



Optimizing HRM Practices and Decision-Making Quality through Big Data Quality Components

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Journal of Information Technology Management, 2025, Vol. 17, Special Issue, pp. 103-124

Published by the University of Tehran, College of Management

doi: <https://doi.org/10.22059/jitm.2025.100700>

Article Type: Research Paper

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Received: October 21, 2024

Received in revised form: December 13, 2024

Accepted: January 29, 2025

Published online: February 17, 2025



Abstract

This research aims to examine the impact of Big Data Quality (BDQ) components, including completeness, accuracy, format, and currency, on Big Data-driven Human Resources (BDHRP) management practices and Decision-Making Quality (DMQ) from the viewpoint of HR managers. It also seeks to identify the most impactful components among completeness, accuracy, format, and currency in the context of BDHRP and DMQ. A survey of HR professionals in 108 French organizations deploying Big Data Analytics systems revealed positive relationships between BDQ, BDHRP, and DMQ. Statistical analyses conducted with the Partial Least Squares Structural Equation Modeling (PLSEM) method showed a positive relationship between BDQ components and BDHRP, with currency and accuracy emerging as the most influential factors. Additionally, a strong positive relationship was found between BDQ components and DMQ, with currency and accuracy leading the way. The research also found a significant connection between BDHRP and DMQ, further underscoring the importance of effective HRM practices in enhancing decision-making quality. These findings contribute significantly to understanding the crucial role played by big data quality in BDHRP and decision-making, highlighting the potential for organizations to improve outcomes by focusing on currency and accuracy-related concerns. In practical terms, this research offers insights that can guide data quality practices, resource allocation, and strategic decision-making within organizations.

Keywords: Big Data Quality, BD-driven Human Resource Practices, Decision-Making Quality, Accuracy, Currency, Structural Equation Modeling (SEM).

Introduction

In today's data-driven business environment, organizations, as noted by Verma et al. (2021), increasingly rely on data for decision-making and optimizing operations, including extending this data-centric approach to Human Resource Management (HRM). HR practices now heavily depend on sophisticated big data analytics systems to enhance efficiency, effectiveness, and innovation in functions such as talent acquisition, employee development, and performance management (Ochuba et al., 2024; Soomro et al., 2024).

Despite the growing recognition of the pivotal role of Big Data Quality (BDQ), Verma et al. (2021) argue that a more nuanced understanding of its specific impact on HRM practices and decision-making processes is needed. BDQ encompasses multiple dimensions—completeness, accuracy, format, and currency—which are critical in ensuring that data used for decision-making is reliable, precise, and relevant, as highlighted by Ramasamy and Chowdhury (2020). These dimensions not only affect the operational efficiency of HR systems but also influence strategic decisions, such as optimizing recruitment strategies or improving performance evaluation processes. However, organizations, as asserted by Verma et al. (2021), need a deeper understanding of how these components interact, both independently and synergistically, to impact HRM practices and decision-making outcomes.

In this context, our research question becomes highly pertinent for organizations that rely on big data to drive HRM practices and improve decision-making quality. Specifically, this study seeks to explore how the key components of BDQ—completeness, accuracy, format, and currency—affect Big Data-Driven Human Resource Practices (BDHRP) and Decision-Making Quality (DMQ). Furthermore, we aim to identify which of these components are most influential in terms of specific HR outcomes, such as recruitment efficiency, employee performance management, and innovation in talent development strategies.

The central research question driving this study is: "To what extent do BDQ components—completeness, accuracy, format, and currency—independently or synergistically influence Big Data-Driven Human Resource Practices (BDHRP) and Decision-Making Quality (DMQ) across specific HR functions (such as recruitment, employee development, and performance management)?"

Through this exploration, our research objectives are twofold: first, to enhance the theoretical understanding of how BDQ dimensions shape HR decision-making processes and practices, and second, to empirically identify the most impactful BDQ components in driving efficiency and effectiveness in HR functions. Ultimately, building on the work of Verma et al. (2021) and Ramasamy & Chowdhury (2020), this study seeks to offer practical

recommendations for organizations to improve big data quality, with a focus on optimizing specific HR outcomes.

Literature review

Big Data Quality (BDQ) and its characteristics

The 21st-century transformation of the information technology industry, marked by advancements like cloud computing, the Internet of Things, and social networking, has given rise to unprecedented data generation, commonly termed "big data" (Meng & Ci, 2013). Esteemed authors such as Frizzo-Barker et al. (2016) and Wenzel and Van (2018) have traditionally defined big data based on the "3Vs" (volumes, variety, and velocity), expanded to the "5Vs" by Rotolo and Church (2015), introducing veracity and value. Contemporary organizations rely on Big Data Analytics (BDA) systems, defined by Goundar (2021), to manage this data surge effectively. BDA involves exploring extensive datasets to uncover hidden patterns, correlations, and market trends, leading to data-driven decisions and a competitive edge (Goundar et al., 2021). Big Data analytics' capacity to swiftly analyze extensive datasets is paramount for addressing challenges and enhancing profitability (Basile et al., 2024). However, the quality of big data has become a significant concern, particularly in the context of Big Data (Verma et al., 2021). Data quality, defined by Strong et al. (1996), is crucial, and Big Data Quality (BDQ) involves ensuring accuracy, reliability, consistency, and suitability for the intended purpose of diverse datasets, managing challenges like volume, velocity, variety, and veracity. Wang and Strong's influential framework introduces "data quality dimensions," with Intrinsic Data Quality (DQ), Contextual Data Quality (DQ), Representational Data Quality (DQ), and Accessibility Data Quality (DQ). Numerous authors, including Côte-Real, Ruivo, and Oliveira (2015), contribute to shaping the definition of BDQ, emphasizing critical dimensions like completeness, accuracy, format, and currency, crucial in the context of Big Data Analytics (BDA) and Internet of Things (IoT) applications.

