness of HR function (Walford-Wright and Scott-Jackson, 2018), improved HR processes, such as recruitment (Staney, 2014) and assessment (Lam and Hawkes, 2017), employee learning (Hicks, 2018), credibility and the professional legitimacy of HR (Belizón and Kieran, 2022), increased individual job performance of HR professionals (Kryscynski *et al.*, 2018), accuracy, fairness and employee commitment (Sharma and Sharma, 2017), a just workplace (Hamilton and Davison, 2022), and effective HRM (Hamilton and Davison, 2022). One of the HRA outcomes that is commonly discussed in both groups is an improved decision-making process and better overall decisions, either business- or HR-related. This is the most frequently mentioned outcome in the reviewed literature. Better decisions are decisions that are data- and evidence-based, objective, strategic and effective (e.g. Boudreau and Cascio, 2017; Lunsford and Phillips, 2018).

An interesting observation is that all articles, in one way or another, sometimes with conditions, mention the positive outcomes of HRA, either as potential or as actually achieved. The only exception is Jörden *et al.* (2022), who suggest HRA has a negative impact on the HR profession because of the differences in identities and logics between managers and HRA practitioners. In sum, different HRA outcomes can clearly be linked to all main categories of the HRA-as-practice model and particularly to the idea that HRA-as-practice is a continuously evolving entity.

The final topic that is revealed from our review is *HRA hindrances and facilitators*. It would have been possible to discuss these two groups separately. For the purposes of this paper, however, we chose to join them together in one category because not only are they opposite sides of the same factor, but often the lack of a facilitating factor constitutes an actual hindrance. We attribute HRA hindrances and facilitators to the following subgroups: individual, technological, organisational and environmental. Individual factors related to HRA practitioners include the display (or otherwise) of different skills such as analytical and statistical (DiClaudio, 2019), HR professional (Jones, 2014), business knowledge and understanding (Dahlbom *et al.*, 2020), as well as the ability to communicate (Welbourne, 2015) and build relationships (Lam and Hawkes, 2017). HRA users' buy-in and trust (Lam and Hawkes, 2017), employees' buy-in (Lipkin, 2015) and attitudes and mindsets (Rasmussen and Ulrich, 2015) are also named among individual HRA hindrances and facilitators. Technological factors mentioned in the literature are either linked to data availability and quality or infrastructure and IT systems (e.g. Dahlbom *et al.*, 2020; Leonardi and Contractor, 2018). Organisational factors include the "right" organisational structure (Angrave *et al.*, 2016) and analytical culture (Ellmer and Reichel, 2021), resource allocation (Simón and Ferreiro, 2018), operational processes (Howes, 2014) and leadership support (Hamilton and Sodeman, 2020). Environmental factors mentioned in the literature are privacy (Gelbard *et al.*, 2018), ethical and legal concerns (Hamilton and Davison, 2022) and the gap between academia and industry (Rombaut and Guerry, 2018). The content of the topic HRA hindrances and facilitators is clearly linked to the activities of "doing" HRA. They constitute the contextual basis for action. Hindrances and facilitators are also clearly linked to the main practices of HRA and the conditions that are assumed by them. Finally, some of the features are also related to the individual characteristics of the practitioners, indicating that they might theoretically serve to integrate the main categories of our practice model, helping to constitute HRA-as-practice.

5. Discussion and future research

The analysis section has mirrored the content of the reviewed articles and constructed the current HRA-as-practice as depicted in Figure 2. This frame and underlying theory for analysis imply, for analytical purposes, a possible separation between content belonging to the main categories describing HRA practices, HRA praxis and HRA practitioners. But it is clear from our analysis that there are many juxtapositions between them. For example, the HRA practice of data analysis is also a sequential step in a process that depicts HRA praxis. Another example is that the HRA practice of insight generation is revealed only when a HR analyst uses her analytical and communication skills in a certain visualisation activity, which is part of the HRA praxis of aligning to the final users' needs. Such observations are in line with the initial theoretical standpoint about the inseparability of practices, praxis and practitioners (Jarzabkowski *et al.*, 2016).

According to the departure point for our analysis, the three major elements – HRA practices, HRA practitioners and HRA praxis – are inseparable in real life and thus together create a coherent whole of the practice of HRA. Our analysis has also revealed three closely related topics: HRA technology, HRA outcomes and HRA hindrances and facilitators, which

