

GUEST EDITORS' INTRODUCTION

The science and practice of workforce analytics: Introduction to the *HRM* special issue

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This special issue of *Human Resource Management* is focused on the latest thinking, research, and practical advances in the emerging field of *Workforce Analytics*. The eight diverse papers in this issue present new theoretical developments, methodological and statistical tools, and examples of innovative workforce analytics in practice. Taken as a whole, the findings show that workforce analytics can significantly enhance the ability of leaders and managers to achieve their operational and strategic objectives through more effective workforce management. But capitalizing on these opportunities will require both HR and line managers to develop a comprehensive understanding of *how* the workforce contributes to their firm's strategic success—and this understanding must be reflected in the workforce metrics and analytics they develop and deploy.

KEYWORDS

HR measurement, special issue, strategic HR, workforce analytics, workforce metrics

1 | INTRODUCTION

Interest in the fields of data science and data analytics has increased substantially among scholars and practitioners in recent years. Spanning challenges as diverse as individualized health care diagnosis and treatment, customer sentiment analysis, intelligent traffic management, real-time financial fraud detection, and national security concerns, data analytics and science have become central topics in the academic, business, and popular press. These trends are the result of a confluence of factors, including the availability and accessibility of data, increased computer processing speeds, and dramatically lower networking and storage costs. In addition, contributing to the disruptive impact of data science and analytics is the development of interdisciplinary theoretical and statistical innovations in computer science, statistics, and mathematics (McKinsey Global Institute, 2016).

Interest in analytics in the fields of HR and workforce management has grown dramatically among scholars and practitioners as well (Bock, 2015; Boudreau & Cascio, 2017; Davenport, 2013; Davenport, Harris, & Morison, 2010; Guenole, Ferrar, & Feinzig, 2017; Huselid, 2015; Levenson, 2017; Rasmussen & Ulrich, 2015). As the market for high-performing and high-potential talent is becoming much more “efficient” in many firms, top talent is becoming simultaneously more expensive and more easily lost to competitors. As conventional

sources of competitive advantage no longer differentiate firms in the global marketplace, effectively responding to globalization requires flexibility, speed and innovation, and talent. This has led to an intense focus on workforce strategy, and on differentiation in investment levels among employees and jobs in support of business objectives. As a result, many firms are substantially increasing the level of accountability of the line manager's role in talent management and, ultimately, strategy execution (Huselid, Becker, & Beatty, 2005).

One of the key outcomes of the increased emphasis on accountability has been the significant growth in the demand for the insights and information that workforce analytics can generate. Widespread interest in innovations such as Google's *Project Oxygen* (Bock, 2015; Garvin, 2013) and the *Moneyball* phenomenon have had a significant impact on the prevalence of workforce metrics and analytics in many firms (Huselid & Becker, 2005). The demand for employees capable of developing and implementing workforce analytics has also increased dramatically as job titles and postings containing the terms “workforce analytics” have proliferated, and the workforce analytics “industry” among consulting and technology firms has seen significant growth (Deloitte, 2017). Finally, many major international universities are creating undergraduate and graduate degrees in analytics, and several university-based research centers are now in place.

While the recent interest in workforce analytics has been substantial, we believe that the field is at once both a very old and a very new phenomenon. At its core, workforce analytics represents the application of social science research methods to the workforce components of specific business problems, issues that have been the focus of a significant body of research since the early 1900s. What is new and notable is the growing recognition of the potential impact of analytics via talent's impact on business success and the accessibility of data and computational tools that make such analyses possible.

1.1 | Origins of the HRM special issue on workforce analytics

Despite the recent popularity of workforce analytics, there is much that we do not yet know about the processes through which analytics affects the strategy execution process in organizations and, ultimately, firm success. The irony of this situation is that most organizations have accountability and control systems in place for many of their key assets, for example, finance, inventory, marketing, etc., but the "talent" information infrastructure remains quite underdeveloped in most companies, at least in proportion to its expected value. This situation is even more curious given the fact that there is robust academic literature focused on the antecedents and consequences of investments in both HR policies and practices, as well as investment in the workforce directly (Combs, Liu, Hall, & Ketchen, 2006; Huselid, 1995).

