

Data analytics in human resource management

Benefits and challenges

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Abstract

In recent years, the use of big data analytics in Human Resource Management (HRM) has become enormously popular. It supports and directs decision-making in HRM. The changes in the external and also internal environment of the armed forces (technology, labour market, aging population, personnel recruitment) are major challenges for personnel management and a data analytic approach can provide many benefits to apply to complex personnel issues. In this way, the Netherlands armed forces are able to gain better insight into the recruitment, employability and retention (inflow and outflow) of employees in relation to the desired situation of the Defence Vision 2035 and the implementation of a new HRM system. This chapter provides insight into the challenges facing the Netherlands armed forces today with respect to data analytics in HRM and starts with an overview of the movement in HRM towards data analytics. It then describes data analytics in general, followed by the specific application of data analytics in HRM, and in particular the benefits and challenges of applying data analytics for HR and personnel issues in the armed forces. The chapter concludes with how the armed forces can meet the challenges of a data analytic approach in HRM in the future.

Keywords: HRM system, Decision-making, Data analytics, Employability, Inflow-outflow.

2.1. Introduction

Today, organisations are aware that (big) data analytics can be applied to provide insight into trends and events and thus can be effective for strategic decision-making. This insight has grown tremendously, and this involves various fields of analysis and big data.^{1,2} Organisations continually explore trends and transform business processes to cope with organisational challenges and improve decision-making.³ Big data, data analytics and technology are important tools for strategic decision-making. Advanced analytic techniques on big data predict and

influence data-driven choices in organisations. Information technology spreads fast and new methods are constantly emerging to deal with large scale data for strategic decision-making.⁴

Because of the (future) ambitions of the Netherlands armed forces in terms of technological developments and information-driven operations, it is, like industry, engaged in developments in the field of data analytics, partly due to the increasing importance of cyberspace. Also, the use of sensor data, satellite images, social media, videos, photos has become increasingly important. These developments allow the armed forces to better guide decision-making processes related to (day-to-day) operations.^{5,6}

Data analytics in the Human Resource Management (HRM) domain has also become an important new direction and companies are actively looking to implement it, as organisations are always looking for metrics and methods to maximise the effectiveness of the workforce and optimise business results.⁷ It is very valuable for the HR departments and the organisation to be able to measure and predict the strategic impact of their activities in the organisation. The Netherlands armed forces are also exploring this, as they are currently introducing a new HRM system in relation to the new Defence Vision 2035. Data analytics could help to better anticipate and respond to decision-making on current personnel issues, for example recruitment and selection, given the many vacancies the armed forces are facing.⁸ Recruitment has become one of the critical success factors and in an all-volunteer force, the challenge is not to miss potential qualified volunteers.⁹ Therefore it is important to get insight in the trends of the labour market, because a military organisation that consists of volunteers must compete with other organisations.

2.2. Traditional HRM and the rise of analytics in HRM

Employees with their knowledge, skills and abilities are called the human resources or human capital of organisations.¹⁰ Human Resource Management can be referred to as the function that is responsible for staff selection and recruitment, training, performance appraisal, career development, disciplinary procedures, pre-retirement advisory work, equal opportunities policy and pay negotiations. A commonly used definition by Storey states that it is “*an approach to employee management that seeks to achieve competitive advantage through the strategic deployment of a highly engaged and capable workforce, using a range of cultural, structural and people management techniques*”¹¹. HRM influences the performance of organisations in a positive way,¹² because there will be competitive advantage through people¹³: the employees of an organisation determine the success of the organisation. Thus, employee management is an important factor in achieving organisational

goals.¹⁴ To attract, deploy, and retain employees efficiently and effectively to gain and predict competitive advantage over other organisations and perform well is important.^{15,16}

