Aalto University
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EMBRACING DIGITALIZATION IN HR: THEORY AND
PRACTICE OF HR ANALYTICS

Master's Thesis

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Abstract

New socio-economic reality and abrupt technological advances gave an impetus to the rapid development of the business analytics field. While functions like marketing and finance have been fast to embrace analytics, HR has been lagging behind for a long time. Yet, recently the new phenomenon of HR Analytics has emerged holding a great promise to improve decision-making on people matters, boost productivity and profitability of organizations and elevate the role of the HR function. Despite these impressive benefits, the adoption of the practice by companies has been slow and the topic has not drawn much attention from the research community. However, given all the gains resulting from the use of the innovative practice, HR Analytics represents an important topic to explore, as a better understanding of the practice and the ways it can be applied within an organizational context can enable companies to move forward with their analytics initiatives in HR.

Thus, this thesis aims to elevate and amplify knowledge of the HR Analytics phenomenon and its practical application. In particular, it focuses on exploring enablers, moderators, elements and outcomes of the practice to obtain a holistic view on the phenomenon. The multiple-case design is used to study HR Analytics in the context of three case companies. The case companies are represented by large international organizations at different levels of HR Analytics maturity. The study relies on the data collected from multiple sources including exploratory interviews, case interviews, documents derived from the case companies and open sources.

The findings of this study indicate that even though the application of HR Analytics is contingent upon the context, within which it is applied, there are general aspects pertaining to the practice that are common across the case companies. The study, for instance, shows that three groups of moderating factors – knowledge, skills, and attitudes of HR professionals, technological and organizational – identified through the literature review affect the application of HR Analytics across all the three cases. These common grounds in HR Analytics application represent a great learning opportunity for researchers and organizations alike. Considering general paucity of knowledge related to the HR Analytics phenomenon, there are many directions, in which the future research on the topic could go. In regard to the present study, the future research can focus on exploring key aspects related to HR Analytics practice in more detail separately or as a group in line with the framework developed within this thesis.

Keywords HR Analytics, People Analytics, Workforce Analytics, Talent Analytics, HR Metrics, HRIS, HCM, Strategic Human Resource Management

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LIST OF ABBREVIATIONS

AMO: Ability, motivation, opportunity

CIPD: Chartered Institute of Personnel and Development

CTR: Center for Talent Reporting

e-HRM: Electronic Human Resource Management

ERP: Enterprise Resource Planning

HC: Human Capital

HCM: Human Capital Management

HPWP: High Performance Work Practices

HR: Human Resource

HRIS: Human Resource Information Systems

HRM: Human Resource Management

IT: Information Technology

KPI: Key Performance Indicator

RBV: Resource-Based View

ROI: Return on Investment

SHRM: Society for Human Resource Management

SHRM: Strategic Human Resource Management

1. INTRODUCTION

1.1. Background to the study

Increasing international competition, abrupt technological advances, and a growing commoditization of product markets have nudged management to rediscover employees as the basis of value creation process and crucial differentiators of a commercial enterprise (Becker et al, 2001; Fitz-Enz, 2000; Wright & Snell, 2005). Employees are unique in that they are the only "active" resource of a firm while the rest of the resources are inert and have to be applied by humans in order to create value (Fitz-Enz, 2000). The research in the strategic human resource management field posits that human resources could serve as a source of sustainable competitive advantage (e.g. Wright & McMahan, 1992; Schuler & Jackson, 1987). Yet, whilst declaring that people are their most valuable asset, many organizations still treat employees as an expense to be minimized and the change in how companies manage their human resources has been slow (Fitz-Enz, 2010). These trends, resulting from the lack of understanding of how HR makes the big vision of people as the foundation of value creation a reality, and how employees create value in organizations represent a considerable challenge for the HR function, management and researchers in the field of the strategic human resource management (SHRM).

Recent academic studies suggest that companies wishing to achieve a superior individual and organizational performance shall adopt an evidence-based approach to decision-making on people matters, meaning that it should be based on facts rather than intuition (e.g. Pfeffer & Sutton, 2006; Fitz-Enz, 2010; Boudreau & Jesuthasan, 2011). The time for making a turnaround in people management couldn't be better as advances in the information technology such as rapid development of human resource information systems (HRIS), enterprise resource planning (ERP) systems, and specialized analytical tools have paved the way for a paradigm shift in HRM (Boudreau, 2006). The new discipline of the HR Analytics enabled by the modern technology has recently emerged holding a great promise for the HR function – to get more aligned with business and assume a more strategic role (e.g. Bassi, 2011; DiBernardino, 2011; Harris et al., 2011; Lawler et al., 2004; Mondore et al., 2011) – and for organizations at large – to set priorities and improve investments into people (e.g.

Ulrich & Dulebohn, 2015, Bassi, 2011; DiBernardino, 2011; Mondore et al., 2011) and achieve substantial productivity and profitability gains (e.g. Aral et al., 2012). Although different HR metrics and scorecards have been around for a long time, application of statistical analysis to HR context that allows gaining valuable business insights from the HR data is a nascent phenomenon and only 16% of companies currently report using HR Analytics (Marler & Boudreau, 2016). Considering its limited application, HR Analytics hasn't drawn significant attention from the academic community up until recently and, thus, research on the topic is still very scarce. Yet, given all the promises that the adoption of the practice holds for companies, HR Analytics represents an import topic to explore.

Before going into detail about my study, I would like to introduce my thesis topic through an unconventional example of HR Analytics application. With this case, I intend to illustrate in more detail the opportunities that HR analytics holds for companies and underscore the importance of the research on the topic. The example originates from the book called "Moneyball: The art of winning an unfair game". Both – the famous nonfiction book by Michael Lewis (2004) and the movie (2011) of the same name – share the story of the general manager of the Oakland Athletics baseball team – Billy Beane – and his struggle to build a competitive team in the 2002 season facing severe budget constraints. Realizing that traditional approach to scouting players – relying on subjective evaluations of the scouts when choosing the players within the affordable range – wouldn't help the Oakland A's to "win an unfair game" (Lewis, M., 2004), in which the richest teams get the top talent, Billy Beane took a radical decision to utilize sabermetrics for identifying the best possible talent available to A's. Confronting severe criticism of his unorthodox approach, Beane with the help of his mathematically skilled assistant assembled the team from the highly undervalued players. The team showed unparalleled results in the season by setting a new American League record with a 20-game winning streak and the efficiency of its payroll (cost per win ratio = team payroll divided by the number of wins) was also astonishing – the A's paid around half a million dollars per win while rich teams like the Texas Rangers paid around 3 million per win. The success of the sabermetrics model didn't go unnoticed and, as a consequence, many other baseball teams started to adopt the innovative approach to the player evaluation pioneered by the Oakland A's.

The narrative vividly illustrates what benefits HR Analytics could provide to the companies – e.g. better human capital (HC) investments and improved performance, how the company's journey towards implementing people analytics may look like – how it should start from the clear strategic objectives and be persistently supported by the top management – and what kind of challenges may arise along the way – lack of understanding of statistics and the possibilities it can offer to HRM, skepticism and even denial. Although different people may attribute a different meaning to this story, to me it boils down to a stunning example of how the application of HR Analytics could help an organization to transform its HR practices so that it could achieve its strategic goals and superior performance, and this is essentially what the present thesis is about.

1.2. Research gap and problem

HR Analytics is a relatively new research stream and is highly interdisciplinary combining perspectives from strategic HRM (e.g. Lawler et al., 2004; Rasmussen & Ulrich, 2015), management science (e.g. Pape, 2016) and other fields. The extensive literature review recently conducted by Marler and Boudreau (2016) has identified only 16 peer-reviewed articles on the topic that appeared on the Journal Quality List. The term "HR Analytics" originated in 2003-2004 and, thus far, no widely accepted definition of HR Analytics has been developed (Marler & Boudreau, 2016). Although the phenomenon is endowed with high strategic potential (Marler & Boudreau, 2016), there is little evidence that proves the value of HR Analytics (Rasmussen & Ulrich, 2015) and the adoption of the practice by companies has been limited (Marler & Boudreau, 2016).

Due to the general paucity of academic knowledge related to HR Analytics, there is a variety of directions in which the research on the topic could go. One of the suggested avenues for studies is the praxis of HR Analytics (Angrave et al., 2016; CIPD, 2017). Angrave et al. (2016) notice that the process of HR Analytics could be rather complex involving large multi-stage projects starting with the definition of a research question and research design and ending with translation of the research results into a simple story that decision makers could comprehend, and that so far little has been done to elucidate this process. Contributing to this discussion, Falletta (2014) points out that the ways in which the companies use HR Analytics

beyond simple metrics to aid HR strategy, decision-making and execution remain unclear. Yet, CIPD's report (2017) suggests that HR metrics could also be a focus of a research, as it is not yet known what metrics is used for what purposes, using what tools and systems. The literature on the subject also largely overlooks the practical side of the phenomenon – very few publications touch upon the organization of HR Analytics teams (e.g. Falletta, 2014; Levenson, 2005) and technology behind the practice (e.g. Aral et al., 2012). In addition to that, Marler and Boudreau (2016) suggest that it would be useful to learn more about the role of the moderating factors such as, for example, availability of analytical skills among HR professionals, in adoption and development of HR Analytics practice. Finally, researchers point out the paucity of knowledge related to the outcomes and consequences (e.g. Falletta, 2014; Marler and Boudreau, 2016) resulting from the practice. For instance, CIPD's report (2017) underscores the "worrying" deficit of academic interest towards ethical consequences related to the use of HR Analytics. In addition, the studies that provide the empirical evidence related to the outcomes of HR Analytics usually focus on the successful projects, rather than the general application of the practice by organizations (e.g. Coco et al., 2011; Rasmussen & Ulrich, 2015). With so many blind spots in the research, it is not surprising that Marler and Boudreau (2016) indicate an acute need to elevate and amplify knowledge related to the phenomenon of HR Analytics and through this contribute to the development of the practice.

There is not only the gap related to the knowledge about HR Analytics phenomenon but also the gap associated with the methodology of the studies. Commenting on this issue, Angrave et al. (2016) notice that the current research guided by the hyper – positivist ontological framework doesn't address the complexity of real-world open systems and suggest that critical realism is more likely to yield valuable insights. Marler and Boudreau (2016) also point out that future research needs greater precision and more unifying frameworks and propose that frameworks such as LAMP could be used to obtain a better understanding of HR Analytics phenomenon.

In general, it can be noticed that the research gap related to HR Analytics is very wide and couldn't be addressed in one study. Thus, for the purpose of this thesis, I will direct my

research effort towards the following research problem in line with my academic interests and the reasoning provided above:

"There is a need to better understand the HR Analytics phenomenon, its enablers, moderators, elements and outcomes resulting from the use of the practice."

Hence, this thesis based on the philosophical underpinnings of critical realism aims to extend the understanding of HR Analytics phenomenon. To this end, the study utilizes the framework that combines several aspects pertaining to the phenomenon – elements of HR Analytics practice, its enablers, moderators and outcomes to obtain a coherent picture regarding the HR Analytics application within the organizational context.

1.3. Research objective and questions

Against the background and the research problem described in previous sections, the objective of this thesis is to elevate and amplify the knowledge related to HR Analytics phenomenon. In particular, the thesis aims to explore enablers, moderators, and outcomes resulting from the use of the HR Analytics practice within the organizational contexts of three case companies. Thus, the main research question can be formulated as follows:

Q: How is HR Analytics applied within an organizational context?

The main research question is supported by the following sub-questions aimed at guiding the study towards the objective:

Q1: What are the technological and human enablers of HR Analytics practice in the case companies?

Q2: What are the positive and negative moderating factors affecting the application of HR Analytics in the case companies?

Q3: What elements of HR Analytics practice do the case companies utilize?

Q4: What are the outcomes resulting from the use of HR Analytics in the case companies?

The first sub-question aims to identify prerequisites of HR Analytics – human and technological enablers of the practice. The second sub-question is targeted at identifying moderating factors that affect the application of HR Analytics and moderating effect, positive

and negative, that they provide. The third sub-question focuses on the elements of HR Analytics that the case companies use. Finally, the forth sub-question seeks to determine outcomes resulting from the use of HR Analytics practice.

Within my study, I generally refer to the literature on HR Analytics in the context of strategic human resource management. Based on this, I develop the frame of reference, which synthesizes the resource-based view and contingency theory of SHRM and key aspects pertaining to HR Analytics practice. I then apply this framework to gather and analyze the information received from the three case companies and present the research findings.

1.4. Methodology

Within this thesis, I follow the reasoning of critical realism and conduct qualitative research. In particular, I use the case study as the main research method. The multiple-case design serves to elucidate the phenomenon of HR Analytics in the context of three case companies. The case companies, considered within the study, are represented by the large international corporations since such companies according to Strohmeier (2007) tend to apply information technology in the HR context more intensively. The case companies are operating in the different industries, which contributes to the diversity of study. The methodological chapter of the thesis provides more detailed information on the case study research design utilized within my work.

The semi-structured interviews are used as a technique for primary data collection in this thesis. In addition, I utilize several sources of existing empirical data. Some of the secondary data in the form of PowerPoint presentations and PDF documents were obtained directly from the case companies. Other secondary data was collected through the open sources, e.g. annual reports, registration documents, web pages. Collecting data from multiple sources, I was aiming at gaining a more profound understanding of HR Analytics phenomenon in line with the propositions of Eriksson & Kovalainen (2015).

The study follows the deductive research strategy: it starts from the theoretical framework and then proceeds to the empirical data. Considering learning from the academic literature, I first examine each case separately utilizing data from relevant sources. After that, guided by

the theoretical framework, I conduct cross-case analysis, identify pattern across the cases and summarize my findings. Finally, I use those findings to respond to my research question.

1.5. Key definitions

This section presents the key definitions used in the thesis work.

HR Analytics

Since HR Analytics is a new research topic, there is a lot of definitional ambiguity at the moment (Marler & Boudreau, 2016). For the purposes of this thesis I adopt the definition developed by Marler and Boudreau (2016) characterizing HR Analytics as *"a HR practice enabled by information technology that uses descriptive, visual, and statistical analyses of data related to HR processes, human capital, organizational performance, and external economic benchmarks to establish business impact and enable data-driven decision-making."* In addition, I use the term "People Analytics" as a synonym to "HR Analytics" since this term is also often used to label the phenomenon in the academic and professional literature (Marler & Boudreau, 2016).

Strategic Human Resource Management (SHRM)

This study adopts the definition of SHRM developed by Wright and McMahan (1992). According to them, SHRM represents *"the pattern of planned human resource deployments and activities intended to enable an organization to achieve its goals"*.

Human Resource Management (HRM)

This study adopts the definition of Boselie et al. (2005), who on the basis of their extensive literature review, have defined HRM as *"a set of employee management activities"*.

HR function

According to Schuler (1995), the HR function is defined as *"a set of activities, practices, roles, responsibilities, and structures in an organization concerned with HR management that may be carried out by any and all employees both managers and non-managers"*.

Human Capital

Huselid, Jackson, and Schuler (1997) have defined the firm's human capital as *"employees' collective knowledge, skills, and abilities"*.