For instance, the dimensions of BDQ might manifest differently in BDA settings due to the sheer complexity of the data, the speed at which it is processed, and its unstructured nature. Thus, there remains a need to adapt traditional data quality models to the unique challenges posed by big data systems. My research will address this gap by empirically testing how BDQ components (completeness, accuracy, format, and currency) affect HRM outcomes, particularly in the context of Big Data-Driven Human Resource Practices (BDHRP). In our research, we adopt the data quality dimensions proposed by Côte-Real, Ruivo, and Oliveira (2015) to discern their impact on Big Data-Driven Human Resource Practices (BDHRP) and decision-making processes.

Big Data-Driven Human Resource Practices (BDHRP)

The evolving landscape of Human Resource Management (HRM), as defined by Storey (1995) and Wright et al. (2001), has witnessed a transformative shift with the advent of Big

Data-driven Human Resource Practices (BDHRP). This integration introduces advanced data analytics and a holistic approach to HR processes, utilizing internal HR data and external market information for data-driven decision-making (Verma et al., 2021). Despite the advantages, HR has been slower to adopt new digital technologies (Garcia-Arroyo & Osca, 2019). However, BDHRP is considered an organizational strategy that employs agile Big Data and analytics technologies to align employee behavior with strategic choices, offering numerous advantages in areas such as diversity and inclusion, HR cost management, talent acquisition, and real-time data on mobile workers (Liebowitz et al., 2019; Xu et al., 2019).

BDHRP's impact extends across various organizational operations, including organization development, staffing, behavior analysis, and knowledge management. It utilizes innovative approaches like machine-learning algorithms to transform digital footprints into psychological profiles, predicting future performance. Social media platforms contribute valuable Big Data for well-informed decisions in HR practices like staffing, with effective data quality management being crucial for knowledge extraction (Hadoussa & Louati, 2023; Verma et al., 2021; Sahota & Ashley, 2019).

Big data analytics systems, noted by Hamilton and Sodeman (2019), have become transformative forces in HR, reshaping every aspect from talent acquisition to compensation management. Asare and Boateng (2021) emphasize the powerful tools BD analytics equips HR managers with for monitoring and evaluating recruitment strategies. Adrian et al. (2018) note that these systems empower HR departments to uncover patterns and trends in employee behavior, enhancing satisfaction and reducing turnover rates. Garcia-Arroyo & Osca (2019) categorize research on BDHRP into five categories: HR research and practice, selection and hiring, assessment and development, information, learning, and knowledge, and strategic efficiency and performance.

In HR research and practice, the use of Big Data has made significant contributions, shifting towards predictive analytics. Challenges include the need for advanced analytical skills and technological capabilities, and while benefits are acknowledged, concerns about challenges and complexities associated with BD are raised (Coron, 2019; Barnes, 2014; Guilfoyle et al., 2016; Angrave et al., 2016). For selection and hiring, the V's of BD contribute to expanding the talent pool and reducing costs. Social networks play a crucial role, and innovative applications like digital interviews provide psychological profiles for more effective and cost-efficient processes (Hausknecht & Li, 2015; Chamorro-Premuzic et al., 2017). In assessment and development, BD systems guide work processes with automatically generated key indicators. BD aids in assessing talent management, and machine-learning algorithms explore predicting future performance and measuring psychological attributes (Evans & Kitchin, 2018; King, 2016; Chamorro-Premuzic et al., 2017). In information, learning, and knowledge, effective BD-based systems require managing data volume, storage, cleaning, and debugging. BD analytics enhance workplace learning, talent development, and training interventions, expanding the capacity of knowledge management (Calvard, 2016;

Giacumo & Breman, 2016). In strategic efficiency and performance, BD contributes to decision-making processes, HR cost control, work control and automation, diversity and inclusion promotion, and effective organizational communication. BD advancements optimize employee workloads, analyze routes, and enhance efficiency in various areas (Smith, 2018; Shu, 2017; Evans & Kitchin, 2018; Bisel et al., 2014; Wiencierz & Röttger, 2017; Pajević & Shearmur, 2017).

Hamilton and Sodeman (2019) argue that big data can revolutionize HR practices, but they focus primarily on talent acquisition and performance management. Their work does not thoroughly investigate how the quality of big data itself (accuracy, timeliness, completeness) influences the effectiveness of HR decisions. This is a critical gap, as flawed or incomplete data can lead to suboptimal decision-making, undermining the benefits of BDHRP. My research aims to fill this gap by systematically analyzing the role of BDQ dimensions in HRM decision quality, offering a more comprehensive assessment of BDHRP's true potential.

Decision-Making Quality (DMQ)

Wang et al. (2016) define Decision Making Quality (DMQ) as the effectiveness, efficiency, and consistency of decisions aligned with organizational goals. Similarly, Marler and Boudreau (2018) articulate DMQ as decisions made with high cognitive effort, based on accurate information, and consistent with organizational objectives. These comprehensive definitions underscore the importance of effective decision-making seamlessly aligned with organizational goals, emphasizing efficiency, accuracy, and cognitive effort. Organizations actively considering these factors can strive to enhance their decision-making processes and achieve higher DMQ levels.

In the context of Human Resource Management (HRM) practices associated with Big Data, DMQ refers to the effectiveness, efficiency, and consistency of HR decisions. These decisions, supported by extensive datasets, aim to align with organizational goals. HR professionals make well-informed and strategic decisions by leveraging insights and predictive capabilities from Big Data analytics in HRM (Jamshed, 2016).

In today's dynamic business landscape, decision-making quality transcends gut feelings, relying on data-driven choices. The advent of Big Data analytics systems, noted by Adrian et al. (2018), has unlocked valuable insights from vast information sources. Notably, Big Data analytics enhances decision-making quality by providing profound insights into consumer behavior, market trends, and industry patterns. This capability empowers decision-makers to anticipate shifts, identify opportunities, and outperform competitors (Basile et al., 2024).