Since the 1980s, many academic studies in the field of HRM have been conducted and many theories have been described to motivate employees to adopt the most appropriate organisational behaviour. One of the pioneers in this field was Huselid, who scientifically substantiated HRM practices and their impact on organisational performance.¹⁷ He showed that high performance work (HPW) systems go hand in hand with lower personnel turnover, increased market value and higher profits for the organisation.¹⁸ HPW systems include refined selection and training methods, formal performance evaluations, and sound compensation plans and employee participation programs. Although many studies have shown that HRM can effectively improve the performance of organisations, there are still debates about the exact impact of HRM and causality – about the influence of HRM on performance – or about the importance of the relationship between an employer and an employee – employees are not only a resource, but also the human part is important -, and finally about the role of the context of organisations.^{19,20}

Regarding the role of the context, studies have demonstrated two perspectives. The so-called universalist or “best practices” perspective of Pfeffer²¹, states that organisations perform well when they implement the best practices in HRM.²² However, the other theoretical perspective is that of the “best fit.” This perspective assumes that organisations must align their HRM policies and practices with their environment for a positive impact on organisational outcomes.^{23,24,25} Similarly, within organisations, there may be different HR practices or investments tailored to exclusive types of (strategic) employee groups (i.e. exclusive approach) or to all categories of personnel (i.e. the inclusive approach).²⁶ So we can conclude there is some influence of the internal and external context of organisations on HRM.²⁷

However, theory is not always considered important in decision-making in practice, and sometimes HR decisions are based on subjective decisions due to, for example, personal interests or unsystematic practical experiences. Accordingly, in recent years there has been an increasing interest in evidence-based approaches to decision-making in organisations: “*translating principles based on the best evidence into organisational practices.*”²⁸ It is important for organisations and managers to base their decision-making on the best scientific evidence combined with critical thinking and available business information. The principles of human behaviour and organisational processes are translated into more effective management practices. Four sources of information are important in evidence-based decision-making (1) professional reflection and judgment, (2) stakeholder concerns, (3) scientific evidence, and (4) reliable and valid organisational metrics.²⁹ The first two sources of information are almost always present in HRM. Scientific evidence,

however, has become more important over time and several studies have appeared from management and organisational sciences, social sciences, and behavioural psychology.³⁰

In the fourth source of information (i.e. reliable and valid organisational metrics), we see data analytics emerging as it proves helpful for HR decisions in practice. HRM specialists and policymakers translate scientific evidence into policies, which are then implemented and monitored to see if the intervention has been effective.³¹ Furthermore, within and across organisations, contextual influences differ, and this implies that once implemented in practice, the effects of HRM can thus vary significantly. A data analytic approach uses the available data and measurement methods in a more inductive way to discover the effects achieved, rather than randomly as in traditional data analysis. In traditional HRM research, a more top-down deductive process based on theory is applied.³² Thus an analytic approach differs from a sound scientific approach in practice and follows a distinct statistical path because it has a different goal.³³

This fourth information aspect of evidence-based HRM is especially the biggest challenge facing the HRM function today, because HRM specialists often lack the ability to measure effects in the organisation using data analytics.³⁴ The user should be an expert in using large scale data and in discovering new business facts and trends. At the same time, there is a shift towards the development of methods and effective technologies to analyse big data. Frameworks and conceptual models for data analysis are being developed, for example, to evaluate the impact of data analysis on decision-making or to develop a framework for management, and their advantages and disadvantages are discussed in various studies.^{35,36,37,38}

2.3. Data analytics

Big data and data analytics have been in the interest of scientists and practitioners for several years, but scientific studies do not yet agree on the effectiveness of the analytical approach in HRM because of many challenges. Nevertheless, there is an increase of the data analytic approach in the HRM domain, and some large companies have already had good experiences with it, for example Google.com, or Booking.com, Walmart, some healthcare companies,³⁹ but also the Dutch company Post-NL.⁴⁰ They apply data analytics to influence the behaviour of their employees and to improve decision-making in the organisation.⁴¹

Defence organisations, including the Netherlands armed forces, have also introduced data analytics, and although data analytics is not yet applied in a very structured way within all units and divisions, it has certainly already gained a foothold in the Netherlands armed forces.^{42,43}