1.6. Structure of the study

This thesis consists of five chapters. The introductory chapter is followed by the review of the existing literature on SHRM and HR Analytics. In particular, it begins with a discussion of the major theories of strategic HRM and their potential contribution to understanding the HR Analytics phenomenon and elucidating the strategic value of the practice. The literature review chapter also provides a summary of academic works pertaining to the key aspects of HR Analytics with regard to the research problem under study. The chapter concludes with the theoretical frame of reference guiding data analysis and discussion of the research results.

The third chapter deals with methodological aspects of the thesis, including the philosophical assumptions behind the study, the research design, the data collection, and analysis process. Within the methodological chapter, the cases are also briefly presented and described and the evaluation and ethical concerns related to the study are considered. The selected case examples are discussed in chapter four. This information is based on the interviews conducted with the representatives of case companies as well as on secondary data sources. Considering the theoretical framework, the empirical findings for each case are summarized for discussion. The final chapter covers the analysis of the results and presents further discussions. It also addresses the limitations of the study and provides recommendations for future research.

2. LITERATURE REVIEW

This part of the thesis is devoted to an examination of the existing literature relevant to my area of research. In the first two sections of the literature review, I explore the foundations on which HR Analytics research is based. According to Marler & Boudreau (2016) academic studies on HR Analytics are deeply rooted in the SHRM research, and in particular – the resource-based view. Proceeding from this proposition, I examine the dominant theories of SHRM and their relevance to the HR Analytics research. Looking into the HRM-performance relationship, I also explore the basic assumptions behind the strategic HRM and their connection to HR Analytics studies.

The second part of the review focuses on the phenomenon of HR Analytics. Following the research question, I first delineate the concept of HR Analytics and explore the elements that constitute the practice. I then briefly review the theoretical frameworks that the scholars (Levenson, 2011; Marler & Boudreau, 2016) suggest being useful for the HR Analytics research. The frameworks are presented for the reference purposes and in support of my reasoning for the customized framework. In the next sections, I explore the enablers, outcomes and moderating factors of HR Analytics practice. In the final part of the review, I summarize different aspects pertaining to HR Analytics phenomenon discovered through the academic literature and present the theoretical framework, guiding the empirical part of the study.

2.1. SHRM as the foundation of HR Analytics research

2.1.1. Perspectives and theories behind SHRM research and the role of context

Organizations do not do anything – people within them do. Strategic Human Resource Management has emerged in response to the need to integrate people aspect into the strategic management process. Wright and McMahan (1992) defined SHRM as "*the pattern of planned human resource deployments and activities intended to enable an organization to achieve its goals*". As it follows from the definition, the new discipline linked strategy and HRM and bundled separate HR practices emphasizing their interdependence (Wright & McMahan, 1992).

Despite being a relatively new research domain, strategic HRM has evolved quite rapidly generating a variety of theoretical perspectives on the subject matter. Yet, according to the Delery & Doty (1996) SHRM research draws on the three major modes of theorizing: universalistic, contingency and configurational perspectives. Universalistic or "best practice" approach implies that certain HR practices are always better than others (Delery & Doty, 1996) and, thus, will have the same effect in different contexts and in respect to different types of employees (Clinton & Guest, 2013). Contingency perspective suggests that HR practices should be chosen based on the context within which they are applied (Clinton & Guest, 2013). Finally, researchers adhering to the configurational perspective posit that companies shall adopt a unique set of HR practices aligned with organizational characteristics and consistent with each other (Delery & Doty, 1996).

Three major theoretical paradigms have come to dominate SHRM research within the perspectives described above – the resource-based view (RBV) of the firm, AMO model and contingency theory (Boselie et al., 2005). The RBV has become the most widely used theoretical lens within the SHRM literature guiding theory building and empirical research (Wright et al., 2001). The theory emphasizes the connection between strategy and company's internal resources (Wright & McMahan, 1992). In the foundation of the RBV lie the definitions of competitive advantage and sustained competitive advantage: the RBV posits that in order to provide sustained competitive advantage the firm's resource should be rare, valuable, imperfectly imitable and non-substitutable (Barney, 1991) and, thus, firm can't purchase sustained competitive advantage from the other firms (Wright & McMahan, 1992). Even though the RBV is broadly applied within the SHRM research, the researchers do not always agree on where the source of competitive advantage resides. While some of the academics suggest that the source of sustained competitive advantage lies in HR practices (e.g. Lado & Wilson, 1994), others notice that HR practices can be copied and, thus, the source of competitive advantage resides in human and social capital (e.g. Boselie et al., 2005; Wright et al., 1994). The RBV theory has been criticized for the limitations regarding the development and application of the firm's valuable resource. Addressing these limitations, researchers have extended the RBV with dynamic capability theory, which accounts for

organization's capacity to achieve congruence with the business environment by developing and deploying its resources (Leiblein, 2011).

AMO model suggests that employee performance is a function of three major components: ability, motivation, opportunity to perform (Boselie et al., 2005). Hence, HR systems that aim to maximize employee performance should focus on these three elements to enhance employee skills, motivation and opportunity to contribute (Jiang et al., 2012). Lepak et al. (2006) proposed to classify all HR practices in line with AMO into skill-enhancing, motivation-enhancing, and opportunity-enhancing. Drawing upon this proposition Jiang et al. (2012) conducted a study in which they found out that all three types of practices have positive effects on a firm's financial outcomes, both direct and indirect – by enhancing human capital and employee motivation. Contingency theory in line with the corresponding theoretical perspective calls for internal and external fit (Boxall & Purcell, 2011). External fit implies that the choice of HR practices should be aligned with competitive strategy, while internal fit suggests that the practices should fit either strategic priorities, HC decisions or the organizational culture and related matters (Clinton & Guest, 2013).

Boselie et al. (2005) propose that the three theoretical paradigms – the RBV, AMO, and contingency theory – which are often used together, could offer a complimentary frameworks as AMO could serve as a theory for HRM, the RBV emphasizes the value of employee contribution to organizational performance and contingency theory could link them together and underline the importance of external contextual factors. These theories could also serve as a solid ground for research in HR Analytics. According to Marler and Boudreau (2016), the majority of the studies in the HR Analytics field to this point were based on the RBV, which underlies popular theoretical frameworks such as LAMP and the HR Scorecard. In line with the provisions of the RBV Marler and Boudreau (2016) suggest that HR Analytics could be associated with and result in improved performance and competitive advantage under the condition that it is "unique and value producing". AMO model is also sometimes prescribed as a theoretical lens for HR Analytics practice and research (Levenson, 2011; Marler and Boudreau, 2016). The contextual factors addressed within the contingency theory thus far haven't received much attention in the HR Analytics literature, however, their

importance cannot be denied. Although contextual aspects are missing from the HR Analytics studies, some insights on the matter could be gained from the adjacent field of research in e-HRM. Strohmeier (2007) points out that the organizational, sectoral and cultural and (inter-) national contextual factors influence the application of e-HRM. He notices that firm size and the state of conventional HRM affect the scope and intensity of the information technology application in the HR context. This could similarly be true for HR Analytics as many empirical studies in the field focus on the large-sized companies (e.g. DiBernardino, 2011; Falletta, 2014; Levenson, 2011).

The Moneyball phenomenon (Lewis, 2004) described in the introductory chapter could also serve as a good example that underscores the impact of external and internal contextual factors on adoption and application of HR Analytics practice. The sabermetrics approach pioneered by Billy Beane emerged in response to external pressures – the need to compete with notably richer teams – and brought success to Oakland A's because it allowed Beane to exploit an inefficiency in the baseball labor market, i.e. player's ability to get on base had been highly undervalued (Wolfe et al., 2006). The internal factors such as resistance to change also played an important role in the Oakland A's sabermetrics adoption as the lack of acceptance initially almost ruined Billy Beane's analytics initiative. Moneyball example could be also viewed through the RBV and AMO lenses. According to Wolfe et al. (2006), Oakland Athletics managed to achieve competitive advantage through sabermetrics because they attracted highly skilled and able players at lower than market cost. In addition, the team management provided players with relevant motivation and opportunities to perform. Yet, the time has shown that Beane's sabermetrics approach, which was valuable and rare at the time of introduction, turned out to be imitable and, thus, the Oakland A's didn't manage to sustain its competitive advantage over time (Hiltzik, 2009; Wolfe et al., 2006). However, the advent of the sabermetrics has changed the baseball game for good: it is no longer a question of whether to implement sabermetrics, but how, and the same trend spreads over the business analytics field at large (Forbs, 2015). All in all, the Moneyball example elucidates how the dominant theories of SHRM described in this section could shed the light on the phenomenon of HR Analytics and contribute to the better understanding of the practice. Besides, it underscores the potential strategic value of HR Analytics as a practice.

2.1.2. HRM and organizational performance

The major focus area within the theoretical perspectives described in the previous section has been the relationship between HRM and organizational performance (Paauwe, 2009). According to Boselie et al. (2005), HRM is commonly understood as "a set of employee management activities", however, there is no consensus on what these activities should be. While some researchers view HRM as a collection of discrete HR practices (e.g. Guest & Hoque, 1994), other bundle HR practices together and study them as a system (e.g. Huselid, 1995; Koch & McGrath, 1996). Yet, there are still no theoretical grounds on which those practices should be bundled, as no accepted classification exists that would distinguish between mandatory and optional HR practices (Boselie et al., 2005).

The empirical studies aimed at exploring the link between HRM and performance started to appear in 1994-1995 (e.g. Arthur, 1994; MacDuffie, 1995). Yet, after the publication of the research by Huselid (1995), in which he demonstrated a positive correlation between High Performance Work Practices (constituted of recruitment and selection procedures, incentive reward system, performance management system and employee involvement and training) and corporate financial performance, HRM – performance relationship came into the limelight. The years of research have brought some understanding of the relationship; however, its nature is yet to be unlocked (Paauwe, 2009). While researchers like Combs et al. (2006) confidently report that an increase in use of HPWP leads to the corresponding increase in the organizational performance, other scholars conclude that HR practices and firm's performance are only weakly (Wright & Gardner, 2003) or circumstantially (Wall & Wood, 2005) related and that "… the existing evidence for a relationship between HRM and performance should be treated with caution" (Wall & Wood, 2005).

The research exploring the link between HRM and performance is problematic in a way that it is difficult to isolate the impact of HR practices on firm's outcomes given the multiple factors affecting the firm's performance at any point in time (Becker, B. et al, 2001). There is also a variety of outcomes that can result from HR activities. Dyer and Reeves (1995) define the major of them as:

- HR outcomes (e.g. absenteeism, turnover, individual or group performance);

- Organizational outcomes (e.g. productivity, quality, and service);
- Financial or accounting outcomes (e.g. ROI, return on assets).

Financial outcomes are present in many studies on HRM – performance relationship and are sometimes treated as the only measures worth considering, yet, the distance between them and HR practices seems to be too large and subject to the other business influences (Boselie et al., 2005). The situation is aggravated by the time lag problem inherent to a plethora of studies on the topic: the studies are designed in such a way that HR practices are measured after the performance period and, thus, predict past instead of future performance (Wright & Haggerty, 2005).

Through the literature review, Boselie et al. (2005) have identified a number of hidden assumptions underlying HRM – performance research. Figure 1 presents general causality commonly found in the academic literature on the topic.
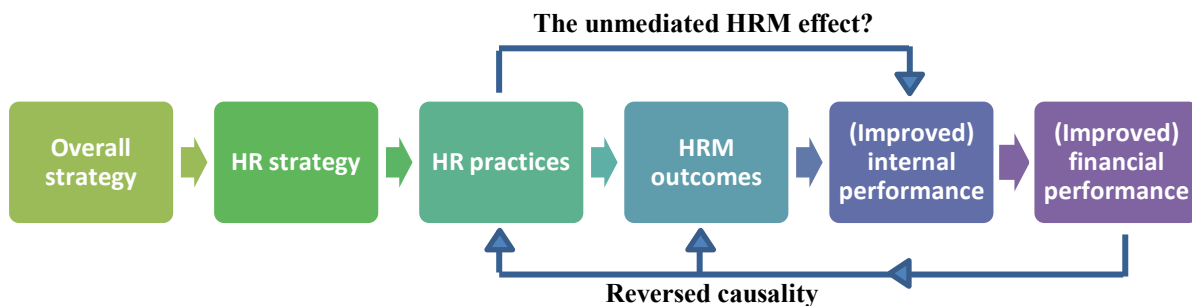
Figure 1. The standard causal model for the relationship between HRM and Performance. Source: Boselie et al. (2005)

Within the model presented in Figure 1, two causalities need to be pointed out in relation to HR Analytics research: strategy-HRM and HRM-performance. One of the major assumptions behind the SHRM research is that the HRM is developed in response to strategic objectives and follows downstream from the organizational strategy (Boselie et al., 2005). This assumption doesn't necessarily hold true as HR function may have its strategic input, and if it does hold this could be a matter of concern for a company as according to the Lawler et al. (2004) business strategies based on the incorrect expectations regarding people are set to fail. Another major assumption behind the SHRM studies is that HR practices affect organizational performance through some mediating mechanisms (Jiang et al., 2013). This

mediating mechanisms or processes have been long overlooked in the SHRM literature, and the lack of understanding of the mediating variables between HRM and performance became known as the "black box" problem (Jiang et al., 2013). Yet, recently numerous studies have emerged in an effort to explain how this mediation unfolds. The common assumption behind these studies is that HR practices produce outcomes in a form of desirable employees' attitudes and behaviors that lead to a better internal and, consequently, financial performance (Boselie et al., 2005; Jackson et al., 1989). Yet, from the perspective of the RBV, the mediator between HR practices and performance is the level of human capital (McMahan et al., 1999; Wright & McMahan, 1992), and from the perspective of AMO – consequently, employee ability, motivation and opportunity to perform (Jiang et al., 2012). However, with a plethora of theoretical perspectives and empirical studies, the "black box" dilemma remains unresolved (Jiang et al., 2013). Boselie et al. (2005) also point out the possibility of HRM to affect organizational outcomes directly, for instance, by removing job-related obstacles.

Even though the HR Analytics research is based on the SHRM studies, majority of HR Analytics scholars challenge the assumption that HRM follows the strategic objectives, and argue instead that HR function can and should drive business strategy (e.g. Coco et al, 2011; DiBernardino, 2011; Lawler et al., 2004; Mondore et al., 2011). Within these studies, HR Analytics practice is seen as a means to bring a people aspect to important business decisions and strategy. Rasmussen & Ulrich (2015) claim that HR Analytics has the potential to bridge management research and practice. Advancing this statement, Angrave et al. (2016) notice that HR Analytics could be the only way to shed the light on the "black box" of SHRM and, thus, understand the nature of the HRM – performance relationship. They state that if researchers manage to better engage with companies and work with firms' own data, they would be able to establish more convincing causal links without the need to organize expensive data collection within the longitudinal studies which "black box" research calls for (Jiang et al., 2013). Hence, such an approach could also help to overcome time lag problem and track the effects that HR systems produce over time.

Overall, the HR Analytics research constitutes an integral part of the larger SHRM research field, and the theories of strategic HRM could contribute to elucidating the phenomenon of

HR Analytics. In the meantime, HR Analytics could be used as a means to verify and validate the assumptions behind the SHRM research and understand the HRM-performance relationship. From the practical side, in line with the RBV, HR Analytics could be seen as both – a source of competitive advantage and a means to create competitive advantage from the people.