However, Marler and Boudreau (2018) argue that big data enhances decision-making by providing more comprehensive and reliable insights. However, their study largely assumes that organizations have access to high-quality data. This assumption overlooks the variability in data quality across organizations, which may severely limit the benefits of big data for decision-making. My research critically examines this issue by exploring how different

components of BDQ (completeness, accuracy, format, and currency) affect decision-making quality in HRM. By doing so, I aim to address a key gap in the literature—the lack of understanding regarding how data quality moderates the relationship between BDA and DMQ.

Research model

RBV and KBV as theoretical perspectives

The conceptualization of our research framework involves drawing on prominent theoretical perspectives within the intersection of Human Resource Management (HRM) and Big Data Analytics (Ochuba et al., 2024). In exploring the impact of Big Data Quality (BDQ) components—completeness, accuracy, format, and currency—on Big Data-driven HR practices (BDHRP) and Decision-Making Quality (DMQ), we consider the Resource-Based View (RBV) and Knowledge-Based View (KBV) as foundational frameworks.

RBV, introduced by Barney in 1991, offers insights into the strategic HRM literature, considering Big Data (BD) as a valuable resource contributing to competitive advantages for firms. Scholars have extended RBV by identifying valuable resources in various contexts and developing strategies for managing new resources offered by information technologies (Barney et al., 2011; Barney & Mackey, 2016). From an RBV perspective, Big Data (BD) is considered a valuable resource with the potential to provide a competitive advantage to firms. Behavioral BD, such as data collected through electronic devices, and employee relational data gathered from social networks, have been recognized as contributors to firm performance (Corte-real et al., 2020; Basile et al., 2024).

KBV, an extension of RBV, underscores the importance of organizational knowledge resources, aligning BD with core competencies rooted in knowledge. KBV underscores the firm's pivotal role in harnessing these resources to yield productive outcomes. In the context of Big Data-Driven Human Resource Practices (BDHRP), Big Data (BD) aligns with the core competencies rooted in knowledge. It encompasses data related to employees' knowledge, skills, and abilities (human capital), internal and external employee-company relationships (social-relational capital), as well as processes, technologies, information systems, and databases (Snell et al., 1996). KBV accentuates the role of BD in facilitating knowledge-related processes within organizations, operating at both individual and collective levels (Hadoussa & Louati, 2023). This perspective acknowledges that BD integrates various dimensions of the firm's intellectual resources (Grant, 1996; Liebeskind, 1996).

These theoretical underpinnings inform our exploration of the intricate interplay between BDQ components, BDHRP, and DMQ, contributing to a deeper understanding of their strategic implications within organizational contexts.

Impacts of Big Data Quality Components on BDHRP

The interplay between Big Data-Driven Human Resource Practices (BDHRP) and organizational performance is a critical nexus, with strategic implications. As underscored by Verma (2017), BDHRP practices wield considerable influence over vital organizational aspects such as productivity and employee turnover, intimately tied to the overarching business strategy. Notably, the effectiveness of strategic Human Resource Management (HRM) has been found to significantly outshine traditional HRM in impacting firm performance (Garcia-Arroyo & Osca, 2019), emphasizing the need for alignment with strategic goals for optimal outcomes.

In this context, the significance of Big Data Quality (BDQ) as a valuable resource emerges. BDQ enables organizations to integrate and harness knowledge through HRM practices, empowering HR managers to make well-informed decisions across various HRM activities (Verma, 2017; Garcia-Arroyo & Osca, 2019). The integration of BDQ into HRM practices enables organizations to proactively and effectively manage their human resources.

To unlock the full potential of Big Data in HRM, the importance of data quality, specifically the four fundamental components of BDQ - Completeness, Accuracy, Format, and Currency - becomes paramount (Wamba et al., 2017). Each component has widespread implications not only in HRM but also in diverse sectors such as health, trading, and marketing (Sidi et al., 2012).

Firstly, data completeness, as highlighted by Sidi et al. (2012), is fundamental across various fields. In healthcare, complete patient records are crucial for comprehensive medical care, ensuring accurate diagnoses and treatment (Häyrynen et al., 2008). In the e-commerce industry, product information completeness influences purchasing decisions, affecting sales (Benn et al., 2015). In HR, data completeness enables well-rounded decision-making about employees, contributing to confident data-driven practices (Wamba et al., 2017; Côte-Real et al., 2020).

Secondly, data accuracy, a cornerstone of data quality emphasized by Sidi et al. (2012), is indispensable in scientific research, supply chain management, and marketing (Whittemore & Knafl, 2005; Basinger, 2006). In HR, accurate data is essential for assessing training needs, conducting performance evaluations, and determining compensation structures (Wamba et al., 2017; Côte-Real et al., 2020).

Thirdly, the data format's importance, as underlined by Sidi et al. (2012), extends across sectors, significantly influencing operational efficiency. In HR, data format impacts the speed and effectiveness of data analysis, directly contributing to the efficiency of HR professionals (Wamba et al., 2017; Côte-Real et al., 2020).

Lastly, data currency's substantial importance, highlighted by Sidi et al. (2012), ensures the relevance and applicability of information. In HR, up-to-date data is critical for making

decisions based on current information, and mitigating potential risks for the organization (Wamba et al., 2017; Côte-Real et al., 2020).

Therefore, based on the insights from researchers such as Wamba et al. (2017), data completeness, accuracy, format, and currency collectively underpin the quality of HR data and the effectiveness of HRM practices. Each dimension contributes to well-informed decisions, the avoidance of errors, efficient analysis, and timely responses to dynamic HR challenges. From this perspective, it is hypothesized that the different components of Big Data Quality (BDQ) - Completeness, Accuracy, Format, and Currency - positively impact BDHRP, playing a vital role in shaping the overall effectiveness and success of HRM practices. Thus, we propose the first hypothesis as follows:

- H1. Big Data Quality components positively impact BDHRP

Considering that our study encompasses four key components within BDQ, we have established four sub-hypotheses to investigate the specific impacts:

- H1a. Completeness positively impacts BDHRP
- H1b. Accuracy components positively impact BDHRP
- H1c. Format components positively impact BDHRP
- H1d. Currency components positively impact BDHRP

Our unique contribution lies in identifying the most impactful components of BDHRP.