But what is (big) data analytics? We all know examples of big data such as email, social data, XML data, audio files, photos, videos, GPS data, satellite images, sensor data, as well as spreadsheets, and web log data from the internet or mobile data. They all refer to large amounts of data and definitions also focus on the data in storage (volume) and other attributes like data variety, data velocity.^{44,45} We actually speak of data analytics when traditional computing capabilities (e.g., storage, analysis, transfer networks and, for example, visualisation) cannot be applied because the amount, speed, complexity or quality of the data is beyond the user's control. It is clear that big data refer to volume. This is a characteristic of big data (e.g. expressed in terabytes or even zettabytes)⁴⁶ and the data consist of transactions (i.e. bank or store), tables and files or other types. The velocity or speed refers to the frequency and the speed of data delivery by each device (think of sensors on vehicles, robotic machines, microphones that record sound).⁴⁷ The third characteristic, data variety, addresses the types of sources that are tapped, for example social media, logs, blogs, call centre applications, text data, semi-structured data, geographical data, or sensor data.⁴⁸ Which data sets and from what sources they are collected could vary from organisation to organisation.⁴⁹ Some data concern the whole organisation (business analytics) and other data only the financial unit (financial analytics). There is no 'one size fits all'. In line with these characteristics, it is easy to understand that the benefits of data analytics are numerous. Data are voluminous, delivered quickly, and provided by a variety of sources.

By combining analytics of big data with more traditional data analysis, organisations are able to gain new insights and a deeper understanding of organisational dynamics. It opens up new opportunities and optimises decision-making, discovers trends and predicts future events. In telecommunications and transportation companies, for example, big data analytics is used to better predict customer usage. Similarly, supermarkets are able to better understand their customers and predict which products will sell.^{50,51}

An analytical approach also allows for more complete and accurate responses and can improve data processing performance because more types of data are available and will be combined, such as text and semi-structured data. In traditional scientific studies, one would say that this mixed-methods approach increases the quality of a study.⁵² Another benefit is that an organisation is able to act more quickly because data are collected in (near) real time as the speed of big data reflects. Data analytics could optimise organisations' decision-making process because more accurate data are available. The use of IT programs (e.g., IBM SPSS) that simultaneously support data analytics and the more traditional data analysis can provide benefits and is less expensive.^{53,54} In addition to investing in software and hardware packages, organisations also invest in setting up different units that deal with a different focus on data analytics and environments and platforms to

share information. In the Netherlands armed forces, different units are engaged in a different focus on data analytics, also called data science departments.^{55,56}

2.4. Data analytics in HRM

The definition of data analytics in HRM, like the different definitions about data analytics, is not very unambiguous and can be labelled in different ways, such as HR analytics⁵⁷ people analytics,⁵⁸ workforce analytics,^{59,60} talent analytics,⁶¹ or human capital analytics.^{62,63} The definitions are very similar, but there is a nuanced difference between them. HR analytics, human capital, and people analytics are often used to refer to more general analytical topics that cover the whole range of HRM.⁶⁴ An overview study by Marler and Boudreau led to the following definition for people analytics: *“HR practice enabled by information technology that uses descriptive, visual, and statistical analysis of data related to HR processes, human capital, organisational performance, and external economic benchmarks to determine business impact and enable data-driven decision-making.”*⁶⁵ Workforce and talent analytics, however, have a narrower scope as these terms focus more on employees, such as strategic workforce planning, recruitment and selection, and also development of employees.⁶⁶ Huselid defines workforce analytics 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?)”*⁶⁷ A Dutch study refers to data analytics in HRM as making decisions about people and the organisation based on numbers.⁶⁸ Other definitions of workforce analytics include for example applying analysis, statistics and models to data related to employees, or aim at evidence-based results to improve employee behaviour and the organisational performance by optimising decision-making from the human side of the business.^{69,70}