Research on the impact of HR management policies and practices on operational and financial performance has a long history in the social sciences (Becker & Huselid, 2006). For much of this time, both scholars and practitioners have focused on assessing the firm-level impact of HR *function* activities. What is new and potentially important in the current environment is a shift in emphasis from assessing the activities performed by the HR *function* to developing a better understanding of the productive outcomes associated with the *workforce* (Becker, Huselid, & Beatty, 2009; Becker, Huselid, & Ulrich, 2001; Huselid, Becker, & Beatty, 2005). More specifically, the focus has shifted from assessing the *levels* associated with a particular workforce attribute (e.g., what is our cost per hire?) to understanding the *impact* of the workforce on the execution of firm strategy (e.g., how might an increase in the quality of our project managers affect our new product cycle time?).

Driving these changes is the recognition by both scholars and practitioners that, for many firms, more effective workforce management represents a substantial and unrealized business opportunity. Both the empirical research as well as practical experience would suggest that most firms exhibit a workforce "information and management failure," in that the most expensive organizational investment (many firms routinely spend between 50 and 70% of their revenues on direct and indirect workforce costs) is often the least well measured and managed. Fortunately, the availability of significantly enhanced data and informatics has made many new types of workforce analytics not only feasible but also relatively inexpensive to perform.

The emerging field of *Workforce Analytics* has the potential to make a number of important contributions to the ability of managers to proactively execute their firm's strategy. But capitalizing on these opportunities means that leaders (both HR and line) will need to

develop a comprehensive understanding of *how* the workforce contributes to their strategic success—and this understanding will then need to be reflected in the workforce metrics and analytics that they develop and deploy. From a conceptual perspective, effective workforce analytics should reflect a move from *descriptive* to *inferential* statistics, and these analyses should help us understand the following: How can we more effectively execute strategy through our workforce?

1.2 | Defining workforce analytics

As might not be surprising in a nascent discipline, there does not yet appear to be a single overarching definition of (or even title for) the field of workforce analytics. Why might this be the case? Some functional business process areas, such as accounting and finance, have a long history and a nomenclature that is likewise well developed. Analytics, in contrast, is relatively new and expanding in terms of stakeholders, methods, and impact. In addition to *Workforce Analytics*, the terms *HR Metrics*, *HR Analytics*, *Talent Analytics*, *Human Capital Analytics*, and *People Analytics* have all been used to describe this field. This variance in monikers, while not unexpected, is less than ideal. For example, even the colloquial use of the term "talent" (as in *Talent Analytics*) can have quite different meanings depending on context and location. In North America, the term *talent* is a generic term that would typically be applied to a firm's entire workforce; in Europe and much of Asia, the term *talent* is reserved for only the highest performing employees (much in the same way that the term *high potential* is used in the United States).

The challenge posed by this situation is perhaps obvious: In this field, the *same* term can be used by both practitioners and academics to describe very *different* activities; other times, *different* terms will be used to describe the *same* activities, all in the domain of analytics. Given our focus on understanding and enabling the impact of the workforce (and not just the HR function) on organizational success, we prefer the term *Workforce Analytics*, which we define as follows:

Workforce Analytics refers to the processes involved with understanding, quantifying, managing, and improving the role of talent in the execution of strategy and the creation of value. It includes not only a focus on metrics (e.g., what do we need to measure about our workforce?), but also analytics (e.g., how do we manage and improve the metrics we deem to be critical for business success?)

2 | KEY QUESTIONS ABOUT WORKFORCE ANALYTICS

When designed and implemented effectively, workforce analytics have the potential to provide crucial insights into the processes involved in executing strategy through the workforce, as well as a firm's progress in completing this work. For the field to realize its potential, we believe there are a number of salient questions that confront both practitioners and academics that need to be addressed. For example:

- How can firms identify and prioritize their key strategic questions about their workforces?
- What data do managers require to enable substantial improvements in the workforce? What associated analytics are needed to be persuasive?
- The advent of *big data* has helped to create many new and novel approaches to predictive analytics in fields as disparate as health care, bioinformatics, physics, astronomy, homeland security, and social media. What might the field of HR learn from these advances?
- How can firms identify and quantify the strategic capabilities—bundles of information, technology, and people—that facilitate the execution of firm strategy? How does the performance of the workforce—especially in strategic positions—help to enhance these capabilities within a given firm or sample of firms?
- How can firms prioritize their workforce investments through a greater understanding of economic returns associated with investing in specific jobs, work routines, teams, or employees?
- What are the most effective approaches to the design and implementation of workforce measurement systems or scorecards? How can new data visualization and reporting advances facilitate the rollout of these systems?
- How will the workforce react to significantly enhanced measurement and monitoring? Will these trends increase or decrease perceptions of fairness and equity?
- Big data is frequently defined in terms of volume, variety, velocity, variability, veracity, and complexity. What challenges and opportunities for HR leaders and line managers are created by access to such data?
- How can firms create an infrastructure and culture to ensure that metrics and predictive analytics are being used appropriately? How might these metrics be used to help ensure managerial accountability for the workforce?
- What skills and competencies are required for the *development* of effective workforce analytics? How do these skills and competencies differ for those tasked with the *interpretation* of these analytics? What is the best way to develop these skills?
- How can we equip both HR and line managers to use data and analytics to improve the quality of workforce decision making?