2.2. HR Analytics

2.2.1. What is HR Analytics?

In this section, I would like to present the discussion regarding the conceptualization of HR Analytics. I start by examining how the term originated and then move to reviewing the approaches that researchers take towards defining the phenomenon. Next, I examine several definitions of HR Analytics that appeared in the high-quality publications as well as the aggregate definition of the term presented by Marler and Boudreau (2016) and explicate the choice of the definition used within this thesis.

Even though HR Analytics emerged as a "hot topic" just recently, the phenomenon is not that new, as HR scorecards, HR ROI and different metrics have been around for a long time (Rasmussen & Ulrich, 2015). In fact, it has been acknowledged that people tried to introduce measurements to HR already in the beginning of the 20th century (Marler & Boudreau, 2016). In 1978 Jac Fitz-Enz, Human Resource Analytics evangelist, in his article "The Measurement Imperative" first argued that HR professionals had to join "the numbers game" in order to play on the same field with the executives, and to learn how to measure personnel's value and effectiveness quantitatively. The notion was perceived as revolutionary at that time and raised serious doubts and disagreement (Bassi, 2011). Yet, forty years later, HR Analytics is finally enjoying its moment of glory as 71% of companies report that they consider HR analytics as their high priority goal according to the Deloitte's Global Human Capital Trends 2017 report.

Having gained recognition from the professionals, HR Analytics is also drawing an increasing interest from the academia; however, research on the topic is still quite scarce. For the time being, Marler and Boudreau (2016) within their extensive literature review on HR

Analytics managed to identify only 16 peer-reviewed articles devoted to the subject matter in the publications that were on the Journal Quality list. The nascent nature of research is also reflected in abundance of labels assigned to the phenomenon such as "Talent Analytics", "Workforce Analytics", "People Analytics" and etc. (Marler & Boudreau, 2016). The term "HR Analytics" first appeared in HR literature only in 2003-2004 (Marler & Boudreau, 2016) and since then has been interpreted in a variety of ways (Bassi, 2011), which has resulted in the definitional ambiguity. Yet, the evolution of academic or professional discussion on the topic calls for the common understanding of the subject matter. It is essential to have the common terminology (discourse) as the definition of the term affects the direction of the research and target audience (Bondarouk & Ruël, 2009). Many academics and consultants acknowledge that HR Analytics is a broad term which cannot be boiled down to a set of HR Metrics (e.g. Falletta, 2014; Bassi, 2011; Lawler et al.,2004), *"measures of key HR outcomes"* (Marler & Boudreau, 2016). However, very few authors of the high-profile articles clearly explicate what they mean by HR Analytics.

While some of the researches (e.g. Angrave et al., 2016; Pape, 2016) exploring the topic refer to a general definition of business analytics without specifically relating it to HR, which is understandable, taking into account that HR Analytics represents one of the subject-field domains within the larger business analytics realm (Holsapple et al., 2014), others prefer not to touch upon the terminology at all (e.g. DiBernardino, 2011; Rasmussen & Ulrich, 2015). On the contrary, authors like Bassi (2011) have been trying to bring clarity into the HR Analytics discussion by presenting their versions of the term definition. For instance, according to Bassi (2011), HR Analytics is "*evidence-based approach for making better decisions on the people side of the business; it consists of an array of tools and technologies, ranging from simple reporting of HR metrics all the way up to predictive modeling*". The important characteristics of HR Analytics that follow from this description are that the phenomenon is concerned with data-based decision-making on HR matters, is enabled by information technology and involves utilization of a wide range of tools – from collecting HR metrics to exploiting predictive modeling. It also emphasizes that HR Analytics relates not only to the analysis of past performance but also to forecasting future. However, the definition is limited in a way that it doesn't address the strategic nature of the phenomenon.

Conversely, the definitions provided by the authors like Lawler et al. (2004) and Mondare et al. (2011) focus mainly on the strategic role of HR Analytics omitting the other aspects of the concept.

Contributing to this discussion Falletta (2014) has introduced the concept of HR Intelligence – *"a proactive and systematic process for gathering, analyzing, communicating and using insightful HR research and analytics results to help organizations achieve their strategic objectives"*. According to him, the principal difference between the HR Analytics and the HR Intelligence consists in that the latter is based on empirical and theoretical research (Falletta, 2014). Falletta's definition presents HR Analytics as a process and underscores the connection between the phenomenon and the strategic goals of the company

Addressing the terminology problem Marler and Boudreau (2016), based on their extensive literature review, have introduced the definition of HR Analytics that combines various aspects pertaining to the phenomenon as described by different researchers mentioned above. Thus, according to Marler and Boudreau (2016), HR Analytics is:

"A HR practice enabled by information technology that uses descriptive, visual, and statistical analyses of data related to HR processes, human capital, organizational performance, and external economic benchmarks to establish business impact and enable data-driven decision-making."

The aggregate definition states that the HR Analytics is about supporting HR-related decisions. Yet, it also emphasizes the strategic role of the practice that allows connecting people-related decision-making to business outcomes. In addition, it shows that the analysis takes place within a broader context as it combines HR and non-HR data from the various internal and external sources. Finally, it illuminates the role of information technology as an enabler of the practice. Despite providing a multi-faceted description of the phenomenon, the definition of Marler and Boudreau (2016) doesn't embrace the aspect specified by the Bassi (2011) regarding multi-level nature of the analysis dealing with past and future.

It is important to notice that the discussion on the conceptualization of HR Analytics taking place today is not limited to the 16 articles mentioned earlier as there are also numerous white

papers, blog posts, and books on the topic which also generate different definitions of HR Analytics. Yet, for the purpose of this thesis I focus mainly on the academic research and adopt the definition presented by Marler and Boudreau (2016) as, in my view, it provides a clearer understanding of what the HR Analytics essentially is by capturing the most important aspects pertaining to the phenomenon. As the research on the HR Analytics will evolve, it can be expected that the definition of the term will transform along the way.

2.2.2. Enablers of HR Analytics: IT technology and people behind the practice

This section explores the technological and human enablers of HR Analytics. At the beginning of the section, I examine IT technology behind the practice, i.e. systems and applications that companies use to perform HR Analytics tasks. After that, I proceed to explore people aspect of the practice – individuals and teams responsible for HR analytics research and analysis.

According to the definition, adopted within this thesis, HR Analytics is *"a HR practice enabled by information technology…"* (Marler & Boudreau, 2016). Thus, IT technology is a crucial part of HR Analytics. Interestingly, the academic articles on the topic with a rare exception, tend to omit the technological aspect of the practice, and the ones that cover it usually refer to broad categories such as Human Resource Information Systems (Angrave et al., 2016), Human Capital Management solutions (Aral et al., 2012) or Business Intelligence systems (Pape, 2016). There is a variety of perspectives on what these systems correspond to. For instance, Aral et al. (2012) suggest that HCM is a part of ERP system aiming to provide executives, HR professionals and line managers with information needed for workforce support and HR Analytics. From the perspective of Dulebohn & Johnson (2013), HRIS refers to various technologies by means of which companies capture, store and use data in support of HR function and covers small spreadsheet based employee files as well as integrated HR solutions within large multi-million dollar ERP systems. Aral et al. (2012) notice that even though enterprise systems, such as HCM, constitute a large part of IT investments, there is a paucity of empirical evidence regarding the productivity and performance implications of these investments.

According to the recent survey by Sierra-Cedar (2017), no single software package yet exists that would cover all the functionality needed to perform HR Analytics, and the majority of companies, 98% of survey participants, still use Microsoft Excel to perform HR Analytics tasks. Based on the same survey, within the HR Analytics practice, the systems like HRIS are usually seen as data sources and not as tools to perform the analysis. This goes in line with the reasoning of Angrave et al. (2016) stating that even though HRIS software packages tend to include analytics modules, their toolset doesn't allow performing the sort of analysis that organizations need.

Organizations may use several systems or solutions for their HR practices. The Sierra-Cedar's report (2017), for instance, differentiate among three major HR systems/ applications that organizations typically use and that are not necessarily integrated – Human Resource Management System (including e.g. payroll, benefits administration), Workforce Management Application (solution for optimal human resource allocation) and Talent Management Application (solution for attracting, developing and retaining talent). Availability of various HR systems and analytical tools within one organization results in a number of implications for HR Analytics practice, which are considered within the next sections of the thesis.

The people side of the HR Analytics is perhaps as understudied as its technological side: very few academic publications consider people and teams behind the practice. The research conducted by Falletta (2014) indicates that three-quarters of 220 Fortune 1000 and global companies participating in the study stated that they have an individual or function dedicated to HR Analytics. The study also suggests that majority of surveyed companies – 62 percent – have five or fewer people on the HR Analytics team, yet, these results may be understated as HR professionals tend to be embedded through organizations and other functions may take part in the analysis of HR data as well. Little is known about people that constitute the HR Analytics teams, although some studies touch upon their skillset (e.g. Levenson, 2011) and background (e.g. Fink, 2010). A lot of emphasis within the HR Analytics literature is put on HR professionals and their analytical skillset in the context of low HR Analytics adoption rates and uncertain outcomes resulting from the practice (e.g. Angrave et al., 2016; Bassi,

2011, Levenson, 2011, Rasmussen & Ulrich, 2015). Yet, those studies do not contribute to the understanding of the people side of the practice in the companies that currently utilize HR Analytics.

Davenport et al. (2010) propose that companies choose from five major models to organize their analytics teams depending on organizational goals and stage of analytics maturity. According to them, the *decentralized model*, when analysts reside in different functions and business units, and the *functional model*, when analysts are located in the functions that perform major analytical tasks, e.g. marketing or finance, are more suitable for less analytically mature organizations. At the same time, the *centralized model* with analysts residing in one central group, the *center of excellence* model, when analysts are located in units but their actions are coordinated from the center, and the *consulting* model with analysts working in the central group and charging other units for their services are better suited for organizations with developed analytics capabilities (Davenport et al., 2010). The projection of Rasmussen & Ulrich (2015) that HR Analytics will eventually become part of cross-functional analytics goes in line with the proposition of Davenport et al. (2010). Levenson (2005), on the other hand, advocates the development of HR Analytics center of expertise where technical experts drive statistical work while their stakeholders in HR ensure the interpretation of the analysis results and subsequent actions. Falletta's (2014) research suggests that HR Analytics teams tend to be strategically positioned in terms of organizational structure, meaning that they usually report directly to Chief Human Resource Officers. Yet, the empirical findings that would shed a light on how companies organize individuals and team to perform HR Analytics tasks and what kind of employees constitute those teams are missing. All in all, the academic literature is short on the information related to IT technology and individuals and teams behind the HR Analytics practice.

2.2.3. Moderating factors affecting HR Analytics practice

In this section, I discuss factors that have a moderating effect on the adoption and development of HR Analytics. Building on the literature review, I combine these factors into the three groups – **skills, knowledge, and attitudes of HR professionals, technological and**

organizational. I describe each group in detail and provide reasoning for selecting this particular categorization for HR Analytics moderators.

Several groups of factors affecting the adoption of HR Analytics were identified in the academic literature on the topic. The first group deals with the aspects pertaining to **skills, knowledge, and attitudes of HR professionals.** Thus far, the progress in the application of HR Analytics has been negatively moderated by:

- Lack of clear business focus among chief human resource officers (e.g. Rasmussen & Ulrich, 2015);

- Lack of analytical skills and mindset among HR professionals (e.g. Angrave et al., 2016; Bassi, 2011; Giuffrida, 2014; Lawler et al., 2004; Levenson, 2011; Rasmussen & Ulrich, 2015);

- Lack of ability to gain managerial buy-in and sell results of the analysis among HR professionals (e.g. Coco et al., 2011; Levenson, 2011; Rasmussen & Ulrich, 2015);

- HR function's focus on its own performance in the application of HR Analytics (e.g. Harris et al., 2011);

- HR function's application of analytics for validation of existing knowledge in practice (e.g. Rasmussen & Ulrich, 2015).

Lack of statistical skills, knowledge, and insight to perform analysis on HR data is among the most frequently mentioned reasons that prevent wider adoption of HR Analytics. In his study Levenson (2011) identified the list of the analytical competencies needed to perform HR Analytics and explored diffusion of those competencies among the analytics and general HR professional groups. The results of his work suggest that majority of HR professionals outside of analytics group lack skills to perform even basic analytics tasks such as conducting root-cause analysis or calculating univariate statistics (means, percentiles, etc.) and professionals who work with HR Analytics lack skills to conduct more advanced, multivariate analytics tasks (Levenson, 2011).

Another group of moderating factors discovered through the literature review can be characterized as **technological factors**. Here again one can find a lot of examples of negative moderation attributed to:

- Availability of a wide array of analytical and statistical techniques and tools to choose from (e.g. Levenson, 2011);

- Lack of right metrics and analytical models, use of wrong models (e.g. Harris et al., 2011; Lawler et al., 2004);

- Not knowing what types of data the company is collecting (e.g. Coco et al., 2011);

- Dealing with incompatible or redundant systems housing data (e.g. Coco et al., 2011);

- Data quality issues (e.g. Coco et al., 2011);

- Limited functionality of HRIS (Angrave et al., 2016; Douthitt & Mondore, 2014).

Angrave et al. (2016) and Douthitt & Mondore (2014) point out that the limitations of HRIS are largely stipulated by the drawbacks of the analytics industry. Angrave et al. (2016) notice that HRIS that organizations usually buy from the large IT companies such as Oracle or IBM are focused on operational reporting and transfer generic best practices. Due to this HR function produces the same old reports from the same old data with the same low impact (Douthitt & Mondore, 2014). Yet, the majority of the technological factors listed above are not unique to HR Analytics but pertinent to the business analytics field at large. Among the other aspects that affect development of analytics in general and HR Analytics in particular are **organizational factors** which are presented in HR Analytics literature also in a form of negative moderators such as silos (Angrave et al., 2016; Coco et al., 2011), overall skepticism towards the practice (Douthitt & Mondore, 2014) and time and budget constraints (Falletta, 2014; Levenson, 2011).

DiBernardino (2011), focusing on establishing a link between HC investments and financial results, brings up an important issue related to HC and accounting – he argues that HR Analytics is difficult to apply because of the way HC assets are dispersed through the general ledger. Addressing this problem earlier, Becker et al. (2001) have noticed that contemporary accounting systems create a danger of information distortion as they reflect intangibles very poorly. This distortion leads to controversial analytics and poor decisions on people matters, ultimately, resulting in treating employees as expenditures to be minimized (Becker et al., 2001). Yet, in spite of the mentioned issues, it seems unlikely that the established accounting practices will change in the near or medium-term future and, thus, no positive moderation is

expected to come from the accounting side. In contrast to this, the three types of moderators presented earlier could also affect the adoption of HR Analytics in a positive way. In the end, HR Analytics is only possible because there are professionals who are overseeing and/or implementing the practice, technology that enables it and organizational context within which the practice is applied. However, the state of HR Analytics literature is such that the current focus is mainly on the hindering effects of the moderators.