If we take a critical look at data analytics in HRM, we see that the data analytic approach in human resource management is still quite recent and focuses primarily on screening job applicants.⁷¹ Organisations use special software to review job applications faster than in a manual fashion, and mostly to save on administrative costs. From the HRM function this seems logical, but from a strategic perspective there is much more to be gained from HR data analytics. For example, an analytical approach proves especially valuable for discovering and strengthening the strategic relationship between human resources and the organisation's overall strategy.⁷² Data analytics can also be used to answer questions about how HRM improves employee knowledge and skills to enhance organisational performance

and competitive advantage. It addresses motivation and training programs to develop talents in the organisation, and it can predict what may happen in stead of providing descriptive reports on what happened.⁷³ Big data sets also make it possible to predict future behaviour of employees and explore labour market trends. Not only can big data be useful for faster and more cost-effective selection, but also for recruiting new potential. The U.S. Army Recruiting Command, for example, has significantly expanded virtual recruiting and this has produced more data. Virtual recruiting takes place through digital systems (e.g., email, internet, and social media applications). Virtual recruitment teams (VRTs) exclusively use virtual recruitment processes to attract personnel, not only for selection, but also for recruiting new employees.⁷⁴

There are also scholars who claim the opposite. They argue that data analytics does not exist in HRM. The employee data used are not large in volume – there are not millions of people working for organisations – the data have no special variety because mostly internal data are used.^{75,76} So why should there be any reason to use special software and methods associated with big data analytics? The challenge lies not in applying data analytics but in analysing the data and interpreting them. So, we need to ask *how* big data can support HRM. Some scholars argue that for HRM we should no longer talk about “big” data but about “smart” data, because the insights that the data can provide are more important than, for example, volume and speed.⁷⁷ HR managers need to focus on the “smart” HR data available in the organisation for decision-making, rather than on “big” data.⁷⁸

2.5. Data analytics in HRM: benefits for the armed forces

In September 2019, the Netherlands armed forces introduced a new HR model and with so-called “pilots” new ways of recruiting personnel (more decentralised) have been implemented and more customised contracts have been offered so far. Cooperation in the field of recruitment and training has also been professionalised, with close contact being maintained with regional civilian partners. In this development, there is a focus on social anchoring and cooperation with educational institutions, local businesses and governments. The wishes of personnel will also be taken into account. This should enable the Netherlands armed forces to meet future personnel challenges as stated in the Defence Vision 2035⁷⁹ and to reach even more workforce diversity.⁸⁰

2.5.1. Data analytics in HRM

Some years ago, the Netherlands armed forces introduced data analytics in HRM. There are some references to courses, some initial data, explanatory notes, and

manuals and other documents available on platforms provided by different units. A platform has also been introduced by the armed forces Trends, Research and Statistics (TOS) department. This department has been responsible for the analysis of data in the field of HRM in the armed forces for a number of years.

An interview with representatives of the Trends, Research and Statistics (TOS) department that is associated with the Business Information Personnel & Organisation department (BI P&O) reveals that TOS conducts Social Scientific Research (SWO) and carries out, among other things, work perception and job satisfaction surveys on a regular basis. The Business Information Personnel & Organisation (BI P&O) extracts data from the defence information systems.⁸¹ The services have been working together for a number of years, combining figures from management information systems with social scientific research, to give greater depth to findings on the exit intentions of military personnel, for example. This cooperation enhances the credibility of the armed forces' approach to personnel issues.⁸²

Organisations often try to address retention issues through in-depth retrospective interviews (so-called exit interviews), but by applying an analytical approach, companies can be predictive and respond proactively rather than reactively. For example, by conducting predictive behavioural analysis, a company could discover that the expensive bonuses it had started handing out because of staff turnover was an ineffective measure.⁸³ The Netherlands military therefore also combines quantitative and qualitative data as part of exit analysis.⁸⁴

Furthermore, TOS carries out and monitors social scientific questionnaire research on HR topics and regularly publishes reports and other documentation consisting of visuals and infographics. Accurate information and analyses and timely delivery are central to this. An example of a report is the HR Monitor, for which there was a great need within the armed forces.⁸⁵ The HR Monitor consists of a logically structured 'catchy' report. It has a 'flow' structure with many infographics. This way, people start making connections and asking deeper questions. While this monitor is a great example of data analytics, the HR analytic approach in the armed forces is still developing. In the future, the armed forces will combine more data on intentions to leave and reasons for doing so.