Impacts of Big Data Quality Components on Decision-Making Quality (DMQ)

Big Data serves as a valuable organizational knowledge asset, and its potential benefits through Big Data Analytics (BDA) and Internet of Things (IoT) applications are contingent upon the quality of the underlying data (Strong, 2015). The presence of good data quality, as emphasized by Strong et al. (2017), is crucial for effective BDA and IoT utilization, ultimately enhancing decision-making processes within companies.

High-quality data is indispensable for maximizing the value of BDA and IoT applications (Strong et al., 2017). Accurate and reliable data, following the definition by Strong (1996) and Maryam and Goran (2019), plays a pivotal role in decision-making, given the vast amounts of structured and unstructured big data and IoT data that organizations need to manage.

For robust decision-making in Human Resource Management (HRM) practices with Big Data, reliable, up-to-date, and comprehensive data is imperative (Garcia-Arroyo & Osca, 2019). Utilizing software programs and analytical tools can effectively manage and process this data, while HR departments need to cultivate analytical skills and technological capabilities to fully leverage Big Data's potential (Garcia-Arroyo & Osca, 2019; Verma, 2017).

A wealth of internal and external big data related to employees can significantly benefit HR departments, especially when supported by accurate, formatted, reliable, and complete Big Data Quality (BDQ) (Garcia-Arroyo & Osca, 2019). Such BDQ enables consistent, transparent, and reliable decision-making across the organization, fostering innovation in products and services (Mello & Martins, 2019).

Decision-making success is intricately tied to the quality of the data used. The impact of BDQ components—Completeness, Accuracy, Format, and Currency—cannot be understated in big data-driven decision-making (Côte-Real et al., 2020). These dimensions, as highlighted by Sidi et al. (2012), extend beyond HRM and significantly influence well-informed and dependable decision-making across diverse fields.

Data Completeness is foundational for well-informed decisions, reducing the risk of crucial oversights in various sectors (Sidi et al., 2012). In HR, it ensures comprehensive information access for decision-makers, aiding in performance evaluation and various HR practices (Wamba et al., 2017; Côte-Real et al., 2020).

Data Accuracy, indispensable in scientific research and financial trading, is essential in HR for equitable compensation, training assessments, and hiring decisions (Wamba et al., 2017; Côte-Real et al., 2020).

Data Format's influence in enhancing decision-making extends to the education sector, while in HR, it impacts the efficiency of data analysis and interpretation (Wamba et al., 2017; Côte-Real et al., 2020).

Data Currency, vital in agriculture and global supply chain management, ensures HR decisions are based on the most recent and relevant information, enhancing their applicability (Wamba et al., 2017; Côte-Real et al., 2020).

In conclusion, data completeness, accuracy, format, and currency are pivotal for sound decision-making across various sectors, presenting organizations with the opportunity to optimize processes and enhance performance. This emphasizes the importance of prioritizing data quality for unlocking big data's full potential, not only in HRM but across organizational domains (Verma et al., 2021).

Considering that higher-quality data has the potential to enhance and redirect the decision-making quality, it is hypothesized that the different components of Big Data Quality (BDQ) - Completeness, Accuracy, Format, and Currency - positively impact DMQ.

- H2. Big Data Quality Components Impact on Decision-Making Quality (DMQ)

Given that our research investigates four components within BDQ, we have formulated four sub-hypotheses to thoroughly explore their individual effects:

- H2a. Completeness positively impacts DMQ
- H2b. Accuracy components positively impact DMQ

- H2c. Format components positively impact DMQ
- H2d. Currency components positively impact DMQ

Our unique contribution lies in identifying the most impactful components of DMQ.

BDHRP impacts on Decision Making Quality (DMQ)

The integration of big data into Human Resource Management (HRM) practices, known as Big Data-driven HR Practices (BDHRP), has ushered in a transformative era in organizational talent management and decision-making. BDHRP employs advanced analytics and data-driven insights to inform crucial decisions across employee recruitment, retention, performance evaluation, and overall workforce management (Wamba et al., 2017). This strategic use of big data empowers HR professionals to make more informed choices, thereby enhancing the quality of decision-making processes. The hypothesis posits that BDHRP significantly impacts Decision Making Quality (DMQ), leading to more effective and efficient organizational outcomes.

In the context of HR functions in Small and Medium-sized Enterprises (SMEs), BDHRP serves as a paradigm shift, enabling organizations to make data-driven decisions by analyzing patterns in both internal and external data. Basic descriptive methods and regression analysis are employed to identify historical trends and correlations among variables. Leveraging large volumes of high-quality big data (BDQ) from diverse sources, SMEs can predict future decisions, anticipate trends, and optimize business processes. BDQ, in this framework, enhances SMEs' innovation competency, enabling the development of new products or extensions to existing ones.

Researchers such as Wamba et al. (2017) highlight the critical role of BDQ in enhancing organizational decision-making capabilities and providing valuable insights into HRM practices. Reliable and accurate data facilitated by BDQ allows for more dependable predictions, a deeper understanding of employee behavior, and improved identification of patterns and trends. This, in turn, enables organizations to optimize HRM strategies, align policies with objectives, and ultimately enhance organizational performance.