3 | PAPERS IN THE SPECIAL ISSUE

The goal of this special issue of *Human Resource Management* was to showcase the latest thinking, research, and practical advances in the field of workforce analytics. We asked authors to submit conceptual, empirical, and/or case-based research papers that employ a variety of theoretical and methodological approaches. We received a great many submissions from authors all over the world, spanning many disciplines and points of view. Each paper underwent a rigorous double-blind review process, and eight papers were ultimately accepted for publication. Broadly speaking, the content of these papers fell into three categories: (a) Conceptual frameworks for workforce analytics, (b) Methodological and statistical capabilities and tools for workforce

analytics, and (c) Workforce analytics in action: Examples of effective implementation.

3.1 | Conceptual frameworks for workforce analytics

Levenson's (2018) paper argues that effective systems thinking and diagnostics are essential for the design and implementation of effective workforce analytics programs. For Levenson, workforce analytics can only be meaningfully developed following a careful diagnosis of the critical problems facing business leaders and an understanding of the extent to which these challenges lie in cultural attributes, the workforce, or elsewhere. He argues that the process begins with assessments at two levels: competitive advantage analytics and enterprise analytics, which in turn enable the creation of human capital analytics that enable effective strategy execution.

Minbaeva (2018), who directs the Human Capital Analytics Group at the Copenhagen Business School, makes the point that despite the utility and appeal of predictive workforce analytics (helping us to understand what *will* happen), most firms focus their analytics efforts on gaining an understanding of what *has* happened (e.g., activity metrics within the HR function, such as cost per hire). Minbaeva believes that HR leaders do this out of an effort to gain legitimacy for their own HR function, at the expense of developing analytics systems that are truly useful for the organization. Minbaeva then shows that the ability to design and implement effective measures is best thought of as an organizational capability and demonstrates a method to operationalize this construct. She then effectively argues that effective human capital analytics requires that managers address three interrelated facets: data quality, analytical competencies, and strategic ability to act. Driving improvements in these facets will require interventions at the individual, process, and structural levels of analysis.

3.2 | Methodological and statistical capabilities and tools for workforce analytics

Up to this point we have argued that the design and implementation of relevant workforce analytics systems create value through their impact on workforce strategy execution. The next reasonable question might be: Do analytical capabilities among HR professionals lead to enhanced performance? Kruscynski, Reeves, Stice-Lusvardi, Ulrich, and Russell (2018) explore this question in a global sample of HR managers. Based on 360 feedback survey data from over 1,100 HR leaders from nearly 450 employees, they find that HR professionals with higher levels of analytical expertise also have higher perceived job performance. The implication of these findings is that analytical capabilities are an important component of an HR manager's role. Becoming analytically literate and capable may be an important avenue for HR leaders wishing to improve their own performance, as well as the performance of their firms.

Surveys are ubiquitous in organizations and often form an important component of workforce analytics efforts. Yet, despite their importance and centrality, managers often do a poor job demonstrating the reliability and validity of their instruments. Robinson (2018)

provides an important contribution to the literature by reviewing the research on the psychometrics of scale development. Robinson's (2018) paper provides a very useful contribution to the very high proportion of practitioners wishing to incorporate survey data into their analytics efforts. His comprehensive guide to the development and use of multi-item psychometrics scales for workforce analytics is likely to become widely used in the workforce analytics profession.

Continuing on the theme of psychometric and analytical contributions, van der Laken, Bakk, Giagkoulas, van Leeuwen, and Bongenaar (2018) show how two advanced statistical procedures—*Latent Bathtub Models* and *Optimal Matching Analysis*—can be very useful innovations for workforce analytics. Two factors often characterize workforce data in organizations. First, they can be hierarchical in nature, that is, performance at one organizational level drives performance at another, often higher, level of analysis. For example, individual employees are frequently members of teams, which are themselves part of larger work groups, which all come together to create a product or service at the level of the enterprise or firm. The profit (or loss) from this product or service is then nested in the larger, overall measures of firm performance. The second challenging methodological factor frequently confronting workforce analysts involves time. That is, in terms of talent, we often make investments in people (e.g., selection or training or developmental opportunities) that are not reflected in firm performance immediately—indeed, these investments may take many months or years to pay off. So, the twin elements of hierarchy and time can be vexing to organizational researchers. However, there is well-developed literature in statistics upon which we can draw to address these issues. van der Laken and his colleagues show how latent bathtub models can be used with multilevel data, while optimal matching analysis can be useful to unveil longitudinal patterns in HR data.