Within the Netherlands armed forces, the idea of HR analytics on sensitive health data of military personnel to make health predictions has also been a "hot topic" for several years. One advantage may be that the armed forces are able to better respond to the medical condition of its personnel and, for example, gain insight into the health situation of military employees. However, the privacy and security of these data seem to be challenges for the armed forces, especially when it concerns sensitive and personal (health) data.^{86,87} Therefore, it is important to develop a sound ethical practice for data analytics with respect to personal (health) data. In the U.S., for example, ethics is broken down into discrimination or exclusion

of specific target groups in data. On the other hand, there are concerns that data analytics can lead to a breach of privacy.⁸⁸ For example, if tracking systems or audio, video recordings are used and if these data identify certain employees, employees may start behaving differently or the system may not be accepted. There are many laws in Europe that are similar to the U.S. laws, such as the General Data Protection Regulation (GDPR).⁸⁹ This GDPR focuses on all data that are processed (e.g., input, transmission of data, output, stored data) even if no European citizen is involved. This law consists of a set of rules for the (automatic) collection, processing and storage of personal data. Organisations must be careful and responsible when storing and securing employees' personal and medical data, so this can be a challenge when working with (big) data. Data should be carefully processed by the employer and this has to be a transparent process. In social sciences, organisational sciences, (behavioural) psychology and medical sciences, for example, it is common to use informed consent forms that explain to participants how their data will be processed and stored.⁹⁰

The military organisation is aware of GDPR in health studies and other studies that analyse personal data. GDPR coordinators have also been appointed to advise on compliance and various information documents on the application of the GDPR are available. With regard to scientific research in the armed forces, ethical protocols have also been developed for compliance with the ethical aspects of research. Such protocols are obviously also applicable to (big) data analytics.

2.5.2. Different analytic approaches in HRM

Analytics in HRM uses various sources of (big) data, in addition to the three characteristics of big data already described above. In HR analytics in the Netherlands armed forces, a distinction is made between HR data sources (e.g., internal recruiting data, retention data, demographic data, absence data, data on compensation and benefits, data on performance, on engagement, exit reasons and well-being), and diverse data analysis tools are used to discover valuable insights and trends in data sources. As previously described, platforms have been developed and visualisations created in the Netherlands armed forces to share information.⁹¹ This information focuses on HR analytics, workforce analytics and people analytics.

Workforce analytics and people analytics still seem to lag behind in relation to the HR analytics information displayed on the intranet platform of the Netherlands armed forces. But this platform is still under development. However, there is an online platform to share information and that is important. The importance of a platform for sharing information is also evident in a Dutch study on data analytics.⁹² An internal online platform is important for the transfer of know-how, it is crucial to learn from, and it is important for sharing ideas, experiences and insights.⁹³

Workforce analytics is described on the platform and focuses on the workforce in relation to the organisation as a whole. Here, descriptive internal (e.g., data of employees) and external (e.g., labour market trends) data and predictive data are used primarily to support strategic workforce planning. So, workforce analytics aims at a wide range of activities and processes, which are constantly evolving. Workforce planning is about building strategies to ensure the organisation has the appropriate workforce to deliver the organisation strategy (e.g. demand and supply).⁹⁴ This can be an important approach for the Netherlands armed forces in connection with the strategic personnel planning in the new HRM system. The main focus of workforce analytics is on strategic issues relating to future bottlenecks in the workforce, all kinds of diversity issues, or questions relating to inflow through outflow. In view of the current vacancies in the armed forces, these are important issues that can be better predicted by using workforce analytics.

Workforce planning is related to workforce analytics and focuses on operational or short-term planning topics like the number of filled positions or the sickness absenteeism rate in certain units. Short-term planning provides commanders with information about their unit, for example when preparing for an operational situation abroad. Such analyses inform commanders about the current or changing workforce and influence their decisions. This analytical approach determines which metrics, or what data, are relevant and need to be documented, and how these data should be linked.