High-quality data, as emphasized by Albers et al. (2017), facilitates accurate assessments of employee performance, identification of skill gaps, and tailored training initiatives. HR professionals, equipped with reliable data, can make evidence-based decisions aligned with the organization's goals. The impact of big data quality extends to Decision Making Quality (DMQ) within HRM, referring to the effectiveness, efficiency, and consistency of decisions. Access to reliable and relevant data improves the quality of decision-making in HRM practices, ensuring decisions are accurate, evidence-supported, and aligned with strategic objectives. Thus, prioritizing big data quality emerges as a crucial factor for unlocking the full potential of BDHRP and ensuring successful organizational outcomes.

Based on the literature review, this study proposes the following hypothesis:

- H3. BDHRP impacts Decision Making Quality (DMQ)

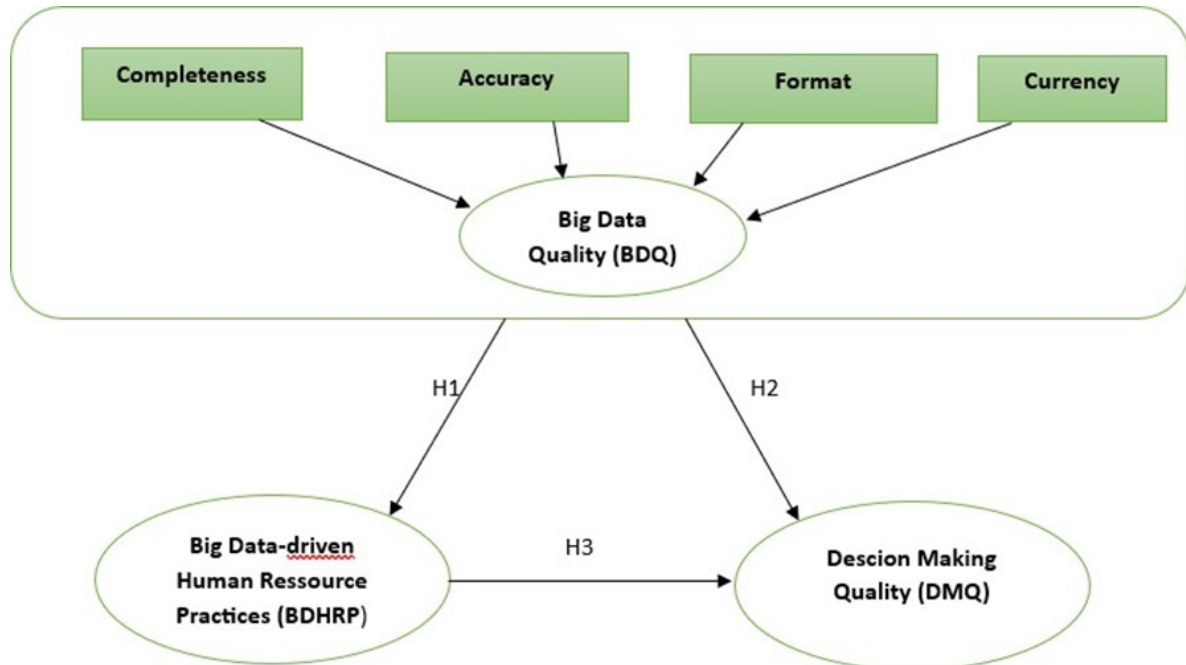


Figure 1. Research Model

Figure 1 above illustrates our research framework, meticulously designed to investigate the relationships between Big Data-driven Human Resource Practices (BDHRP), Big Data Quality (BDQ) components, and decision-making Quality (DMQ). Through this research model, our objective is to explore the impact of data quality on BDHRP and decision-making processes within organizations. By examining these relationships, we aim to provide valuable insights into how BDQ components influence the effectiveness of HR strategies and decision-making quality, with a particular focus on identifying the most impactful component.

Methodology

Measurement instrument

The study employs a quantitative approach based on a questionnaire survey targeting Human Resources (HR) professionals. The survey instrument is meticulously crafted based on valid constructs from existing literature.

The instrument draws upon established constructs from the literature to measure key variables, including Big Data Quality (BDQ) components, HRM practices, and Decision-Making Quality (DMQ). BDQ is composed of four primary components: completeness, accuracy, format, and currency, with each defined and measured using adapted scales from prior studies (e.g., Côte-Real et al., 2020; García-Arroyo & Osca, 2019).

HRM practices are assessed through dimensions such as talent acquisition and employee performance evaluation. The survey items regarding HRM practices were adapted from well-established HRM frameworks (Boselie et al., 2005). For DMQ, variables were derived from previous research, focusing on dimensions such as efficiency and effectiveness of decision-making outcomes.

Our variables are measured using Likert scales ranging from "strongly agree" to "strongly disagree," and the questionnaire is composed of closed-ended questions. A pre-test phase is conducted to ensure content validity and clarity, involving a rigorous review by the researchers and a preliminary test with professionals and academics. The survey is distributed digitally using Google Forms.

Data collection and sample size

The study focuses on companies in France utilizing Big Data Analytics systems. The non-probabilistic sampling method is chosen, involving the non-random selection of sampling units. The target population includes various company sizes, and participants are selected based on their positions within the HR department. The study extends 200 survey invitations, receiving active contributions from 110 participants. Two questionnaires are excluded as respondents indicated their companies did not use Big Data analytics systems. The sample encompasses diverse industries such as education, trading, banking, healthcare, and manufacturing. Table 1 below presents the characteristics of the respondents according to their Companies' sizes, positions, and fields of activity.

Table 1. Respondents' characteristics

Companies' sizes	Respondents' positions	Companies' fields of activity
<ul style="list-style-type: none"> • More than 250: 20,37 % • Between 250 and 50: 43,52% • Between 10 and 50: 36,11 % 	<ul style="list-style-type: none"> • HR manager:60,19% • HR coordinator: 21,30% • Directors: 8;33% • Talent acquisition: 7,41% • IT manager: 2,78% 	<ul style="list-style-type: none"> • Education: 27,78% • Trading: 26,85% • Banking: 17,59% • Telecommunication: 14,81% • Manufacturing:8,33% • Healthcare:4,63%

Data Analysis Tools

Both descriptive and explanatory analyses are conducted using the XLSTAT software. Descriptive analyses, crucial for checking data representation accuracy, involve exploratory factor analysis (EFA) for assessing the reliability and validity of the measuring instrument. Explanatory analyses utilize Partial Least Squares Structural Equation Modeling (PLS-SEM) to scrutinize research hypotheses outlined within the conceptual framework (Hair et al., 2019).