It is important to notice that the academic literature, in the majority of cases, only touches upon the moderators of HR Analytics practice but doesn't explicitly acknowledge them. The only study that recognizes and classifies the factors that affect the adoption of HR Analytics is the literature review conducted by Marler & Boudreau (2016). The authors of the review identify the following moderators of HR Analytics success: availability of analytical skills among HR professionals, the capability to gain managerial buy-in and availability of HR information technology (Marler & Boudreau, 2016). Yet, within the thesis, I utilize my own categorization of HR Analytics moderators presented in this section. One of the reasons for doing so is that the academic literature contains more factors attributed to HR professionals, which affect the application of HR Analytics, than analytical skills and ability to gain managerial buy-in. Another reason is that the literature review has revealed that the organizational factors that Marler & Boudreau (2016) do not take into consideration could also have an impact on adoption and development of HR Analytics practice.

2.2.4. Elements of HR Analytics practice, maturity stages, and theoretical frameworks

Many researchers agree that HR Analytics goes beyond the metrics (Marler & Boudreau, 2016). This section sheds the light on the various elements constituting the practice. In addition, the change in the application of these elements within the organizational context over time, i.e. HR Analytics maturity process, and the resulting value are considered. The section also provides an overview of the major theoretical models, identified through the literature review, that establish guidelines for adoption of HR Analytics practice.

As it was mentioned in the previous section, very few studies provide a clear definition of HR Analytics. Yet, even fewer publications touch upon the elements that comprise the HR Analytics practice. Levenson (2011), for instance, states that listing all the available statistical

and analytical techniques would be "overkill". Thus, instead of doing so, he provides a general categorization of statistical techniques and their examples (e.g. basic multivariate models – ANOVA, regression, factor analysis). However, he doesn't link the given categories to the HR context. Fink (2010) within her interview study of 22 leading organizations and half-dozen thought leaders has identified the following HR Analytics elements that the participating organizations commonly used: surveys, regression, Structural Equation Modeling (SEM), discrete choice analysis, financial modeling, descriptive statistics (metrics), qualitative analysis, ethnographic method. She notices though that the qualitative studies are commonly used to support quantitative analysis and that the valuable business insight is usually derived through "linking multiple data sources and mining for patterns across data sets" (Fink, 2010) and not through the use of sophisticated statistical techniques. Some researchers present information on the application of the particular analytical techniques within the context of their case studies (e.g. Coco et al., 2011, Douthitt & Mondore, 2014) contributing to the understanding of the value that these techniques could bring when applied to HR context.

In the meantime, the study by Falletta (2014) provides the most comprehensive list of HR Analytics elements identified through the literature. The elements of HR Analytics practice in Table 1 are listed in the order of importance established through the rating of 220 companies participating in the study (Falletta, 2014). Falletta's (2014) research results suggest that employee and organizational surveys are considered to be the most costly and the third most time-consuming HR Analytics initiative and that from the whole list of 18 initiatives, the more advanced analytical techniques from operations research and management science field are currently perceived as least important for HR strategy and decision making. Taking into account emerging nature of HR Analytics praxis and research, Falletta's list of HR Analytics elements cannot be considered exhaustive, yet, I will rely on this list for the purpose of my study.

As any other practice, HR Analytics evolves over time following the certain path towards the maturity (Harris et al., 2011). Organizations usually start their HR Analytics journey by reporting what happened in the past utilizing more simple HR Analytics elements, then move

to predicting the future using more advanced analytical techniques and finally progress towards prescribing potential decision alternatives by the means of sophisticated statistical methods (Harris et al., 2011).

#	HR Analytics Element	#	HR Analytics Element
1	Employee and organizational surveys	10	Labor market, talent pool, and site/location identification research
2	Employee/ talent profiling	11	Talent supply chain
3	HR metrics and indicators	12	Advance organizational behavior research and modeling
4	Partnership or outsourced research	13	Selection research
5	HR scorecards and dashboards	14	Return-on-investment studies
6	Workforce forecasting	15	Qualitative research methods
7	Ad hoc HRIS data mining and analysis	16	360 degree or multi-rater feedback
8	HR benchmarking	17	Literature review
9	Training and HR program evaluation	18	Operations research and management science

Table 1. Importance rating of HR Analytics elements. Modified from Falletta (2014).

This journey is not unique to HR Analytics but pertinent to the analytics field at large. Figure 2 presents enablers and outcomes of business analysis at different levels of analytics maturity.

Fitz-Enz & Mattox (2014) have described the organization's journey towards HR Analytics maturity in more detail. According to them, when companies start to use **descriptive HR Analytics**, it provides them with the information about past and present performance enabling costs reduction and improvement of organizational processes. Examples of descriptive HR Analytics include traditional HR Metrics such as the cost of hire or turnover rate as well as HR dashboards, scorecards, periodic reports and etc. (Fitz-Enz & Mattox,

2014). When organizations move towards **predictive HR Analytics**, they start to utilize more sophisticated statistical techniques such as data mining and modeling in order to foresee possible futures.
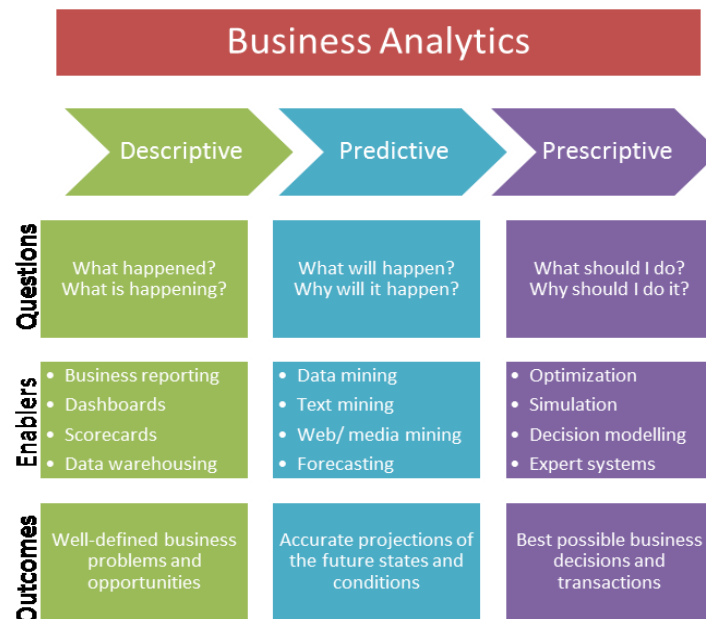
Figure 2. A simple taxonomy of business analytics. Source: Delen & Demirkan (2013)

One of the examples of predictive analytics application in the HR context could be building decision support model for identifying the most appropriate candidates for hiring, training, and promotion. Finally, moving towards **prescriptive HR Analytics** companies start to rely on even more sophisticated data analysis to obtain different decision alternatives and evaluate different business impacts (Fitz-Enz & Mattox, 2014).

The common assumption behind HR Analytics maturity path is that the value of the analysis increases along with its statistical sophistication. Yet, Levenson (2011) argues that this notion doesn't necessarily hold true as the adoption of more advanced statistical techniques sometimes doesn't bring any additional value and the results of Fink's (2010) research provide support for this argument. Contributing to this conversation Rasmussen & Ulrich (2015) notice that companies too often follow the technical path and dive into the data without defining business challenges that they are aiming to tackle with HR Analytics. As the result, a lot of effort and time are wasted on performing the analysis that doesn't yield

substantial benefits for a company and HR Analytics, at large, delivers far less value than it potentially could (Rasmussen & Ulrich, 2015). Adherence to one of the theoretical frameworks described within this section represents a potential solution to this problem holding a great promise for companies of avoiding the pitfalls in HR Analytics implementation, gaining more valuable business insights, enhancing the role of HR Analytics in decision-making on people issues and broadening general application of the practice (Levenson, 2011).

As it was mentioned in the introductory part of the thesis, there is still lack of knowledge regarding the praxis of HR Analytics, i.e. regarding how and why particular elements of HR Analytics practice are applied within organizational context and what kind of impact they make on HR strategy, decision-making and execution (Angrave et al., 2016; Falletta, 2014; CIPD, 2017). Yet, theoretical frameworks guiding the process of adoption and development of HR Analytics are in abundance (e.g. Boudreau & Ramstad, 2007; Fitz-Enz, 2010; Mondore et al., 2011). Majority of those frameworks are deeply rooted in SHRM research and, thus, are targeted at connecting HRM with organizational outcomes and HR/ corporate strategy (Marler & Boudreau, 2016).

According to Marler & Boudreau (2016), academic literature on HR Analytics most frequently prescribes either some version of LAMP model (Boudreau & Ramstad, 2007) presented in Figure 3 or multi-step process based on HR Scorecard (Becker et al., 2001) to guide HR Analytics adoption. LAMP is an acronym for logic, analytics, measures, and processes, which represent the most important components of a measurement system (Boudreau & Ramstad, 2007). As specified in the model, analysis and measures should be driven by a certain logic, i.e. HR Analytics should be targeted at answering particular business questions and development of measures shouldn't depend on the standard reports available in HRIS (Boudreau & Ramstad, 2007). Another component of the model – analytics - drawing upon statistics and research design should help with establishing causal relationships between metrics and transforming HR data into valuable business insights (Boudreau, 2006). Metrics, covered in detail within the next section, should provide an operational and strategic outlook of human resources.
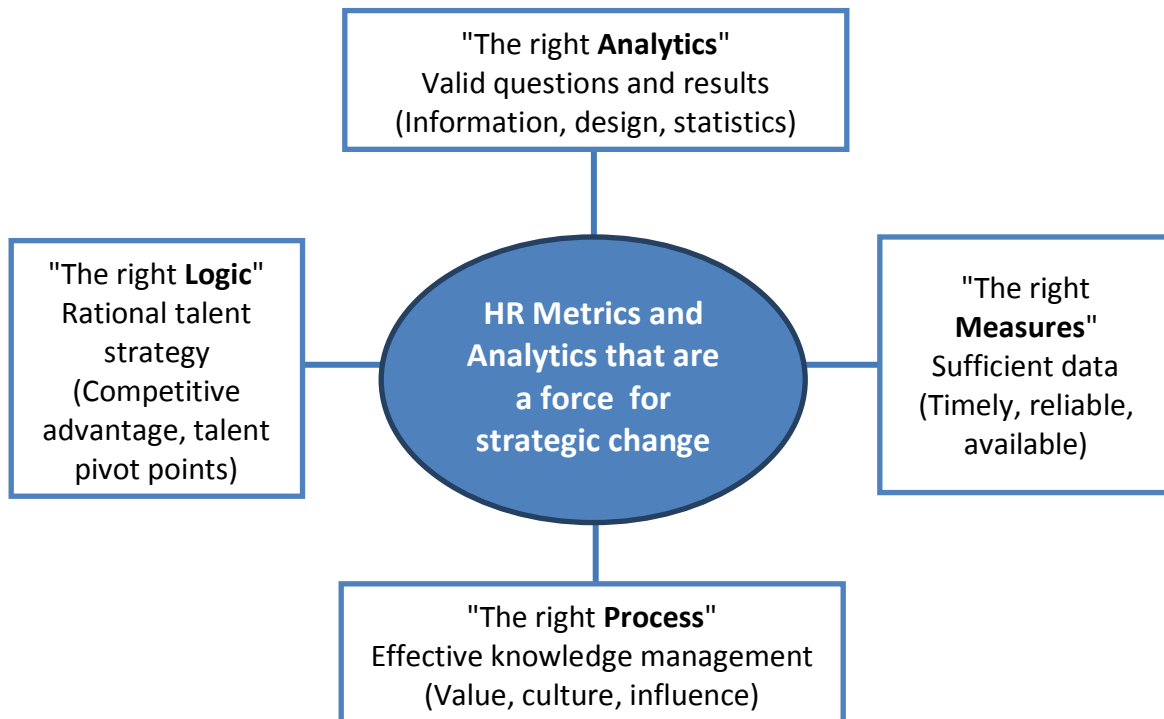
Figure 3. LAMP model. Source: Boudreau & Ramstad (2007)

Finally, the model suggests that HR Analytics shall constitute a part of a change management process and affect organizational outcomes through the impact on the decisions and behaviors of people in the organizations (Boudreau, 2006). Boudreau & Ramstad (2007) stress that all the components of the model should be in balance without over-emphasizing any of them in order to obtain more fruitful results from the adoption of HR Analytics.

Some studies also rely on the HR Scorecard in establishing guidelines for the HR Analytics adoption process (e.g. Coco et al., 2011; Douthitt & Mondore, 2014; Mondore et al., 2011). Consistent with the Falletta's (2014) findings, Lawler & Boudreau (2015) report that HR Scorecard developed by Becker et al. (2001) is one of the most commonly used analytics elements among HR professionals. Development of HR Scorecard represents a complex multi-stage process starting from clarification of a business strategy and establishing a case for why and how HR can support that strategy and ending with designing the strategic measurement system and implementing new approach towards HRM relying on that system (Becker et al., 2001). The resulting HR Scorecard is expected to comprise a unique set of leading, lagging, cost control and value measures relevant to the company's case and aimed

at supporting a company in managing HR as a strategic asset and showing HR's contribution to the organization's financial success (Becker et al., 2001). Other models suggested to aid companies in HR Analytics implementation include AMO, labor markets and organization design models (Levenson, 2011).

Marler & Boudreau (2016) suggest that the reviewed theoretical models could also serve as the thinking tools for understanding the HR Analytics phenomenon. For instance, according to them, the LAMP model could be used to elucidate the relationship between the elements of HR Analytics and changes in decisions. Yet, this thesis relies on the customized framework since none of the given models addresses the objective of the study.

2.2.5. HR Metrics – measurement conundrum

In this section, I am taking a closer look at HR Metrics. HR Metrics represents an initial step on the HR Analytics maturity path and have been around for a long time. For many companies HR Metrics is still the major element of People Analytics practice and, thus, it deserves a closer examination. Hence, within the section, I explore various types of metrics available to the organizations, challenges in metrics application and potential solutions.

As it follows from the previous section, HR Metrics constitutes an important part of HR Analytics. HR literature contains numerous suggestions on what and how should be measured. Yet, too often HR Metrics is generated from the data that is easily available (Rasmussen & Ulrich, 2015) and focuses on benefits and tasks of HR function instead of demonstrating the connection between HR activities and business outcomes (Boudreau & Ramstad, 2002). As the result, people agenda doesn't receive sufficient attention from the top management. Opting for an easy way in metrics application is however understandable taking into account availability of standardized reports within HRIS (Angrave et al., 2016) and excess of different measures to choose from, e.g. the library of Center for Talent Reporting contains over 600 measures (CTR, 2017).

Boudreau & Ramstad (2002) suggest that organizations can collect and utilize three major types of metrics – **efficiency**, **effectiveness,** and **impact** – and that by making use of all three types of measures companies could gain a clear operational and strategic outlook on their

human resources. The first type of metrics deals with the **efficiency** of the HR function and includes various cost and productivity measures (e.g. cost-per-hire, time-to-fill). These measures establish the link between HR practices and accounting results and are relatively easy to calculate and benchmark. Although playing an important role in decision making regarding HR issues, efficiency measures are limited in that they do not consider the quality and effects of HR practices (Lawler et al., 2004). While companies focusing on such metrics may achieve short-term cost savings or productivity gains, they can fail to consider long-term losses resulting from such approach that may significantly outweigh immediate benefits (Boudreau & Ramstad, 2002).