Long-term planning is also described on the defence platform, and this is related to the Defence Vision 2035. The central questions here are: how can workforce analytics contribute to optimising recruitment methods, what can be done differently with a view to the future, and how can valuable staff be retained? With workforce analytics, the translation of data into metrics and the analysis of changes and relationships in these metrics, it is possible to make predictions and discover trends that allow the organisation to actively respond to changes in the labour market.⁹⁵

In both workforce analytics and planning in the armed forces, the use of internal and external data is important. External data or metrics are related to the context of the armed forces and are very easily accessible. Since the context of the armed forces is important, many trends for the recruitment policy of the Netherlands armed forces can easily be predicted based on the expected developments in the labour market, the skills needed by employees in the future and the development of scarcity in the labour market. Internal data, or HR metrics, consist of data (numbers) that describe certain processes or HRM outcomes in detail, for example, the success in recruiting new employees, the sickness absence rate, the employee turnover, or the costs of training programs.⁹⁶ Valuable combinations can be made with internal and external data. According to some researchers,

traditional internal and external data should also be combined with “larger” data on personnel, for example location data from mobile phones, information from employees’ electronic calendars or internet activities, or information about the people they communicate with via mobile phone and emails and the content of conversations.⁹⁷ However, internal data and “larger” data are more difficult to achieve. They consist of sensitive personal data, for example the sickness absence rate in certain units (this could be derived from the personal data platform) or the location data of cell phones. However, as described previously, the armed forces must comply with privacy and data protection legislation based on the European GDPR (General Data Protection Regulation).^{98,99}

When it comes to people analytics, another analytic approach, organisations are increasingly aware of the potential and value of their workforce, and business value is increasingly associated with having a highly talented workforce that can bring radical innovations, so-called “talents.” In the literature, the application of new methods and new ways of thinking in the field of talent management seem to be innovative topics. HR tools such as staff training and talent development programs are important instruments for HRM. The deployment of drones, new weapon systems and cyber developments have ensured the armed forces need a different type of qualified personnel (see also Defence Vision 2035). The armed forces need talents for all kinds of technological and technical positions. Therefore, the new HRM system of the Netherlands armed forces will focus on talent management both in the internal and external labour market.¹⁰⁰ We also see this development in other civilian companies and there is a high demand for qualified personnel. It is hard to find employees in the labour market who possess exactly the skills and qualifications required by the military. Once hired, it is vital to ensure that the necessary talent is retained, developed and motivated to work towards the organisation’s strategic goals.¹⁰¹ Talent management aligns individual capabilities with the needs of the armed forces and optimises human performance and engagement (the ‘best’ soldier at the right position at the right time). It integrates recruitment, development, employment, and retention strategies.¹⁰² For example, the U.S. army’s personnel system includes a more personalised management approach that is more likely to motivate and retain officers by preparing them for leadership roles.¹⁰³ Talent analytics may support issues on the relationship between training, development, productivity and reducing employee turnover. Further, it contributes to employee wellness programs, or addresses questions on specific degrees of employees and productivity.¹⁰⁴

Talent analytics can be more important for certain categories of employees than for others. Typically, the focus is on employees in strategic positions who have relatively important accomplishments for the organisation. Talent analytics could identify these talents and contribute to optimising strategic decision-making

and increasing organisational success.¹⁰⁵ Many organisations already distinguish high potentials or talents among their employees and differentiate their HRM investments (exclusive approach).¹⁰⁶ The Netherlands armed forces deploy talent management as one of the instruments in the HR transition. This approach is important for the inflow and outflow of personnel, where the focus is on all personnel and not on special categories (inclusive approach).¹⁰⁷ The idea is that the employees, based on their knowledge, competences and needs, are central and therefore of added value to the organisation.¹⁰⁸ These changes are only possible in a culture and leadership climate in which coaching, education and training are important. This means that the mind-set and management of the armed forces must change. This will enable the armed forces to attract and retain more talented, committed and deployable personnel.

All in all, the development of analytic approaches in HRM seems to fit the timeline of the introduction of the Defence Vision 2035 and the HR transition in the Netherlands armed forces.^{109,110} This process is expected to be achieved by the end of 2024. In relation to this development, a number of “pilots” with data analytics in the field of workforce and talent management have already been carried out at specific units within the branches of the armed forces, which, as far as is known, were positive. Other units, however, for example the *Royal Netherlands Marechaussee*, are still in the process of developing roadmaps for the practical implementation of talent management.¹¹¹

2.6. Challenges in data analytics in HRM

Traditional HR in practice has shifted to the growing application of data analytics in HRM and today it is even a “hot topic”. Although it seems to be a promising development in the HR domain, there are still certain challenges for organisations and for the armed forces that need to be addressed in order to implement data analytics in HRM in an appropriate and effective way. Some key challenges for the Netherlands armed forces are described.