Results

Measurement model assessment

To assess our measurement model, we will evaluate both internal consistency (reliability) and validity, including convergent validity and discriminant validity.

- Reliability

The measurement model's reliability was systematically evaluated across dimensions such as Big Data Quality (BDQ), Big Data HR Processes (BDHRP), and Data Management and Quality (DMQ). Internal consistency measures, including Cronbach's Alpha and Dillon-Goldstein's rho (ρ), consistently surpassed the widely accepted threshold of 0.7. For instance, within BDQ, completeness, accuracy, format, and currency exhibited robust internal consistency with Cronbach's Alpha values of 0.737, 0.793, 0.756, and 0.823, respectively. Dillon-Goldstein's rho (ρ) further emphasized reliability, with values of 0.851, 0.879, 0.861, and 0.894 for the respective dimensions. BDHRP demonstrated an exceptional level of reliability, with a Cronbach's Alpha of 0.897 and Dillon-Goldstein's rho (ρ) at 0.919. Additionally, DMQ exhibited strong reliability, with a Cronbach's Alpha of 0.872 and Dillon-Goldstein's rho (ρ) at 0.900. These results, in conjunction with the Gohar et al. (2019), underscore the outstanding reliability of the measurement model.

- Validity

The validity assessment of the measurement model focused on convergent and discriminant validity. Convergent validity was substantiated through the examination of Average Variance Extracted (AVE) values, all of which exceeded the recommended threshold of 0.5. This indicates that each item associated with a latent variable shares more variance with it than with other constructs, validating the convergent validity of the measurement model. Discriminant validity was further confirmed as AVE values surpassed 0.5, indicating independence among constructs. The squared correlations did not exceed the correlations with theoretically linked constructs, providing additional support for discriminant validity. Together, these results highlight the robustness of the measurement model in terms of both convergent and discriminant validity.

Table 2. Findings of Measurement Model

Latent Variables	Items	Cronbach's Alpha	Rho (ρ) value	Cross Loadings	AVE
Completeness	BDQ 1	0,737	0,851	0,803	0,653
	BDQ 2			0,815	
	BDQ 3			0,809	
Accuracy	BDQ 4	0,793	0,879	0,846	0,708
	BDQ 5			0,815	
	BDQ 6			0,862	
Format	BDQ 7	0,756	0,861	0,873	0,673
	BDQ 8			0,769	
	BDQ 9			0,817	
Currency	BDQ 10	0,822	0,894	0,881	0,738
	BDQ 11			0,809	
	BDQ 12			0,885	
BDHRP	BDHRP 1	0,897	0,919	0,795	0,621
	BDHRP 2			0,809	
	BDHRP 3			0,815	
	BDHRP 4			0,675	
	BDHRP 5			0,838	
	BDHRP 6			0,744	
	BDHRP 7			0,827	
DMQ	DMQ 1	0,872	0,900	0,699	0,635
	DMQ 2			0,688	
	DMQ 3			0,780	
	DMQ 4			0,733	
	DMQ 5			0,637	
	DMQ 6			0,748	
	DMQ 7			0,693	
	DMQ 8			0,831	

Table 3. Discriminant validity (squared correlation < AVE)

	Completeness	Accuracy	Format	Currency	BDHRP	DMQ	(AVE)
Completeness	1	0,592	0,492	0,466	0,435	0,356	0,653
Accuracy	0,592	1	0,511	0,605	0,521	0,487	0,708
Format	0,492	0,511	1	0,582	0,485	0,458	0,673
Currency	0,466	0,605	0,582	1	0,522	0,581	0,738
BDHRP	0,435	0,521	0,485	0,522	1	0,506	0,621
DMQ	0,356	0,487	0,458	0,581	0,506	1	0,635

Structural model assessment

We built the structural model using the PLSPM module integrated in XLstat. The statistical analyses provided the fitted model (Figure 2).