The second type of metrics focuses on measuring **effectiveness**: these measures are aimed at providing information on whether or not particular HR practices result in the desired outcomes - e.g. whether the training provided to employees resulted in the development of required skills or not (Lawler et al., 2004). According to Boudreau & Ramstad (2002), effectiveness metrics also include HR activity and "best practice" indexes such as human capital benchmarks. Yet, Dulebohn & Johnson (2013) suggest treating human capital benchmarks as distinct metrics type. The final set of metrics is concerned with building "causal chains" between HR practices or employee characteristics and business processes or results (Boudreau & Ramstad, 2002). **Impact metrics** is aimed to demonstrate how HR activities affect company's ability to gain and maintain competitive advantage (Lawler et al., 2004) and is represented by complex models – e.g. model linking employee attitude to service behavior to customer satisfaction to revenue (Boudreau & Ramstad, 2002). The research conducted by Lawler & Boudreau (2015) suggests that the impact metrics is still used very rarely, while effectiveness metrics is growing in popularity and efficiency metrics remains the most widely applied. The results of the study also indicate that HR measurements are seldom directed to the vital talent segments where decisions are most important.

Lawler & Boudreau (2015) also notice that the use of metrics significantly varies by HR process which could be attributed to historical factors, the feasibility of measures for different processes and decision models used. The metrics collections/libraries of established bodies for HR professionals such as CTR, SHRM, and CIPD, aimed at helping companies in their

metrics application, consider this factor by dividing metrics not only by type but also by process as shown in Figure 4.
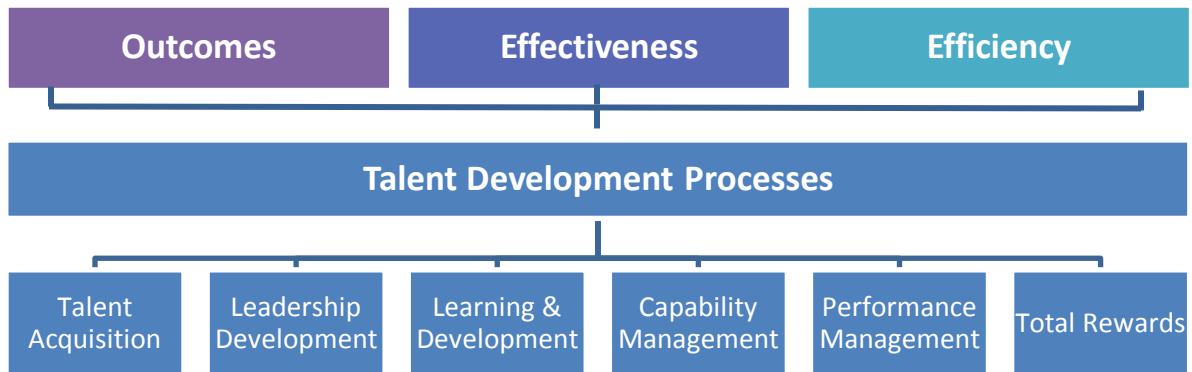
Figure 4. Classification of key HR measures. Modified from Center for Talent Reporting (2017)

Yet, with a more comprehensive categorization, the HR Metrics is still hard to apply, as the number of measures available for each process remains large. For instance, according to CTR talent acquisition process could be described by over a 100 efficiency, effectiveness and outcome measures across six subcategories – requisitions, applicants and interviews, hiring activity, hiring cost, hiring process, quality of hire (CTR, 2017).

Among all the HR measurements, the financial metrics, and in particular ROI, is the one subject to the most controversy. The advocates of such metrics argue that there is a need to provide a link between people and financial results because it can help managers to make more informed investment decisions on people matters and because failure to do so can translate into a huge opportunity cost (e.g. DiBernardino, 2011; Fitz-Enz, 2000). Their opponents, however, notice that financial metrics is rather crude and sensitive to assumptions that underlie it (CIPD, 2017). Reflecting on ROI, Levenson (2005) notices that ROI is too general as it combines benefits and costs to generate one number that doesn't reflect the complexity of the processes that it aims to describe. Through this ROI calculations omit the information that may be essential for decision-making while consuming significant resources (Levenson, 2005). Contributing to this conversation Rasmussen & Ulrich (2015) state that

even though measures such as ROI (for instance, ROI of training programs) have been around for a long time, the value that they add to business decisions is considered rather low.

Overall, with over 600 measures to choose from across several metrics types and HR processes and with the controversy surrounding the use of certain measures, the application of HR Metrics remains a challenge. According to Bassi et al. (2015), this challenge could be resolved by introducing HR metrics and reporting standards similar to Generally Accepted Accounting Principles that would guide companies in their metrics applications and allow evaluating important outcomes pertaining to human capital. Yet, the business community has been steadily opposing the idea of HR Metrics standardization claiming that metrics generation would require a lot of resources while its value remains low (CIPD, 2017). From a company's perspective, it is more valuable to adopt tailored metrics aligned with company-specific goals which may lead an organization towards sustainable strategic success (Boudreau & Ramstad, 2007). Yet, generating such metrics is not an easy task, as it requires developing complex approaches to HRM embracing metrics as its integral part (Becker et al., 2001). However, adoption of the theoretical frameworks, e.g. HR Scorecard or LAMP, presented within the previous section, could potentially guide companies towards the more meaningful application of HR Metrics and Analytics.

2.2.6. Outcomes and consequences of HR Analytics

Having touched upon the promises of HR Analytics within the other sections, I find it important to explore them now in more detail in order to better understand why the companies decide to engage in HR Analytics and make sizable investments into the development of the practice. Within this section, I consider three major business perspectives – **HR, financial and organizational** – on the positive outcomes resulting from the adoption of HR Analytics that I have identified through the literature review. In addition, I examine the present rate of HR Analytics adoption in relation to the outcomes described in the section. Finally, I discuss potential negative consequences – data-privacy and ethical concerns and potential abuses – stemming from the use of HR Analytics practice.

As Bassi (2011) notices, the major aim of HR Analytics is to improve individual and organizational performance, yet, there are many perspectives on how this improvement could

be realized. One of the major perspectives identified in the literature review is **the HR perspective**. From the HR standpoint, HR Analytics holds a great promise for the organizations and for HR function, in particular, as it possibly can:

- Elevate strategic role of HR, help HR become a true strategic partner (e.g. Bassi, 2011; DiBernardino, 2011; Harris et al., 2011; Lawler et al., 2004; Mondore et al., 2011);
- Demonstrate the value that HR programs add to a business enterprise (e.g. DiBernardino, 2011; Douthitt & Mondore, 2014; Lawler et al., 2004);
- Replace fads with evidence-based initiatives (e.g. Rasmussen & Ulrich, 2015);
- Improve the effectiveness of HR policies and practices (e.g. Bassi, 2011);
- Reduce HR workloads (e.g. Bassi, 2011);
- Supplement HR intuition with objectivity (e.g. Rasmussen & Ulrich, 2015).

While some of the potential outcomes of adopting HR Analytics listed above are widely acknowledged and straightforward, others are subject to controversy. Bassi (2011), for instance, claims that using HR Analytics to show the value of HR function is misguided, i.e. it is a misuse of analytics that doesn't create any long-lasting value for a firm. Yet, her statement that HR Analytics can reduce HR workload is also controversial – for example, Falletta (2014) within his study has found that HR Analytics initiatives themselves can be very time and effort consuming.

Another major perspective on the positive outcomes resulting from the adoption of HR Analytics is **the financial perspective**, primarily advocated by the researchers involved in consulting projects. According to them, HR Analytics could potentially benefit the companies through the improvements related to HR and HC investments, notably by:

- Establishing a connection between investments in HC and the company's return on financial capital (e.g. Harris et al., 2011);
- Redirecting HR investments from the initiatives that do not work to the ones that do (e.g. Bassi, 2011; DiBernardino, 2011; Mondore et al., 2011);

- Prioritizing investments – identifying those that will result in the most tangible outcomes (e.g. Mondore et al., 2011; Rasmussen & Ulrich, 2015);

- Tracking performance of HC investments over time (e.g. DiBernardino, 2011);

- Predicting the future impact of HR investments (e.g. Douthitt & Mondore, 2014).

However, the evidence supporting the possibility of such improvements remains slim as there are currently just few case studies that demonstrate the impact of HR Analytics practice on the HR and HC investments (e.g. DiBernardino, 2011; Douthitt & Mondore, 2014). In addition, as it was explained earlier in the section devoted to HR metrics, the use of accounting measures such as ROI in the HR context is, in many ways, problematic (Levenson, 2005).

From a wider **organizational perspective**, HR Analytics is endowed with a great strategic potential. For example, Bassi (2011) argues that HR Analytics could be a source of competitive advantage for companies that could learn to harness its power and the Moneyball example presented in the introduction to this thesis provides support for Bassi's argument. Contributing to this discussion, Coco et al. (2011) notice that HR Analytics can help to drive business strategy and Harris et al. (2011) acknowledge that the practice could allow deriving valuable business insights. The case study presented by Coco et al. (2011) demonstrates how HR Analytics is used to establish a link between HR processes, employee engagement, and performance in the retail chain of home improvement stores. Aral et al. (2012) in their study show how the interplay between Performance Pay, HR Analytics and IT (HCM software) can lead to productivity and profitability gains. Harris et al. (2011) also provide several examples linking HR practices to business outcomes by the means of analytics. Yet, in spite of these and few other studies, the empirical evidence supporting the alleged benefits resulting from the adoption of HR Analytics practice is still limited (Rasmussen & Ulrich, 2015). In addition, those studies that do provide the evidence of HR Analytics' value tend to focus on the certain successful projects (e.g. Coco et al., 2011; Rasmussen & Ulrich, 2015) rather than on the general application of the practice by the companies.

All in all, the adoption of HR Analytics can potentially result in various positive outcomes such as improved HR and HC investments, productivity and profitability gains and

transformation of HR into more strategically-oriented and data-driven function. With so many benefits to offer, HR Analytics has an irrefutable potential to contribute to the competitive advantage of the companies skilled in practice (Bassi, 2011). Yet, thus far, the adoption of HR Analytics has been limited as only 16% of companies report using the practice (Marler & Boudreau, 2016). In his study of 220 large (primarily Fortune 1000) firms, Falletta (2014) has found that HR Analytics plays a key role in HR strategy only for less than 15% of companies. Hence, there is a long way to go before HR Analytics could become a "must have" capability for companies and realize its strategic potential.

In the meantime, development of HR Analytics also raises concerns regarding possible negative consequences resulting from the use of the practice. Among the most common ones are data privacy (Falletta, 2014; Rasmussen & Ulrich, 2015) and ethical (Angrave et al., 2016; Bassi, 2011; Rasmussen & Ulrich, 2015) concerns. Discussing ethical challenges, Falletta (2014) notices that HR professionals have difficulties making the difference between law and ethics and often organize data collection and analytics practices based on their own values and professional code of conduct, which results in adoption of questionable practices such as, for instance, making HC decisions based on an applicant's hometown.

Another big concern is that HR Analytics can be misused to drive certain agenda and maintain status quo (Falletta, 2014; Rasmussen & Ulrich, 2015). As Rasmussen & Ulrich (2015) put it: when someone has a story to tell, he or she searches for the data to support that story. The outcome resulting from such an approach could be, for example, ignoring or hiding the HR Analytics findings regarding initiatives that do not work or have detrimental effects (Rasmussen & Ulrich, 2015).

Yet, the greatest concern stems from the inability of HR professionals to harness the power of the analytics. Lack of analytical skills and knowledge within HR function, emphasized earlier, may lead to transferring of HR Analytics tasks to the other functions, which can, ultimately, result in deeper embedding of financial, engineering and IT perspectives on people matters in the organizations (Angrave et al., 2016; Bassi, 2011). Angrave et al. (2016) predict that under such circumstances the quality of work life and well-being of the employees will deteriorate without delivering competitive advantage to the companies and

support their projection with the example from the US retail industry. On the contrary, Rasmussen & Ulrich (2015) see the transfer of HR Analytics tasks to the other function as a positive and inevitable step in HR Analytics development. They argue that analytics can only delivery truly new business insights when multiple perspectives from different fields (e.g. HR, customers, technology) are combined and that with such approach HR professionals are more likely to assume the strategic role (Rasmussen & Ulrich, 2015). Yet, only time will tell whose projections were more accurate.

2.3. Summary and theoretical framework

The purpose of this study is to elevate and amplify the understanding of HR Analytics phenomenon based on the application of HR Analytics practice within the case companies. In addition, the thesis seeks to explore how the different aspects pertaining to HR Analytics are connected to each other and, through this, obtain a bigger picture of HR Analytics application within the organizational context. In order to do so, the sub-questions were formed that aim at discovering valuable insight regarding the use of HR Analytics, its enablers and moderating factors that affect the application of the practice. Based on the literature review, the theoretical frame of reference for this study was developed. The frame of reference is presented in Figure 5 below.
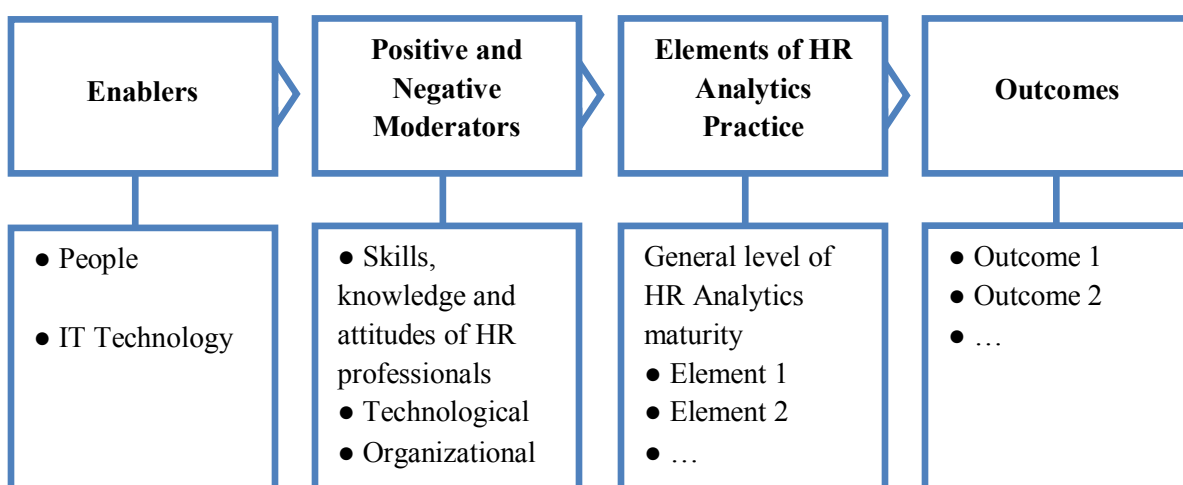

Figure 5. Theoretical frame of reference

Enablers of HR Analytics practice

According to the literature review, individuals and teams and IT technology are crucial enablers of HR Analytics. IT systems and tools define how companies can capture, store and utilize data for HR purposes. People use these systems and tools to analyze and interpret the data. The way teams are organized to perform analytical tasks tend to correspond to the general level of HR Analytics maturity.