The first challenge is the fact that data analytics allows more and “larger” data to be collected and combined, but more data does not always mean more useful information. Sometimes very complex, unstructured data can produce noise, anomalies and ambiguity. It is then difficult to discover the patterns and trends that are relevant to the organisation’s performance.¹¹²

In addition, the complexity of data requires other sophisticated IT programs and HR specialists need more analytical, technical and innovative knowledge and skills. They need to be educated and trained in HR intelligence, key figures, metrics

and all kinds of financial metrics in order to manage HR strategy and make cause-and-effect relationships and future predictions about personnel investments and their effects.¹¹³ One way to do this is to share knowledge by means of job rotation, also possible in the armed forces. In this way, practitioners of data analytics are introduced to different new activities in analytics practice.¹¹⁴

Another challenge is the fact that many data analytics models have been developed in recent years but, because organisations differ in structure and in contextual influences, there is no single uniform model for data analytics in HRM (just as there is no uniform definition of HR analytics). It would be preferable to develop a model that is able to measure and provide evidence of the relationship between the organisation and employees as human capital. Such a model could influence the assessment of big data implementation and decision-making.¹¹⁵ Unfortunately, despite several promising studies, the evidence for a link to organisational performance is not yet very strong.^{116,117,118,119}

A model with mechanisms for the governance of HR analytics would also be preferable. After all, in addition to an appropriate IT environment, the analytics approach requires a different culture, mind-set, leadership climate and governance structure.¹²⁰ This also applies to the armed forces. Although some preliminary results point towards an online platform (already being further developed in the armed forces) and the sharing of information through such a platform, further research is needed on the mechanisms for governance of data analytics.¹²¹

Moreover, many organisations, including military organisations, probably forget that people's social world can play a role. It is part of their daily lives and therefore these social data can be considered as big data. However, the question is: how can the social world of a network be analysed? This could be a future challenge for data analysis in HRM. The social world can be used to predict a user's behaviour and a social network could therefore be an important cohesive variable or predictor of military behaviour.¹²² To identify the behaviour of certain units in the military, because there are different subcultures in the military, may not be trivial. The social network can be an important predictor of organisational behaviour in both data analytics and in traditional data analysis.¹²³

Finally, security and privacy issues in relation to data analytic approaches can present significant challenges. They relate to a safe storage of data and the protection of the transmission of data. How can we prevent anyone from learning about privacy-sensitive information, or information about an employee's network as mentioned above? This is where the GDPR plays an important role, including in the armed forces. We can argue that the issues of data security and privacy in data analytics are fundamentally the same challenge as in traditional data analysis of personnel data. So, the question is how to deal with these issues in data analytics in HRM?^{124,125}

2.7. Conclusion

The collection, storage, analysis and management of a huge amount of data in HRM is inevitable and will only increase in the future. Data analytic approaches in HRM focus on how employee actions directly affect organisational performance and should be transparent. They influence organisational performance in a positive way and can also positively change the employer-employee relationship. Researchers and HR professionals therefore look for opportunities to “operationalise” their research through data analytics and optimise human resources for better employee and organisational performance. Data analytics could support decision-making in various personnel-related and strategic questions, also in the Netherlands armed forces. In terms of a HR analytic approach, the Netherlands armed forces are already on the right track, but before big data analytics can actually deliver on promises in HRM, there is still work to do for the military organisation. After all, there are benefits and challenges at the same time.

Notes

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- ⁶ Recently, a data science knowledge and expertise centre has opened in the Netherlands armed forces (Center of Excellence; CoE) where all data science knowledge and artificial intelligence come together. For example, insights are gained from sensor data of vehicles, geographical data of satellites, and computer science and statistics combined with information from public sources.
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