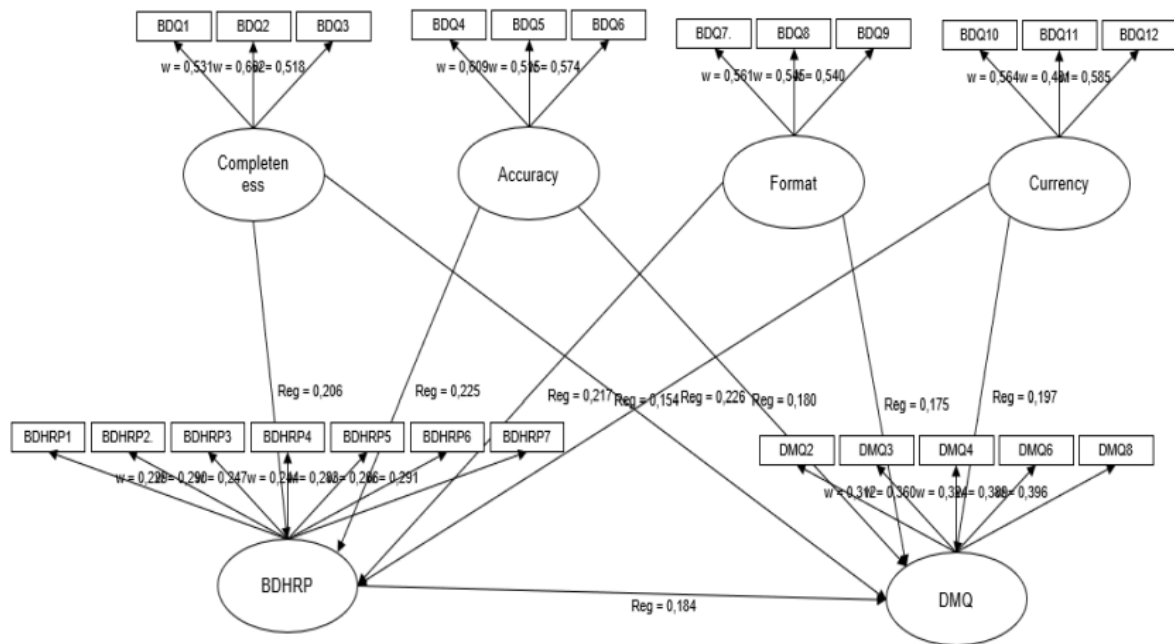


Figure 1. Fitted model

The evaluation of the structural model encompasses various key metrics, including R^2 values, the Stone-Geisser Q^2 coefficient, Goodness of Fit (GoF), and Path Coefficients.

- Coefficient of R^2

As proposed by Croutsche (2002), the R^2 multiple is used to define the explanatory power of our research model. In our analysis, all instances exhibit R^2 values exceeding 0.6, surpassing the threshold for statistical significance. Specifically, the R^2 for the endogenous latent variable BDHRP is 0.613, and for DMQ, it is 0.617, affirming the model's overall statistical significance.

- Stone-Geisser's Q^2 Coefficient

Stone-Geisser's Q^2 coefficient, a crucial measure in structural equation modeling, validates the model's predictive relevance. Our results indicate Q^2 values greater than 0, confirming the model's predictive validity, and aligning with Fernandes's (2012) interpretation.

- Model Fit: Goodness of Fit (GoF)

Model Fit Indices, specifically the Goodness of Fit (GoF), consistently exceed 0.4 in our analysis, indicating a high-quality fit for the model, as outlined by Gohar et al. (2019).

Table 4. GoF values

	GoF
Absolute	0,634
Relative	0,448
External model	0,497
Internal	0,900

- Path Coefficients

Path Coefficients assess the significance of relationships among latent variables, following the framework discussed by Roussel et al. (2002). Employing the Critical Ratio (CR) with a threshold of 1.96 for a 5% significance level, all CR values in Table 4 below exceed the threshold.

Table 5. Path Coefficients

Path coefficients (DMQ / 1):			Path coefficients (BDHRP / 1):		
Latent Variable	Value	Critical Ratio (CR)	Latent Variable	Value	Critical Ratio (CR)
Completeness	0,154	8,570	Completeness	0,206	11,323
Accuracy	0,180	14,519	Accuracy	0,225	13,765
Format	0,175	13,800	Format	0,217	11,660
Currency	0,197	17,891	Currency	0,226	10,381
BDHRP	0,184	10,915	DMQ	0,184	10,915

This confirms the statistical significance of relationships between latent variables, affirming the model's good fit in terms of these relationships.

Based on these findings, it is possible to state that all hypotheses are supported. These results are discussed in the section below.

Discussion

Based on these results, all hypotheses are supported.

Big Data Quality Components Impact on BDHRP

Analyzing sub-hypotheses regarding BDQ's influence on BDHRP reveals positive relationships between completeness, accuracy, format, and currency.

Our findings align closely with the conclusions drawn by Garcia-Arroyo and Osca (2019). Their research similarly underscores the significant impact of BDQ on BDHRP, thereby reinforcing the validity and consistency of our results. Notably, currency and accuracy emerge as the most influential factors, collectively contributing significantly to the R^2 at 26.599% and 26.539%, respectively. The work of Côte-Real et al., (2020) provides complementary insights, particularly in confirming the importance of accuracy and currency as the most influential factors in enhancing BDHRP.

This underscores the significance of prioritizing accuracy and currency in enhancing BDHRP, supporting the overarching hypothesis that BDQ positively impacts BDHRP.

Our research advances the theoretical understanding of the relationship between BDQ and HRM by offering new insights into how currency and accuracy should be prioritized for effective HRM practices. Unlike previous studies, we provide a more nuanced perspective by quantifying the individual contributions of BDQ components to BDHRP. This allows HR professionals to strategically allocate resources toward improving the quality of big data, particularly focusing on accurate data, which are shown to be the most impactful elements in optimizing HR practices.

Big Data Quality Components Impact on DMQ

Examining BDQ components' impact on DMQ reveals positive relationships, with currency and accuracy emerging as key drivers. The substantial R^2 of 61.7% underscores the model's explanatory power, with currency standing out as the most impactful factor, contributing significantly to the R^2 at 24.322%, closely followed by accuracy at 21.198%. These results robustly support the hypothesis that "BDQ positively impacts DMQ," aligning closely with the conclusions drawn by Corte-real et al. (2020). Their research emphasizes the critical role of Big Data components in influencing data quality, mirroring our findings.

Our findings expand the theoretical landscape by not only confirming the importance of BDQ components but also quantifying their specific impacts on decision-making outcomes. This provides managers with practical guidelines on how to enhance decision-making processes within their organizations. In particular, by focusing on improving data currency and accuracy, organizations can significantly elevate the quality of their decisions, thereby fostering better alignment with strategic goals and improving overall performance.

BDHRP Impacts on DMQ

The analysis demonstrates that BDHRP significantly influences and enhances DMQ, with a notable path coefficient of 0.184 and a critical ratio (CR) exceeding the threshold for statistical significance at 10.915. BDHRP contributes significantly to the explained variance in DMQ, accounting for 21.198% of its variance. These findings resonate strongly with the conclusions drawn by Garcia-Arroyo and Osca (2019) and Verma et al. (2021), affirming the positive impact of BDHRP on DMQ. Both studies emphasize the crucial role played by HR practices in influencing the quality of decision-making processes, aligning closely with our findings. By corroborating these insights, our research contributes to the growing body of literature emphasizing the pivotal role of BDHRP in enhancing the overall quality of decision-making processes. Organizations aiming for improved decision-making quality should acknowledge and prioritize the integration of effective HR practices, recognizing their significant influence on enhancing decision-making outcomes.