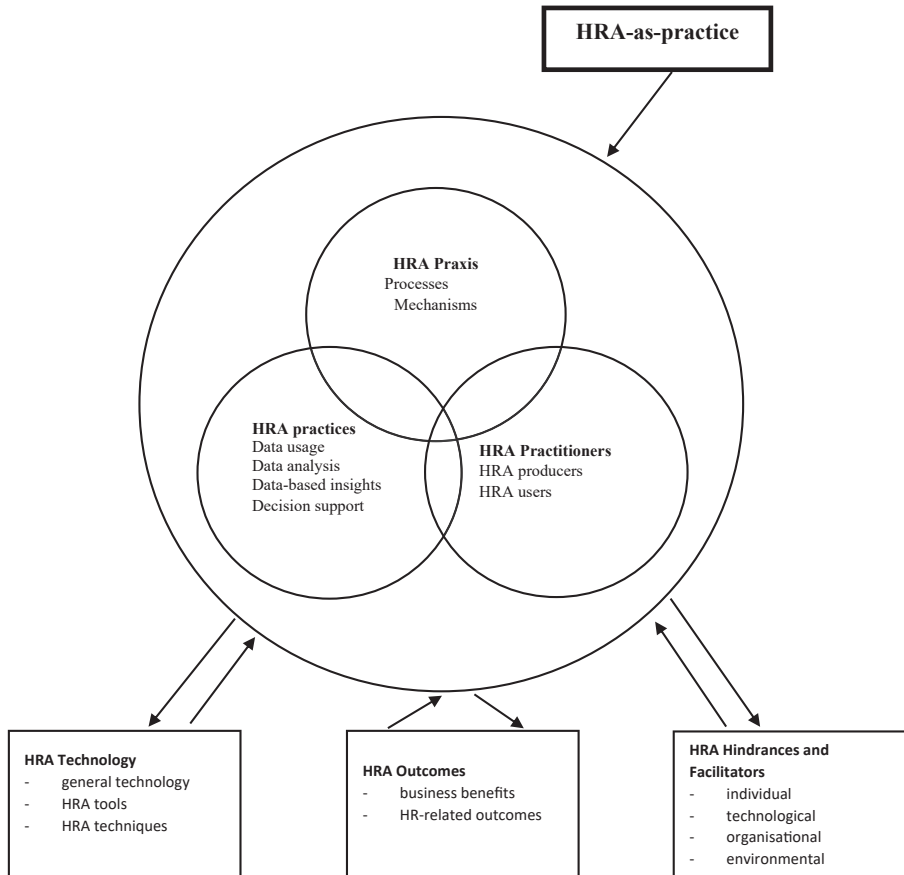


Figure 2.
HRA-as-practice
framework

Source(s): Adapted from Björkman *et al.* (2014, p. 125)

are clearly linked to HRA-as-practice as a whole. These topics, together with the concept of HRA-as-practice represent the nomological network and enhance understanding of the underlying structure of the HRA field. Although HRA technology, outcomes and hindrances and facilitators were previously widely discussed in the existing literature and even categorised as HRA enablers and moderators (e.g. [Marler and Boudreau, 2017](#)), we tried to compile them in a nomological network of HRA, linking them to the enacted HRA practices. We have also expanded the existing categorisation of these topics by adding more recent and ample findings to their content. We suggest that these topics influence and are influenced by the combined concept of HRA-as-practice. They might also actualise the intersections between the main elements of the model and its components. Although our findings clearly show the importance of the revealed topics for HRA practices enactment, the more precise effects and relationships between them and the main categories of the HRA-as-practice framework are to be discussed in future empirical and theoretical investigations. Tentatively though, we have placed the three related topics outside the framework of HRA-as-practice in a nomological network where they are mostly illustrative for how they might influence and be influenced by the “inseparable” practice of HRA.

The topic of HRA technology covers different tools and techniques, such as HR and other organisational information systems, software for data collection, analysis and visualisation. It is found to be closely related to the practice of HRA. The proximity of technology to the concept of practice is widely discussed in the literature. [Björkman *et al.* \(2014\)](#), for instance, in their original model of HRM-as-practice place tools including, presumably, HRM technology under the category of HRM practices. Our analysis shows that technology plays rather a different role than just simply constituting one or several HRA practices, as we understand them as abstract ideas of what is included in HRA. Technology in our suggested model has relationship not only to HRA practices, but rather actualises all constituent elements of the HRA-as-practice concept, including praxis and practitioners, by enabling abstract practices to be enacted by HRA practitioners. For instance, enactment of data analysis practice requires technology in the form of computerisation (general technology) and the application of some statistical analyses, such as regression analysis (HRA technique), using some statistical tool for data analysis, such as Excel or SPSS (HRA tool). The availability of certain HRA technology can also influence the practice of HRA with all its constituent parts: what HRA practices can be chosen, how they can be enacted, and by which practitioner. For instance, the availability of an integrated database storing data on an individual level provides the possibility for predictive analyses enacted in a set of sequential steps by a HRA practitioner with statistical skills. Conversely, HRA technology can be, in its turn, influenced by the practice of HRA. Namely, the availability of the HRA team with mixed competences, high organisational legitimacy and strategy-driven assignments at hand might influence the choice of technology to be used. Understanding HRA technology as actualising HRA practice and as influencing and being influenced by it is also in line with the idea of technology-in-practice proposed by [Orlikowski \(2000\)](#), where she argues that technology is not just an artefact but manifests itself only when it is used in practice, thus converting abstract ideas of practices into evident praxis in a given situation.