3.3 | Workforce analytics in action: Examples of effective implementation

Thus far, we have shown that truly useful workforce metrics need to be based on a clear conceptual model showing that variance in talent makes a difference for organizational outcomes and that this model should be grounded in the relevant literature. We have also focused on the statistical and analytical tools needed to implement workforce analytics effectively. The last three papers in this special issue provide excellent examples of these concepts in practice, joining a robust understanding of how talent makes a difference with the analytical acumen required to design and implement an effective measurement system.

Wang and Cotton's (2018) contribution draws on a long tradition of using sports data to test theory in the management sciences. Drawing on the insights generated by the book *Moneyball*, Wang and Cotton provide a unique test of the workforce differentiation theory (Becker et al., 2009). Using more than 100 years of data taken from Major League Baseball (MLB), Wang and Cotton show that even after controlling for the effects of team quality, managerial stability and reputation, and era effects, the extent of social ties among players has a significant impact on team performance. In short, relationships matter, and differentiating among strategic and support teams on MLB rosters based on a clear understanding of these relationships is an important part of

building a winning team. Wang and Cotton's work also highlights the finding that the differences in the contributions of strategic and support roles can be substantial and that workforce analytics can provide a very effective mechanism to help capture these returns.

Simón and Ferreiro (2018) show how academics and practitioners can work together to improve the efficacy of a workforce analytics initiative. Their case study at the Spanish firm Inditex provides a vivid example of how academics have much to offer practitioners in the implementation process, but they have much to learn as well. Simón and Ferreiro conclude that social science research (and researchers) has the potential to make significant contributions to the development of organizational-level competence in workforce analytics, potentially generating a symbiotic relationship benefiting both.

Finally, Scheimann, Siebert, and Blankenship (2018) provide a detailed case example of the use of workforce analytics at the Jack in the Box company. Schiemann et al.'s (2018) case study shows that using the service-profit chain and people equity models to drive talent investments can have a significant impact on revenue, profit, employee satisfaction, and turnover. They also address the specific roles that senior leaders can play in the successful adoption of workforce analytics programs.

4 | KEY LEARNINGS

The eight exceptional papers in this special issue covered a wide range of topics relevant to workforce analytics. Each of the authors also addressed a central question: How do we design and implement workforce measurement systems capable of helping to implement strategy and achieve organizational goals? In doing so, the authors have made significant contributions to our understanding of the processes through which workforce analytics can be effectively used in organizations. A summary of the key learnings is presented below.

When talent matters, workforce analytics matter. Effective workforce analytics focus on the identification, prediction, and management of key employee behaviors; segments of the workforce (e.g., jobs, teams, or work groups); or other relevant attributes. The need for workforce analytics is what economists describe as a *derived demand*—a demand for a commodity, service, etc., that is a consequence of the demand for something else. So, while workforce analytics are *often* important, they are not *always* important. Workforce analytics matter the most when there is substantial variance in talent and when this variance is linked to an outcome of consequence.

When the difference between the performances of high- and low-performing employees in a given role is small, and roles are easily staffed, analytics are not likely to provide a long-term source of competitive advantage. For example, improving the performance of a senior marketing manager at a Fortune 500 company by 30 or 40% will be a significant challenge in most firms. Much like professional athletes, most senior managers have been honing their skills for many years, have been exposed to many different developmental opportunities, and their level of performance has (presumably) been evaluated through many performance review and promotion cycles. As such, it is rare to see truly low performers in these roles. So, while no one would question the importance of senior executives, given their breadth and

span of control, the lack of variance in their collective performance means that substantial improvements in their individual levels of performance are very challenging.

In contrast, employees in less senior roles (e.g., project managers) generally exhibit substantial levels of variability in performance because (a) there are typically more of them, and (b) their shorter organizational tenure means that they have not had as much time to improve their skills. Thus, it is the intersection of the *importance* of the role and the *potential for improvement* that represents the greatest opportunity for workforce analytics to make a real difference in organizational success (Becker et al., 2009; Huselid, Beatty, & Becker, 2005). Such strategic jobs can appear at any level or place in the organization; however, they all exhibit significant variance and are also linked to a key capability or organizational outcome.