Positive and Negative Moderators

The availability of information technology and people able to perform analytical tasks within the organization are important prerequisites for HR Analytics. Yet, it is particular aspects pertaining to people, technology, and context that can affect the application of HR Analytics in the negative or positive way. Three major types of moderating factors have been identified through the academic literature on the topic – skills, knowledge, and attitudes of HR professionals, technological and organizational. Thus far, the moderating factors have been scattered across the academic literature and have never been studied as a group.

Elements of HR Analytics practice

As it was established through the literature review, HR Analytics practice consists of a variety of elements. The elements of HR Analytics practice that the companies utilize in their analytics pursuits correspond to the general level of their HR Analytics maturity. The choice of elements and their application are assumed to be affected by the positive and negative moderators of HR Analytics practice.

Outcomes of HR Analytics practice

According to the academic literature on HR Analytics, there is a variety of potential outcomes that can result from the use of the practice. In line with the basic assumptions behind SHRM, discussed within the literature review, HR Analytics as any other HR practice can affect organizational outcomes through the HRM outcomes or directly. This is not reflected in the framework in order to avoid excessive complexity. Within the framework, the outcomes are considered against the elements of HR Analytics practice utilized by organizations. Potential negative consequences resulting from the use of HR Analytics have been discarded from the

frame of reference as a collection of data on such a sensitive topic requires special interview setting and is beyond the scope of the study.

3. METHODOLOGY

In this chapter, I present the methodological aspects pertaining to my study. The chapter is structured as follows: first, I restate my research question and remind the reader about the importance of my study. Second, I elucidate the philosophical underpinnings of the study and justify my decision to utilize the case study research design. After that, I describe the case selection procedure related to my multiple-case study approach and explain in detail the data collection method utilized within my research. Subsequently, I present my plan for the data analysis, including explanation and justification for utilizing deductive analytic strategy and cross-case analytic technique. Finally, I outline the research evaluation criteria that I followed throughout my study and address ethical aspects related to my research.

3.1. Importance of the Study and Philosophical Background

Within the present study, I am aiming to answer the research question: *How is HR Analytics applied within an organizational context?* The following sub-questions assist in guiding the study towards the objective:

Q1: What are the technological and human enablers of HR Analytics practice in the case companies?

Q2: What are the positive and negative moderating factors affecting the application of HR Analytics in the case companies?

Q3: What elements of HR Analytics practice do the case companies utilize?

Q4: What are the outcomes resulting from the use of HR Analytics in the case companies?

As it was pointed out earlier in the introduction to my thesis, there are multiple reasons why HR Analytics is an important phenomenon to study. In this section, I would like to address the matter of importance once again. Personally, I am very interested in business analytics and its application to the HR context. Thus, through the study, I aim to elevate my knowledge of HR Analytics and explore how and for what purposes the companies apply different HR Analytics elements within the organizational context. From an academic perspective, it is important to amplify the scant knowledge related to the HR Analytics phenomenon and bridge the research gap identified through the literature review. For the practitioners, HR and

other business professionals, the research could add value by alleviating decision-making regarding adoption of HR Analytics. Concrete examples of HR Analytics applications, evaluation of the outcomes and moderating factors accompanying the practice could contribute to a better understanding of the HR Analytics phenomenon by the practitioners.

Regarding the philosophical aspects of the study, I think that the objective of my research could be better addressed through the onto-epistemological lens of a critical realism, which is in line with the suggestion of Angrave et al. (2016). Together with the advocates of critical realism, I believe that "there is a reality independent of our thinking that science can study" (Farquhar, 2012). Yet, I also believe that "our knowledge of reality is a result of social conditioning" (Farquhar, 2012). Thus, in order to understand a social phenomenon I need to think critically, be self-reflective and aware of presuppositions and assumptions of various perspectives (Dobson, 2001). Farquhar (2012) notices that critical realism reasoning is beneficial for the case study research method that I follow as it allows for flexibility in the research approach and the flexibility is of great importance when dealing with such complex phenomenon as HR Analytics.

3.2. Research Design and Context

Based on the philosophical underpinnings of my research, I can posit that my study is of a qualitative kind. As research on the HR Analytics is still in its infancy, there is an apparent need to explore the phenomenon with the qualitative methods to obtain a bigger picture of the practice. My research question was initially stated broadly with the intention to narrow it down during the research process. As my study evolved and I decided to pursue a case study research strategy, I followed the advice of Eriksson & Kovalainen (2015) suggesting that the final research question should be formulated in a dialogue with empirical data. After collecting the initial evidence, I formulated several sub-questions to focus my research effort. The case companies that I consider within the study are represented by the large international organizations. This circumstance is stipulated by the fact that these companies are currently more likely to adopt and develop their HR Analytics capabilities than the other companies. The case companies also operate in the different industries. As I am aiming to study HR Analytics phenomenon in relation to its context, I believe that the diversity of industries

presented in the study enriches the research and makes it more robust. Yet, taking into account the limited application of HR Analytics practice in general, I consider the case companies to be the innovators in the HRM field whose HR Analytics pursuits could be of great academic and professional interest in spite of their size and industry.

As was mentioned earlier, in my research I follow the case study research design. According to Yin (2009), this design is especially suitable for the situations when a researcher wants to understand a complex social phenomenon. Farquhar (2012) also points out that the case study is particularly useful for descriptive, explanatory and exploratory research. Since the phenomenon of HR Analytics is rather difficult to comprehend and there is a paucity of research on the topic, I believe that following the case study design is the most suitable way to explore the practice. In addition, HR Analytics represents a contemporary phenomenon, which I explore within its context – I collect evidence about the HR Analytics where it is actually taking place, i.e. within the organizations – and this, according to Farquhar (2012) and Yin (2009), can also serve as a reason to apply the case study research method. What is more, as I intend to produce a detailed knowledge related to the HR Analytics phenomenon while having no control over the behaviors and events relevant to it, Eriksson & Kovalainen (2015) and Yin (2009) suggest the case study to be the most suitable research design in such circumstances. Finally, as mentioned earlier, the case study research method is consistent with the philosophical underpinnings of my study.

There are different ways in which the case study research could be carried out. Eriksson & Kovalainen (2015) point out that the nature of the research question is crucial in defining the way to perform a study. According to Yin (2009) a case study can be done either with single-case or with multiple-case design, each of which can have either one or several units of analysis. Following similar logic, Stoecker (1991) suggests two types of case study research – intensive and extensive. According to him, an intensive case study is aimed at obtaining a holistic description of one or few cases and an extensive case study tends to focus on identifying common patterns across the several cases (Stoecker, 1991). Guided by my research question, I decided to pursue multiple-case design. Yin (2009) notices that such design usually allows to obtain more compelling evidence and, thus, the study on whole could

be more robust. Applying categorization of Stoecker (1991), I conduct an extensive case study with three cases as I am interested not only in exploring the application of HR Analytics in a particular case company but also in identifying differences and similarities in the practice application stemming from the diverse contexts of the case companies.

3.3. Case Selection, Description and Data Collection

In order to identify the appropriate cases for my study, I approached several companies during the professional events organized at Aalto University and outside of it. Since the adoption of HR Analytics is still very limited, the key criterion for a case company selection was the state of application of the HR Analytics within an organization. Thus, in line with the proposition of Farquhar (2012), the case selection was purposive. After having discussed the topic of my study with a few HR professionals during exploratory interviews and conducted an initial literature review, I concentrated my research effort on the large international companies as they appeared to be more likely to adopt and develop HR Analytics practice at the moment (Strohmeier, 2007). Finally, I identified and secured access to the three case companies that had already achieved certain progress in HR Analytics adoption and were in the process of developing the practice. In my choice of cases, I was following the suggestion of Yin (2009) who proposed that the researcher should select the cases based on how likely they are to elucidate the research question. Eriksson & Kovalainen (2015) notice that there is no rule regarding the minimum number of cases to be selected for a particular multiple-case study research project and that suitable number of cases should be defined in accordance with the purposes of study and the research question. Within my thesis, I am aiming at addressing the research problem related to the phenomenon and praxis of HR Analytics identified through the literature review and feel that the number and types of cases that I have selected comply well with this purpose.

Within my study, I am focusing on three companies that are currently at different stages of their HR Analytics journey. The case company 1 is one of the world leading industrial companies providing technical products and services. The organization's headcount exceeds 140 000 employees spread across more than a 100 countries. The company has explored the descriptive HR Analytics realm and is currently moving towards predictive analytics. The

case company 2, one of the leading service companies in Finland, has the headcount of approximately 5000 primarily local employees. The company is using prescriptive analytics within the HR domain along with descriptive and predictive analytics. The case company 3 is a leading industrial company focusing mainly on technical services and solutions. Yet, it also has a technical product portfolio. The organization's headcount exceeds 12 000 employees spread across 33 countries. The company is just beginning its HR Analytics journey by exploring the basics of descriptive analytics. A more detailed description of case companies is presented in Table 2.

	Case Company 1	**Case Company 2**	**Case Company 3**
General Description	Industrial company; Operates worldwide (100+ countries); Manufactures and sells technical products and provides technical services; #1 and 2 market player in its key product and service segments worldwide.	Service company; Operates primarily in Finland; Provides transportation services; #1 market player in its key segments in Finland.	Industrial company; Operates worldwide (33 countries); Provides technical services, manufactures and sells technical products; #1, 2 and 3 market player in its key product and service segments worldwide.
Current Situation	Organic growth and growth through acquisitions; Challenging a competitive environment; Focus on cost optimization.	Organic growth; Very fierce competitive environment, low margins, high capital expenditures; Focus on the development of new offerings.	Slow organic growth; Challenging a competitive environment; Focus on the development of new offerings.
Characteristics of Workforce	Approx. 140 000 employees; International workforce – 40% from new economies; General composition: blue-collar – 50%, white-collar – 50%; Gender composition: 70% men, 30% women.	Approx. 5 000 employees; The workforce is primarily from Finland; General composition: customer service – 49%, white-collar – 14%, technical staff – 20%, other – 17%; Gender composition: 44% men, 56% women.	Approx. 12 000 employees; International workforce – 40% from Finland; General composition: blue-collar – 30%, white-collar – 70%; Gender composition: 80% men, 20% women.
Level of HR Analytics Maturity	Descriptive Analytics	Descriptive, Predictive & Prescriptive Analytics	Descriptive Analytics

Table 2. Description of case companies

I believe that having companies at different stages of HR Analytics development contributes to the robustness of the study.

Company	Job Title	Interview Length, minutes	Items
Exploratory Interviews			
4	HR People Partner	30	N/A
5	Global HR Concept Owner	40	N/A
Case Interviews			
1	HR Business Analyst VP HR, Finland & Baltics	50	HR Analytics overview at case company 1 (PowerPoint document) HR KPI Glossary (PDF document) 2014 Registration Document (PDF document) 2016 Annual Report (PDF document) 2017 Annual Report (PDF document) 2016 None-Financial Results (PDF document)
2	VP, Wellbeing & Analytics	50	HR Analytics and Customer Experience (PowerPoint document) 2016 Annual Report (PDF document) 2017 Annual Report (PDF document)
3	Manager, HR Reporting	60	2017 HR KPIs – overview and results (PDF document) 2016 Annual Report (PDF document) 2017 Annual Report (PDF document)

Table 3. Interviews and items

According to Farquhar (2012), the empirical data used to address the research question can be collected from primary and secondary sources. Eriksson & Kovalainen (2015) point out that the researcher can choose to collect data from one or combination of sources. Primary data is a new data produced by a researcher specifically for the research project in question (Saunders et al., 2007). The sources of the primary data include interviews, observations, and surveys (Farquhar, 2012). Secondary data is existing empirical data represented by annual reports, agendas, media text articles (Eriksson & Kovalainen, 2015), just to name a few.

Within my thesis, I used semi-structured interviews as the technique for primary data collection, in line with the suggestion of Farquhar (2012). I also developed the interview guideline to support the data collection process. The interviews were conducted either face to face at the case company premises or by the telephone to adjust to the busy schedule of the informants. One interview was conducted with each case company with one or two informants present at every interview. Since HR Analytics is a relatively new phenomenon, there are very few people directly responsible for the practice in the companies at present. In such circumstances, it was reasonable to conduct one interview with a knowledgeable informant per case company. In order to ensure that the informants could provide the data in line with my research objective, I was sending the preliminary interview agenda along with the request to identify the most suitable person to address it to the company representatives with whom I got acquainted during the professional events. The informants included specialists and top managers overseeing HR Analytics development at the case organizations. As all the informants agreed to be recorded, all the interviews were recorded and transcribed.

In addition to the primary data sources, I also utilize sources of existing empirical data. For the purpose of my thesis, I obtained secondary data in the form of PowerPoint presentations and PDF documents (e.g. KPI Glossaries) directly from the companies. Besides, within my analysis, I also utilized data from annual reports, registration documents, web pages and media text articles related to the case companies found in the open sources. Farquhar (2012) notices that in the student research the sources of secondary data are often perceived as inferior to the primary data sources and, for this reason, happen to be undervalued. Yet, the key criterion for choosing a data source should be its relevance to the research question (Farquhar, 2012). Hence, this thesis treats secondary data sources as equally valuable as primary data sources and relies on both types of sources to obtain a better understanding of HR Analytics phenomenon and praxis. Eriksson & Kovalainen (2015) emphasize that the case studies based on the multiple sources of empirical data are usually perceived as more accurate, diverse and rich as the phenomenon is investigated from various perspectives.

With all the data collected from primary and secondary sources, I feel that I have enough material pertaining to the research question. Within the next section, I will explain in detail my approach towards the analysis of the obtained data.

3.4. Data Management and Analysis

In the case study research, the analysis of qualitative data can start very early – almost immediately after data collection (Eriksson & Kovalainen, 2015; Farquhar, 2012). Dubois & Gadde (2002) suggest that the case study research process can be very flexible and include the continuous interplay between reality, theory, evolving case and analytical framework. For my thesis, I started to analyze data right after data collection, which allowed me to gain a new perspective on the theory related to HR Analytics, and theoretical framework that I was planning to apply and amend theoretical framing of my study. Following the proposition of Eriksson & Kovalainen (2015), I began case construction by organizing empirical data related to each case into a case record. In order to manage data effectively, I have applied preplanned systematic coding in line with the suggestion of Farquhar (2012) and Eriksson & Kovalainen (2015). Eriksson & Kovalainen (2015) notice that preplanned coding should be used when research is based on existing theory and attempts to improve it, which is the case of my study. The coding system that I utilize includes several levels. The first level of coding is used to identify the sources of data. The next level is applied to code particular sub-questions. The third level is used to code more specific data – for instance, I use letter codes to identify particular elements of HR Analytics practice that the companies used: "S" – for surveys, "M" – for metrics and etc. As suggested by Farquhar (2012), within this research project the secondary data is analyzed in the same manner as the primary data.