Contributions

Theoretical implications

Our research significantly advances the theoretical frameworks surrounding Big Data Quality (BDQ), Human Resource Management (HRM), and Decision-Making Quality (DMQ) by introducing a novel model that integrates these domains. This model refines and expands upon existing theories by offering a more detailed understanding of the impact of specific BDQ components—completeness, accuracy, format, and currency—on both BDHRP and DMQ.

One of the key theoretical advancements lies in our emphasis on currency and accuracy as the most influential factors in both HRM and decision-making contexts. While previous studies, such as Garcia-Arroyo and Osca (2019) and Côte-Real et al. (2020), have recognized the importance of BDQ components, our research adds depth by quantifying their relative contributions and clarifying how they specifically enhance organizational processes.

Moreover, by integrating the HRM and decision-making literature with the emerging field of Big Data, our research presents a comprehensive framework that demonstrates the interconnectedness of these domains. This contribution is pivotal for future theoretical explorations in data-driven HRM practices and decision-making processes, providing a foundation for further research into how organizations can better leverage big data to enhance both operational and strategic outcomes.

Managerial contributions

In the realm of managerial insights, our study offers valuable contributions.

Firstly, it enhances data quality practices by providing organizations with a deeper understanding of how specific BDQ components impact BDHRP and DMQ. Managers can prioritize and improve data quality practices, leading to enhanced HRM practices and decision-making.

Secondly, the identification of currency and accuracy as the most influential factors guides resource allocation, empowering managers to focus efforts effectively. This insight ensures that resource allocation aligns with improving these specific aspects of data quality, maximizing their impact on organizational performance.

Thirdly, our study aids strategic decision-making by providing insights for informed decisions on data quality investments and HRM practices. It informs strategic planning by highlighting areas where improvements in data quality can significantly enhance HRM and decision-making outcomes.

In conclusion, our research delivers practical insights for immediate application by managers and practitioners, enabling organizations to leverage big data quality and enhance HRM practices and decision-making.

Limitations and perspectives for future research

The study, while making significant contributions to the theoretical and managerial understanding of Big Data Quality (BDQ), Big Data-Driven Human Resource Practices (BDHRP), and Decision-Making Quality (DMQ), acknowledges certain limitations.

First and foremost, the deliberate focus on a subset of BDQ components—completeness, accuracy, format, and currency—introduces a limitation in capturing the entirety of potential influencing factors. Future research endeavors should expand the exploration to encompass a broader spectrum of BDQ components to achieve a more comprehensive understanding. Additionally, the robustness of Partial Least Squares Structural Equation Modeling (PLSEM) as a predictive methodology necessitates acknowledgment of alternative methodologies that may provide nuanced perspectives. Comparative analyses employing different methodologies could further enrich and validate our findings. Furthermore, the strategic decision to eliminate three items for Decision-Making Quality (DMQ), while contributing to study refinement, introduces a potential limitation in fully capturing the dimensions of DMQ. Subsequent research could reconsider the inclusion of these items or explore additional dimensions to enhance the depth of understanding. Last but not least, it is also important to address potential ethical considerations when applying big data in HRM practices and decision-making. Issues such as data privacy, bias, and transparency in the use of big data must be carefully managed to ensure ethical compliance. Organizations must remain mindful of these concerns when interpreting and applying the findings of this research, ensuring that data-driven decisions are made responsibly and in alignment with ethical standards.

Conclusion

In our comprehensive analysis, we have successfully addressed our research objectives. We have illuminated the pivotal role of specific BDQ components in driving effective HRM practices and decision-making outcomes, thereby contributing to the advancement of knowledge in the field of HR practices and decision-making. Additionally, we have identified the most impactful components of big data quality on BDHRP and decision-making quality. Through a meticulous examination of the data, we have unearthed invaluable insights into the core hypotheses of our research.

In summary, our research journey has shed light on the intricate relationships between big data quality components, BDHRP, and DMQ. We embarked on a quest to unveil the profound influence that completeness, accuracy, format, and currency wield on BDHRP and the quality of decision-making.

Our findings consistently confirm that each of these BDQ components maintains a positive relationship with BDHRP. Significantly, currency and accuracy have emerged as the most influential factors, underscoring their pivotal role in driving enhancements in BDHRP.

Shifting our focus to DMQ, our analysis uncovered a substantial positive relationship with BDQ components. Notably, currency emerged as the most impactful factor, closely followed by accuracy. These results provide robust support for our overarching hypothesis that BDQ positively impacts DMQ.

Furthermore, we have established a solid and statistically significant connection between BDHRP and DMQ. BDHRP's positive influence on DMQ is reinforced by strong path coefficients and a substantial contribution to the explained variance in DMQ.

Considering these compelling findings, organizations aiming to elevate data quality and decision-making effectiveness should prioritize addressing currency-related and accuracy-related concerns. Our analysis indicates that these components wield the most significant influence on data quality and the quality of decision-making.

Conflict of interest

The authors declare no potential conflict of interest regarding the publication of this work. In addition, the ethical issues including plagiarism, informed consent, misconduct, data fabrication and, or falsification, double publication and, or submission, and redundancy have been completely witnessed by the authors.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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Bibliographic information of this paper for citing:

Fakhfakh, Mouna & Mezghani, Karim (2025). Optimizing HRM Practices and Decision-Making Quality through Big Data Quality Components. *Journal of Information Technology Management*, 17 (Special Issue), 103-124. <https://doi.org/10.22059/jitm.2025.100700>

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