HRA outcomes are another important topic in the nomological network of HRA-as-practice. As with HRA technology, HRA outcomes might also actualise the intersections between the main categories of the framework. We suggest that HRA practitioners, both aggregate and individual HRA producers and HRA consumers, are involved in the enactment of particular HRA practices depending on the potential outcomes they are seeking to achieve, thus making HRA outcomes an important component of joining practitioners, praxis and practices together. For example, a HR analyst (HRA producer) is guided by improved decision-making (HR-related outcome) when she is involved in relationship-building activities (HRA praxis) for generating data-driven insights (HRA practice). Alternatively, a

line manager (HRA user) is guided by time and cost savings (business benefit) when engaging in the exercise of strategic commitment (HRA praxis) for the HRA practice of making evidence-based decisions. We also see that HRA outcomes influence and are influenced by the practice of HRA. For instance, the expected HRA outcome of improved HR reporting influences the choice of HRA practices such as visualisation of existing personnel records enacted via customisation for the line manager's needs. On the other hand, the need for action-oriented decision support enacted via exercising of strategic commitment by the HR director might influence the choice of an expected HRA outcome, such as effective strategy execution. We also see that depending on what role HRA practitioners play, it impacts what HRA practices they draw upon and how they enact those, e.g. HR producers, such as HRA analytical teams and individual analysts, who are guided by different HRA outcomes and thus draw upon HRA practices involving data governance, statistical analyses and the generation of data insights, while HRA consumers who use such results are guided by other potential HRA outcomes and are mostly involved in the HRA practices of making evidence-based decisions.

And, finally, the actualisation of HRA-as-practice depends on HRA hindrances and facilitators. One example is that a HR analyst (HRA practitioner) involved in HR data analysis (HRA practice) by engaging in the process of sequential steps, from question formulation to dissemination of results (HRA praxis), might be facilitated by an analytical organisational culture but hindered by a lack of competence of various kinds. In line with [Björkman et al. \(2014\)](#), we also assume that depending on who HRA practitioners are, it might influence how they enact HRA practices in a context and what hinders and facilitates their activities. HR analysts with a statistical background might enact practices involving sophisticated predictive data analysis in a contextual process of interrelated steps, unlike a more traditional HR practitioner, who might be inclined towards the visualisation of descriptive HR-related data through the mechanism of alignment to the final user's needs. The praxis of these different practitioners is also potentially hindered and facilitated by different factors, e.g. specialists in statistics might be hindered by a lack of communicational skills and HR knowledge, while more traditional HR practitioners experience a lack of competence when it comes to technological and analytical skills. We suggest that this question might be an interesting and fruitful area for further empirical research.

Overall evidence from the analysed articles supports the practice perspective by clearly indicating that HRA practices have meaning only when they are implemented by practitioners. This emphasises the importance of the context in which HRA practices are enacted by practitioners. However, our study clearly shows that the context of HRA is not much elaborated in the current HRA literature. Only a few articles provide information that can be used to understand HRA praxis, namely, how HRA practices are enacted in a given context. While all the reviewed articles address HRA practices, and most of them also mention HRA practitioners, HRA praxis is only discussed in less than half of the studies. This result might be seen as a sign that the implementation of HRA is lagging in comparison to the creation of general ideas on the practices that should form the basis for any actual work. In line with the previous research (e.g. [Margherita, 2022](#); [Marler and Boudreau, 2017](#)), we found a low number of empirical papers in our material, especially qualitative papers, with most of the studies covering conceptual research. It also goes hand in hand because studying HRA praxis in its context requires the application of qualitative methodology, such as observations and interviews. To understand how HRA practices are enacted by HRA practitioners and what contextual factors are at play, researchers must closely observe what practitioners do, say and how they interact with the environment, other actors and other things. Beneficial for HRA praxis studies would also be longitudinal approaches since the practice is under development and currently being implemented by organisations (e.g. [Belizón and Kieran, 2022](#)), and HRA praxis manifests itself

in a certain contextual process of sequential steps and mechanisms, such as, for example, alignment to users' needs, which is naturally processual.