Farquhar (2012) states that the researcher could follow one of the two major analytic strategies – deductive or inductive. According to her, the deductive analysis is concerned with testing the theory in accordance with the predefined theoretical framework. The second strategy relies on the development of a case description from which the research questions and the case study framework shall emerge (Eriksson & Kovalainen, 2015). This study follows a deductive research strategy because it is theory-driven and starts from the theoretical framework and then proceeds to the empirical data. Yin (2009) suggests that

besides the general research strategy five types of analytic research techniques can be used to assist a researcher in the analysis of qualitative data. In my research, I follow the cross-case analysis technique which is suitable for compiling findings across several studies (Eriksson & Kovalainen, 2015). I start my analysis by examining each case separately and then move to the comparison of the cases in order to identify similarities and differences among them. After that, I conduct a thematic analysis and look for connections with the existing theory. I expect that during this phase of analysis I may need to revise some parts of my literature review and theoretical framework that I developed for my study. Finally, I proceed to defining the patterns across the cases and developing the final report. As research on HR Analytics is still at its inception I should be reflective and anticipate that not all the patterns that emerge in the course of the research could be connected to the existing theory.

3.5. Evaluation of the Study and Ethical Concerns

In regard to the research quality evaluation, this study follows the suggestion of Eriksson & Kovalainen (2015) who posit that the evaluation of the research project is a continuous process which should be carried out along with the study. According to them, the basic framework for the evaluation of a business research is formed by the concepts of reliability, validity, and generalizability. Yin (2009) presents these concepts as the four logical tests that can be used to assess the quality of a research design. Testing *construct validity* refers to evaluating the extent to which the study explores what it claims to explore (Farquhar, 2012). According to Yin (2009), construct validity is increased through the use of multiple sources of evidence and the establishment of a chain of evidence. In my research, I use a number of primary and secondary data sources in order to minimize bias. In addition, my study follows the certain logic, presented in this chapter, which demonstrates how my research path goes from the research question towards the conclusions. Another concept – *internal validity* – is only relevant for exploratory and causal studies where a researcher seeks to establish a causal relationship (Yin, 2009). In some way, this concept applies to my study as I am exploring how the elements of HR Analytics practice lead to certain outcomes. Thus, in order to increase internal validity of my study, throughout my analysis I intend to pay special attention to the causal links in order not to miss out any important connections. The third concept –

external validity – defines the extent to which a study's findings can be generalized (Yin, 2009). Yet, a standard (statistical) interpretation of generalizability is not suitable for the case studies where the focus is on studying a phenomenon in context (Farquhar, 2012). Hence, Yin (2009) suggests that a case study should rely on the analytical generalization that connects a particular set of results to a broader theory. Johnston et al. (1999) also notice that multiple settings of a case study research with several cases create better conditions for the generalization than those of a single-case study. Within my research, I intend to link my findings related to HR Analytics to the existing theoretical propositions. Besides, by doing multiple-case study research I can explore whether there are certain similarities in findings across the cases. Finally, the concept of *reliability* refers to the transparency and possibility of replication of the study (Farquhar, 2012). In other words, it is an assessment of whether the study can be repeated with the same results (Yin, 2009). In my study, I outline the major steps of the research and document my research progress by summarizing the existing theory related to the HR Analytics phenomenon, transcribing the interviews and constructing within-case descriptions. In general, this methodological chapter is created with the intention to provide clear guidelines for the future research replications.

Eriksson & Kovalainen (2015) point out that the evaluation criteria used in the qualitative research are highly dependent on the ontological and epistemological underpinnings of a study. They notice that the classic criteria of a good-quality research presented above may not be suitable for the studies relying on the certain philosophical doctrines – for instance, relativism which suggests that there are multiple realities. Yet, as I explore my subject of interest through the lens of a critical realism, my research complies well with the evaluation criteria presented by Yin (2009). Eriksson & Kovalainen (2015) state that validity, as evaluation criteria, is supported by realist and critical realist approaches. Contributing to this discussion, Brewer (2000) notice that validity criteria is suitable for the studies that focus on objective indicators rather than subjective meanings. In line with this logic, the validity concept is applicable to my study as my research explores the objective aspects of the HR Analytics phenomenon.

Regarding the ethical aspects of my study, I agree with Miller et al. (2012) who suggest that the ethical considerations should be present at every stage of the research. Within my research, I follow the ethical guidelines provided by Eriksson & Kovalainen (2015). I ensure that all the informant took part in the research voluntarily. Before conducting the interviews I provided participants with the basic information related to the study such as the purpose of the study, my major points of academic interest, basic procedures and use of data. In addition, while agreeing upon the interview details with informants, I also obtained their consent to record the interviews. Complying with the principles of professional integrity, I open up the logic of my analysis, arguments and reporting through this methodological chapter and make sure that my findings are presented in a comprehensible way. Finally, I pay special attention to acknowledging the work of the other researchers by using direct and indirect citations whenever applicable.

4. EMPIRICAL FINDINGS

4.1. Case Company 1

4.1.1. Context

The case company 1 is one of the world leading organizations in the industrial sector. The organization operates in more than 100 countries and its headcount exceeds 140 000 employees. About 40% of the company's workforce comes from the new economies (Asian, Latin American, Middle Eastern, African and Eastern European countries). The ratio of the blue-collar workers to the white-collar employees in the company is approximately 1:1. In terms of gender composition, the case organization is similar to the other companies operating in the technical sphere where the female talent is scarce: women constitute 30% of the workforce, while men comprise 70% of the employees. The company has a matrix structure and extensively utilizes virtual teams (individuals who work together from the different geographic locations) in its operations.

From the 2000s, the company has been rapidly growing through acquisitions, joint ventures, strategic alliances, and mergers. In addition, the company is also characterized by organic growth. The company has two complementary business models for products and solutions, within which the product business is currently generating slightly more revenues than the solutions. Company's operations are also spread across four major business units. The mega-trends such as digitalization, industrialization, and urbanization are shaping the industries within which the company operates creating significant growth opportunities. The company's present growth is characterized by continuous internationalization, acquisitions, and increase in the number of employees dedicated to selling solutions and services while maintaining the same ratio of blue-collar to white-collar workers. While the company enjoys number one and two market position in businesses which generate the greater part of its revenues, the competitive situation in many of the company's markets remains challenging. Thus, in addition to growth, the organization is focusing on driving efficiency at all levels in order to generate savings from manufacturing and purchasing and keep operational expenses low.

4.1.2. Technological and human enablers of HR Analytics practice

There are several tools in place that the company utilizes for the HR Analytics. The primary tool is Oracle Human Capital Management System TalentLink. The system's module called Oracle Business Intelligence allows the users to retrieve a number of customized reports and visualize certain data in a system. Yet, most of the analysis is still done in the Excel and the results are then transferred to PowerPoint. In addition, the company is currently transitioning to the data presentation and visualization tool Tableau.

Regarding the people side of the practice, there are currently around 50 people in the company dedicated to HR Analytics. Yet, the actual number of people taking part in the practice can be much larger as the employees in the company tend to have dual roles, which is stipulated by the matrix structure of the organization. The practice is overseen globally by the two HR Analytics directors who make the decisions regarding the HR Analytics tools to be used and the metrics to be tracked. Each large business unit in the company also has its own HR Analytics manager. However, HR analysts and HR reporting specialists located within the units usually report to the zone HR Vice Presidents (there are several zones within each unit). Thus, it can be noticed that HR Analytics in the case company lies, to the large extent, within the HR function.

4.1.3. Moderating factors affecting HR Analytics practice

Three groups of factors that affect the application of HR Analytics practice have been identified in the case organization 1. These factors are in line with the theoretical propositions presented within the literature review. The first group of factors is related to **knowledge, skills, and attitudes of HR professionals**. The company representatives have noticed that **the business acumen** is of the key importance to the employees responsible for HR Analytics. The organization has recently launched a special program for HR Business Partners and other key HR leaders aimed at the development of their business acumen, and ability to obtain workforce implications and apply workforce planning method. On a more practical level the business acumen can positively moderate utilization of HR Analytics practice because *"understanding how organization is built, especially in a matrix organizational structure that we have, understanding what each business unit does – this will*

help in consolidating the data, presenting it in a more intuitive way and, basically, in leading the stakeholders (through the results of analysis)." In addition, the interviewees pointed out the significance of **analytical skills and knowledge of tools** as they allow the HR analysts to present the data to the senior stakeholders in a more user-friendly manner.

Regarding **the technological moderators**, the company representatives have identified **data quality** as one of the main hindering factors for the development of the HR Analytics practice at the moment. Poor data quality complicates the application of the HR Analytics because the data has to be validated before it can be published or used for the analysis:

"We circulate Excel sheets, upload them to our cloud and ask the employees in different countries to verify or correct the data for their offices. For example, for the employee engagement survey, we want to remove any potential employees that are leaving the company soon but are still active, from the file, so they don't bring response rate down. This is a good example to show how many people are involved and that work is sometimes complicated."

Another important technological moderator identified in the case company 1 is the **functionality of HRIS**. The interviewees have pointed out that the HR system in use produces generic reports and that in order to do a data analysis, the data from the system needs to be imported to Excel and analyzed there, which complicates the practice.

In regard to **the organizational moderators**, the interview participants have identified **cooperation among different stakeholders** as a source of positive influence and enabling force behind the HR Analytics practice:

"Without close cooperation and good communication flow and alignment with HR business partners and our HR administrators, we wouldn't be able to deliver what we deliver."

4.1.4. Elements and outcomes of HR Analytics practice

According to the interview conducted with the representatives of company 1, the organization's present HR Analytics efforts are focused mainly on **descriptive analytics**. In line with this statement, the elements of HR Analytics practice identified in the case company 1 are as follows:

- Employee and organizational surveys;

- External benchmarks;

- HR metrics and indicators;

- Workforce planning.

The company uses surveys to collect primary data for metrics calculation (e.g. employee satisfaction and engagement survey) and obtain feedback on particular HR initiatives (e.g. training evaluation survey). The organization also utilizes the system of indicators to oversee key HR processes. The company has seven major HR processes in place – health and safety, engagement and talent acquisition, talent and performance management and employee development, workforce planning, diversity management, remuneration, employee relations – and uses from 1 to 7 KPIs for each process. In addition, external benchmarks are used to compare the company's performance in the HR area to that of the other companies in the industry (e.g. Employee Engagement Index benchmark). Finally, a solid workforce planning method is put in place to balance supply and demand of the workforce, segment the workforce and take actions with regard to the specifics of the segments.

Apart from using purely HR-related indicators, the company also combines HR data with financial data to obtain metrics that allows to support managerial decision-making and influence the performance. One of the examples of such measures is sales per headcount. This metric is calculated for every country office and compared across the countries. The company representative explains how such metrics is used in the organizational context:

"If a manager in Finland comes to a head manager, to VP, asking for approval to hire extra person, extra salesman, we can look at result of my analysis – sales per headcount – and see, for example, how much million per year can a salesperson in Finland generate vs. Norway, Sweden, Denmark, company locally. And either the decision to hire an extra person is approved or not. If the sales per headcount are low, then we say: "Well, you should rather increase your sales efficiency than hire an extra person". This is how we keep support function costs low and drive the effectiveness of performance."

In the year 2011, the company created a special team dedicated to workforce planning that started to utilize a thorough workforce planning method aiming at connecting business strategy to major workforce implications and enabling **decision-making and action-**

planning for critical role recruitments, critical competency development, and workforce productivity evolvement. In the year 2014, the organization deployed a new integrated HR information system – Oracle Human Capital Management System TalentLink – allowing improved data management and analytics in the areas of strategic workforce planning and talent management. In addition, the new system connected resources to demand related to learning in different parts of the organization.

Regarding the outcomes of HR Analytics practice in general, the interview participants have stated that the HR Analytics allows the company to obtain **visibility** on its large headcount and **execute people strategy**. The practice enables the organization to **set specific goals** related to its HR processes and **track the progress** towards these goals. Through this the core company values are also supported by real data – for instance, the organization can not only claim that it strives for diversity but is able also to demonstrate with numbers how diverse it is. Another important aspect, mentioned earlier, is that HR Analytics enables the company **to impact the performance**, which leads to cost reductions and higher performance effectiveness.

Although at present the HR Analytics practice of the company is focused mainly on the HR Metrics, in the future the company is planning to move towards the **predictive analytics**. The organization sees the opportunity for practice development in combining qualitative and quantitative data. The company plans to focus its future analytics effort on predicting managers' performance (primarily in terms of leadership), employee performance, employee turnover and attrition.

4.2. Case Company 2

4.2.1. Context

The case company 2 is one of the leading organizations within the Finnish service sector. The company has approximately 5000 employees and, geographically, the majority of its personnel works in Finland. Even though the field within which the company operates is in some respects highly technical, the organization's gender composition is quite balanced – women constitute about 56% of the workforce while men account for 44%. The employment

in the company is characterized by a long-term service, with 17 years of service on average. The mean age of employees is about 44 years. The major groups within the workforce are represented by the staff operating company's equipment and customer service personnel – 49%, technical workers – 20% and white-collar employees – 14%.

Having experienced significant difficulties in the past, the company is currently characterized by continuous growth. The growth is inherent to the industry on the whole as the industry's world customer base is expected to double within a twenty year period. There are several mega-trends shaping the industry – urbanization, technical development, sustainability and growth in Asian markets. In addition, the field is facing intensifying competition forcing companies to operate with low margins while having high capital expenditures. In response to these trends and challenges the case company devises new offerings, renews its equipment and develops the customer service experience. The customer service is a key priority for the company. The organization is aiming at delivering increasingly personalized services based on a wide use of customer analytics. The company considers its employees to be the major providers of the organization's unique customer service experience and key value creators. Due to this, the company focuses on continuous human resource development as part of its growth strategy, especially in the areas related to the development of leadership, workplace community, occupational health initiatives, cooperation, and competence. In general, the organization sees personnel planning as a means to implement its accelerated growth strategy.

4.2.2. Technological and human enablers of HR Analytics practice

The case company 2 utilizes several information systems in its HR Analytics practice. The primary HR system is Workday Human Capital Management system, which was deployed at the beginning of 2018. Another major system that the company uses in the HR Analytics practice is SAP ERP, which has also been adopted just recently and which roll out is still ongoing. In addition, the organization is currently in the process of choosing the system *"specifically for analytics"* which will combine *"people analytics and customer analytics"*. On top of that, several older systems, not specified by the interviewee, are currently in use.

Concerning the people responsible for the practice, there are currently *"few dozens"* of employees in the company who do some people-related analysis. The company has "*an analyst community*" that performs the analysis based on requests from different departments (e.g. operations, marketing, sales, finance, customer experience). The analysis of people data is usually overseen by the customer experience and wellbeing and people departments. The analysts within the community usually have the same access to the various data sources, including the HR data. Yet, due to the privacy reasons, the HR data is administered by the employees from the wellbeing & people department. Those employees provide clean and modified data for analysis so that the identity of workers cannot be revealed. As the company is currently in the process of adoption of new HR Analytics systems and tools, it is currently hiring and training analysts to work specifically with people data. Thus, the technical and people sides of the HR Analytics practice in the case company 2 are undergoing big changes at the moment.

4.2.3. Moderating factors affecting HR Analytics practice

Three groups of factors that affect the application of HR Analytics practice, in line with the theoretical propositions presented within the literature review, have been identified in the case organization 2. The first group is comprised of **technological factors**. The company representative has noticed that **getting the data in the same format** is the challenge for the organization as *"the systems that are used or the data sources that are used within the company – they might be very different"*. Having data scattered across several distinct information systems not only complicates the HR Analytics process but also jeopardizes **data quality** as some information could be lost during the transition. As the case company is planning to obtain a distinct system to perform people analytics and customer analytics tasks, it's apparent that **the functionality of the current HRIS is not sufficient** to carry out the analytical assignments that the company has.