Begin with a clear understanding of the role of talent in driving the business process that you want to measure. The process of designing effective workforce analytics systems should begin by clearly defining the question that you want to answer, and this process should be completed *before* you begin to design metrics and collect data. Each of the authors in this special issue made the point—directly or indirectly—that the most effective workforce analytics systems are not generic and largely similar across firms but are rather uniquely tailored to the firm and situation. This means you really need to understand the business before you design and implement metrics. Generic metrics and analytics, such as those that might be generated in a conventional benchmarking study, are unlikely to create the insight or value necessary to provide a long-term source of competitive advantage (Becker & Huselid, 2003).

Draw on the relevant academic literature to design your analytical framework and data collection protocol. The first empirical studies linking HR management practices with firm performance were conducted well over 100 years ago. Since then, there has been a plethora of studies across the domains of job design, recruitment, selection, performance management, rewards, and change management. Recognition of this body of work has led to the creation of the evidence-based management movement (Marler & Boudreau, 2017; Rynes & Gulik, 2007; van der Togh & Rasmussen, 2017), which emphasizes using extant research to inform management policy, practice, and implementation. Workforce analytics takes this concept a significant step further, in that it uses existing research to inform study design and instrumentation and the firm's own data to develop and test the model. Using the firm's own data to generate insights and recommendations significantly enhances the internal and external validity of the findings and reduces managerial resistance.

Focus on data for decision making, and don't try to measure everything. Workforce analytics should provide managers with answers to questions about how best to manage their workforces. So, when designing and implementing metrics systems, it is important to ask: What are the data analytics that, if we knew the answer to, could have a significant impact on our talent-related decisions? Rather than devoting time and energy to collecting all potential data points, we believe that a more productive approach is to develop a deep, comprehensive understanding of a small number of strategically relevant variables. In short, design workforce analytics for implementation and action.

Take great care to ensure the reliability and validity of your measures, especially the multi-item psychometric scales. Metrics data are often collected directly from respondents via survey. Several authors in this special issue point to the importance of scale construction and item analysis as firms adopt increasingly sophisticated workforce metrics and analytics.

The impact of talent on business success is both longitudinal and multivariate, and our metrics and analytics need to reflect these relationships. Investments in the workforce are made today for returns that may be enjoyed sometime in the future. Our theorizing, data collection, and statistics need to align with this multivariate, time-series reality.

Competence in workforce analytics must be cultivated: It won't appear on its own. Minbaeva (2018) makes the point that we need to focus on building analytical capability as an *organizational* capability. Doing this effectively will likely require firms to focus on building individual competencies, as described by Kryscynski and his colleagues, which can then lead to organizational-level capabilities. Furthermore, it is unlikely that any one individual possesses all of the skills needed to design and implement an effective workforce analytics system. Larger firms may have the luxury of having entire teams focused on workforce analytics, with individuals focused on the specifics of data collecting and warehousing, research design and methodology, statistical analyses, and reporting and change management. Smaller firms may need to reach out to outside consultants or partner with capable internal employees in finance, accounting, marketing, or supply chain, where relevant skills may also be found.

Hold managers accountable for the talent that reports to them—and for making data-based decisions. At the end of the day, the real power of workforce analytics is to more effectively manage the firm's most important (and expensive) resource, the workforce. Providing data for decision making is a key way firms can improve the level of managerial accountability for the workforce.

5 | CONCLUSION

The emerging field of workforce analytics holds considerable promise for leaders hoping to significantly improve their operational and strategic performance through more effective workforce management. By extension, better data and analytics also have the potential to help employees manage and improve their own careers, through more effective feedback and career pathing systems. Yet there is peril in this opportunity as well. Incorrect, biased, or unethical decisions, once enabled by analytics, may be made not only much more quickly but also become embedded in the organization's processes and routines and become very difficult to change. Thus, it is very important for workforce metrics and analytics systems to be grounded in the highest-quality social science research methods and statistics.

Going forward, many elements of our work and personal lives will be automated. New roles and jobs will be created, while others will undoubtedly be eliminated through automation or efficiency gains. But what cannot be automated is a deep understanding of the cause-effect relationships needed to execute a workforce strategy and a concurrent understanding of the metrics needed to follow this

process. The great promise of workforce analytics will require a much closer collaboration between scholars and practitioners in the service of all of the firm's stakeholders. It is our hope that the research presented in this special issue will help both academics and practitioners to convert this opportunity to a reality.

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