The important role of context is also widely supported in the broader HRM literature, suggesting a contextual approach to HRM (Paauwe and Farndale, 2017). The results of this study, however, also reveal the lack of macro-contextual considerations in the existing literature, with only a few articles covering either geographical or industrial contexts, such as, for instance, the public sector in different countries. The shortage of contextual approaches to the practice of HRA is evident in the limited discussions about multiple factors influencing organisations, their HRM work in general, and consequently the shaping of HRA practices. For instance, legal requirements regarding data protection and ownership and labour union involvement might influence what HRA practices are implemented in different countries and how they are enacted by the practitioners (Hamilton and Davison, 2022). The contextual macro-level praxis of HRA might also be impacted by different cultural norms; for example, the application of HRA practices in different areas, such as employee control, individual financial performance, or organisational health and wellbeing, might be more or less congruent with a certain national culture. Additionally, the lack of studies covering HRA in the public sector opens the possibility for future research to understand if HRA practices and their contextual enactment vary in business firms versus public sector organisations.

Lastly, studying HRA-as-practice in a given context is seen to have the advantages of close cooperation with HRA practitioners in different types of organisations. We strongly believe that our practice-based approach to HRA, possibly combined with some participative form of research, e.g. the so-called "engaged scholarship" (Van de Ven, 2007), might generate a deeper understanding of HRA practical aspects, e.g. what activities are prioritised by HRA practitioners and why, while at the same time generating value for the practitioners in their everyday work of how different HRA practices and their enactment can solve practical problems they address. Our proposed model for HRA-as-practice benefits future research by providing a possible guideline for empirical investigations, namely, suggesting areas to cover and their potential content: HRA practices, HRA practitioners, HRA praxis and several entities actualising intersections between them, HRA technology, HRA outcomes and HRA hindrances and facilitators.

6. Conclusion

This study conceptualises HRA from a practice-based perspective by identifying what practices are included in HRA, by whom and how they are enacted and what connects them in a coherent model of HRA-as-practice. Moreover, it compiles the nomological network of HRA-as-practice, revealing what factors exist in proximity to the practice of HRA and how they influence and are influenced by it.

Summarising the results of the analysis, we suggest that HRA involves four groups of HRA practices linked to: data usage, data analysis, data-based insights and decision support. Regarding HRA practitioners, a general conclusion is that HR professionals are seen from two perspectives. They are viewed either as producers or consumers of HRA or as both. The analysis shows that most HRA practitioners are seen to be members of HRA teams, whose composition often includes non-traditional HR professionals such as data analysts and specialists in IT, statistical analysis, visualisation and communication. Findings suggest that, based on the nature of the HRA practices and competencies needed to enact them, the role of traditional HR professionals as a relevant category of HRA producers might be questioned. The study also shows that the issue of HRA praxis is the least addressed in the reviewed literature. In our analysis, HRA praxis is attributable to either contextualised processes addressing relevant problems or to certain mechanisms that HRA practitioners use to enact HRA practices.

Based on our results, we suggest that HRA practices, HRA practitioners and HRA praxis are closely interrelated and intersect. Together, they form the practice of HRA actualised by HRA technology, HRA outcomes and HRA hindrances and facilitators that influence and are influenced by it. HRA is, thus, a bundle of four types of practices, associated with data usage, data analysis, data-based insights and decision support, enacted by HRA producers and HRA users via engaging in a process of interrelated steps driven by different contextual mechanisms and actualised by HRA technology, HRA outcomes and HRA hindrances and facilitators.

Besides the theoretical contribution of conceptualising HRA-as-practice, this study contributes to HR practical work by providing a description of HRA and enabling a deeper understanding of the HRA field and how different HRA concepts are linked together. It offers HR function and HR professionals a basic ground to evaluate HRA as a potential solution to generate business value and increase HR impact by providing a holistic model, the constituent parts of which indicate the complex and highly contextual character of HRA. The model suggests that the success of HRA depends not only on the standard HRA practices that generate value as soon as they are implemented in an organisation but rather on the complex context of how and by whom such practices are enacted and actualised. HR departments and HR professionals will benefit by taking into considerations factors such as HRA technology, HRA potential outcomes and diverse HRA hindrances and facilitators that might influence the context in which HRA practices are enacted. It might potentially facilitate relevant measures when one or several named factors seem inadequate or problematic. Depending on what potential outcomes HR practitioners expect from engaging in HRA impacts, what particular practices they should implement and develop. When relevant HRA practices are chosen, their enactment is actualised by the appropriate HRA technology but can be hindered or facilitated by several factors and conditions, which are also context-dependent and require close attention in every individual situation. This means that HRA enactment in practice is highly contextual and providing a single recipe for success is problematic. However, understanding the complex contextual character of the practice of HRA might provide a useful tool for how HR professionals can work with HRA in their own individual situations.

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(The Appendix follows overleaf)

Appendix
Articles included for analysis

- (1) Ames, B. (2014). Case Study: Building a Workforce Analytics Program—Crawl before You Jump. *Workforce Solutions Review*, 5(2), 14–16.
- (2) Andersen, M. K. (2017). Human capital analytics: The winding road. *Journal of Organizational Effectiveness*, 4(2), 133–136.
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