Another group of factors is represented by **organizational factors**. Even though the company has developed analytics community within which people have an access to the same data, the analysts use different systems and tools in their analysis that require different skills and knowledge. That circumstance, in some respect, separates the analysts from each other. The

interviewee noticed that in order to cope with this problem in future there would be *"more combined analytics teams…, so that when working together they use the same tools, forms and formats and so forth"*.

Among the third group of factors – **knowledge, skills, and attitudes of HR professionals** – **business acumen** have been identified as having a positive effect on the development of HR Analytics.

Finally, the company representative pointed out that there is a **legal aspect pertaining to the HR data** which affects the practice:

"Not all employee data is something you can use because there are lots of privacy elements. Looking from the purely analytics point of view that, of course, prevents you from using it…Data privacy is something that comes from the legislation and …is something we just have to live with. "

4.2.4. Elements and outcomes of HR Analytics practice

According to the company's representative, the organization is currently focusing on **predictive and prescriptive analytics**. However, **descriptive analytics** is also in use. The elements of HR Analytics practice identified in the case company 2 are as follows:

- Employee and organizational surveys;
- HR metrics and indicators;
- External benchmarks;
- HRIS data mining and analysis;
- Organizational behavior research and modeling.

The company uses surveys mainly as a source of historical data. For instance, the company's annual employee survey provides information regarding employee wellbeing, commitment, cooperation and leadership in teams, units and at the corporate level. Six months after the main survey, the company conducts another survey to evaluate the impact of its development activities. In addition to surveys, the company utilizes different metrics and indicators in relation to its seven major HR processes: recruitment & selection, employment relations, health & safety, performance management, learning & development, diversity management,

remuneration. Due to the industry specifics, a large focus in the organization is put on the health & safety HR process and metrics associated with it. Among the three major HR-related KPIs that the company monitors on the corporate level, two are focused on the health & safety issues – absences due to illness (as a percentage of total absences) and the number of work-related accidents. Interviewee noticed that despite the simplicity of some key HR measures used by the company, they also serve as a source of a valuable business insight when combined with the other data, for instance, financial:

"Sometimes people matters…, unless you transfer them into money, they don't really interest people that much. So, even though we have, for instance, followed sick leaves for years, they have not really taken out the interest of top management before we started putting there the cost of the sick leaves for the first time. And then that simple thing actually came as a very important topic when you see how much costs sick leaves create us on the monthly basis. So, then you start looking at what are the reasons behind it, how you can avoid those unnecessary sick leaves and then you expend it to the very different areas."

The company representative indicated that the organization uses external data sources in its HR Analytics practice for benchmarking, but could not specify the sources. Regarding the HRIS data mining, the interviewee mentioned that the company uses this element of the HR Analytics practice and that there are some big data sources that could be mined to support the People Analytics more intensively.

Yet, in line with the declared level of maturity of the organization's HR Analytics practice, the big emphasis is currently placed on a more advanced and targeted analysis. "*For a purely people area"*, such analysis could be used in the company, for instance, to support health & safety HR process: the organization could monitor the behavior of its employees **to predict** and, thus, **avoid accidents and incidents**. Predictive modeling could be also used in the company's HR Analytics practice to forecast "***how the salaries will evolve over the years***" and, thus, support the remuneration process. However, the focus of such analysis already transcends the human resources. In general, the people area is not the main focal point in the company's HR Analytics studies as *"much more interesting area is clearly tying it* (people data) *up together with the customer experience or even marketing or operations"*. The People

Analytics practice in the case organization is, to the large extent, about **supporting the customer insight**. The interviewee explained the logic behind the customer-centered HR Analytics and the outcomes associated with it:

"You look, for instance, what makes a customer happy, what would be the factors that the customer comes again, returns. And you see in different kind of surveys over the care center, or over the… (other customer touch points)*, what has been the motivation, the factors that the customer returns. Then we know from the people side what kind of things we should support more, or enhance more, or provide more if it is like training or competence-related, … or something related to leadership, or if it is ways or tools, if it is general evolving, all kind of things. And then you know the dynamics – how all these elements, entities work and what kind of outcome we get by focusing more on some of those elements and what kind of impact it creates on the customer interface."*

Although the HR Analytics practice of the company is already focused on predictive and prescriptive analytics, the organization is planning to take a step forward and, for this reason, evaluates the possibility to utilize cognitive systems for a more holistic analysis. Through the use of such systems, which are able to learn from the data, the company is hoping to capture the insights which slip from the comprehension of a human mind.

4.3. Case Company 3

4.3.1. Context

The case company 3 is one of the world leading industrial organizations. The company employs more than 12 000 people from 33 countries. About 40% of the company's workforce comes from Finland. The organization's gender composition is skewed towards male employees: men comprised almost 80% of the company's workforce while women constitute 20%. About 48% of the employees have been with the company for more than 11 years, 23% - for a period from 5 to 10 years, and the rest 29% – for less than 5 years. Thus, the majority of the employees tend to stay with the organization for a long time. The ratio of the blue-collar workers to the white-collar employees is approximately 3:7.

The company's position is stable and characterized by the average growth rate of 1-3% depending on the market. The organization has four business lines focused on services, automation, and selected industries. Within each line, the case company assumes a leading position being the first, second or third largest player on the market. All the business lines are serving the same customer base, which enables the company to offer its customers complex solutions and continuous performance development. The company has its own production facilities located in Finland, Sweden, and China.

Industries, which the company serves, are affected by the following mega-trends: changing consumer behavior and demands, digitalization and new technologies and resource efficiency. In order to adjust and capture value arising from these trends the organization currently focuses on the development of its offering combining process technologies, services, and automation. Due to the highly technical nature of its products, services, and solutions, the organization is paying increasingly more attention to the development of technical competencies of its employees seeing them as key implementers of the company's strategy. The organization's focus on project work also stipulates an emphasis on managerial development. In addition, a general improvement of engagement and performance and development of health and safety practices are among key company's priorities related to the workforce.

4.3.2. Technological and human enablers of HR Analytics practice

The case company 3 utilizes several systems and tools for HR Analytics and reporting. The organization uses SAP ERP, SAP BW reporting tool, which allows retrieving data from the system more easily, and IBM Lotus Notes, containing databases related to key HR processes, e.g. recruitment, training, annual review, and talent review. Microsoft Excel is also used to perform analytical tasks. The company is also currently in the process of adopting Workday Human Capital Management system and upgrading its ERP system. The introduction of the Workday system will allow merging all the HR-related data in one database, which is expected to contribute to the development of HR Analytics practice within the company. The ERP upgrade project is also aimed at combining diverse data, e.g. financial and procurement-related, in one database and support HR Analytics.

At the moment there are two people working on HR Analytics and reporting globally. Yet, subsidiaries, especially big ones, also conduct HR-related analysis according to their local needs. The analytical efforts of subsidiaries are currently not centralized in any way.

4.3.3. Moderating factors affecting HR Analytics practice

Three groups of factors affecting HR Analytics practice have been identified in the case company 3. The factors are aligned with the theoretical framework presented in the literature review section. The largest group is comprised of **technological factors**, and one of the leading among them is **data quality**. The company representative has noticed that *"the basic HR data is not in as good shape as it can be for this size of the company."* Even though a lot of work has been done recently to improve data quality, it still remains an issue as **data is "very scattered around different databases** and it takes a lot of time to combine it."* Another major technological factor affecting HR Analytics practice is **tools and systems** used to compile, extract data and perform the analysis. At the moment, systems used by the company are not very suitable for exploring the data, as company representative states:

"I feel that our numbers are quite hidden. Our managers do have access, but because this tool is not very user-friendly, it basically gives you numbers in some kind of order, but it is not graphs. You have to do the work… Then everyone relies on me in bringing visibility into the data. And I can, of course, do it only on a certain level because it is not possible, this is too wide."

Yet, there is also a lot of hope and optimism related to the introduction of the new Workday system and the company has already done a preliminary work to smoothly transition to the new tool:

*"One of the bright sides is that we already have a good base for the global system, we don't have to actually build everything from scratch. Once we implement this new tool, we have a lot of things that we can basically just move to the new tool... I do believe that **we already have a lot of data** that we could use for analysis… We will have **more reporting and analysis** and the **tool itself will show the data for us**."*

Apart from technological factors, **knowledge, skills, and attitudes of HR professionals** have been identified as important factors affecting HR Analytics practice in the company. HR department has a good understanding of the benefits that analytics can bring to the organization and of a need to educate others about them:

"It is not of course about HR numbers, because for beneficial analysis you also need, for instance, financial data or sales data. I feel that in our company HR is more advanced to think about these things. They see the benefits and what could be done. Our other functions are even a little bit more traditional. They don't see what you can do with all this data together. And this where we also face challenges because we need to make them understand that there needs to be a point in the data where it matches so that you can combine it somehow. And then what kind of advantages that brings to us."

In addition to that, the HR department has a vision and a plan regarding implementation of the new system and development of HR Analytics practice through employee education:

*"**We have to teach our managers to understand the numbers** because once we have the tool, they will get into the data. They will have a lot of data in their hands and there is a chance that they don't interpret it correctly. So this is a kind of education that we will have to start to do… Although, I think again that this is something that will **improve**, for example, **the data quality automatically**."*

Finally, **organizational factors** have been identified as the ones having an impact on HR Analytics practice. One of the factors relates to lack of understanding of benefits that analytics can bring among the management of organization:

"Our business is very traditional... So our management is also a little bit more traditional. A major part of them is older men who have been working in the company for a long time and they are kind of used to doing things in a certain way. If you go and ask: "What kind of things you would be interested to see if there weren't any limitations?" They wouldn't be able to tell many things. Some of them could, but quite a few of them don't know what they should ask. We, HR, can make assumptions on some level, which may be interesting, but we

should be working on the topics that are really beneficial. Because it is not useful to do analytics if nobody looks at it."

Another factor from this group relates to a lack of understanding of analytics among employees:

"Even though we have had global systems for quite a while, countries do not always understand that if they do not deliver some data or if they don't do something, it actually shows up in the numbers."

Finally, there are still some manual data collection processes in place stipulated by the nature of work of certain employee groups:

"We have to put more effort into following up on our training numbers and we do have a lot of blue collar employees who do not have computers and emails and so on. And they also have trainings and we should record these trainings (manually)*, of course."*

4.3.4. Elements and outcomes of HR Analytics practice

According to the interview, conducted with the representative of the case company 3, the organization currently just begins its HR Analytics journey focusing mainly on **descriptive analytics**. The elements of HR Analytics practice identified in the case company 3 are as follows:

- Employee and organizational surveys;
- External benchmarks;
- HR metrics and indicators;
- Ad-hoc research.

The company conducts engagement survey to **identify key areas for employee development and create an action plan for HR**. At the moment, the survey is conducted once in two years, but the company plans to organize it more frequently in the future. In addition to that, exit surveys are used and reported at the end of every year. External benchmarks are currently utilized primarily within the compensation and benefits area.

Regarding metrics and indicators, on the corporate level the company tracks annual KPIs such as engagement index, HR satisfaction score and HR score by region and set of indicators such as number of training days, average number of training hours per employee, training cost, training categories, headcount, turnover, voluntary turnover, recruitment lead times, internal mobility, talent population and talent population turnover. In addition to that, a lot of focus is placed on health and safety KPIs and indicators. The nascent analytical work is centered around headcount and talent pool reporting, and ad-hoc research is conducted from time to time to **gain a better understanding of the company's workforce**:

"There has been this ad-hoc research: "Let's look into our sales headcount." It was an interesting exercise because sales employees are really spread around the organization. There are people, for example, who do sales 20% of their work. So, they are not even defined as salespeople. We don't have sales organization as such."

As the result of its analytics efforts, the case company managed to **improve data alignment** (for example, aligning HR data with financial data) and **accuracy of the HR reporting**:

"By the time SAP was launch it consisted only of certain elements and then we realized at some point when we looked into the finance numbers, how much we spent on compensation was so much bigger than we reported out from HR systems. We realized that we had a lot of smaller benefits, for example, which were missing from SAP."

As the organization just begins to explore HR Analytics and opportunities that the practice holds, its current analytics pursuits are highly focused on learning:

*"I think it is still a lot about **learning your own numbers**. It is interesting because once you start to ask some questions about numbers, I see that there is interest or willingness to try to understand them better. Now we have been putting this forward in HR, so we, for example, discuss our turnover figures and how the trends look like. And do we see that there is any trend or do we understand why the number is high or low?"*

4.4. Cross-Case Comparison

Within this section, I first present the aggregated data related to enablers, moderators, elements, and outcomes of HR Analytics practice from the individual cases together with a

general description of the case companies. After that, I compare findings related to each of the key aspects of HR Analytics across the cases and highlight similarities and differences among them. Finally, I put my findings into broader organizational context to obtain a wider perspective on HR Analytics use in the case companies.

	Case Company 1	**Case Company 2**	**Case Company 3**
General Description of Case Companies	Industrial company; Operates worldwide (100+ countries); Manufactures and sells technical products and provides technical services; #1 and 2 market player in its key product and service segments worldwide.	Service company; Operates primarily in Finland; Provides transportation services; #1 market player in its key segments in Finland.	Industrial company; Operates worldwide (33 countries); Provides technical services, manufactures and sells technical products; #1, 2 and 3 market player in its key product and service segments worldwide.
	Current Situation Organic growth and growth through acquisitions; Challenging a competitive environment; Focus on cost optimization.	**Current Situation** Organic growth; Very fierce competitive environment, low margins, high capital expenditures; Focus on the development of new offerings.	**Current Situation** Slow organic growth; Challenging a competitive environment; Focus on the development of new offerings.
	Characteristics of Workforce Approx. 140 000 employees; International workforce – 40% from new economies; General composition: blue-collar – 50%, white-collar – 50%; Gender composition: 70% men, 30% women.	**Characteristics of Workforce** Approx. 5 000 employees; The workforce is primarily from Finland; General composition: customer service – 49%, white-collar – 14%, technical staff – 20%, other – 17%; Gender composition: 44% men, 56% women	**Characteristics of Workforce** Approx. 12 000 employees; International workforce – 40% from Finland; General composition: blue-collar – 30%, white-collar – 70%; Gender composition: 80% men, 20% women.
Enablers	**Technological:** 4 key systems and tools – Oracle Human Capital Management System TalentLink (Oracle Business Intelligence), Excel, PowerPoint, Tableau.	**Technological:** 2 key systems – Workday Human Capital Management System, SAP. Third core system for combining people & customer analytics is coming soon. Several older systems are still in use.	**Technological:** 4 key systems and tools – SAP, SAP BW, IBM Lotus Notes, Excel. A new system for HR Analytics – Workday – is expected to be adopted shortly.
	Human:	**Human:**	**Human:**

	Approx. 50 people within HR function. Two HR Analytics directors oversee metrics and tools.	Few dozen analysts within the analytics community. HR Analytics projects are initiated by wellbeing & people and customer experience departments. HR data is administrated by wellbeing & people.	2 people within HR function. Subsidiaries are also conducting ad-hoc research according to their needs.
Moderators	**Knowledge, skills & attitudes of HR professionals:** Business acumen (positive); Analytical skill (positive).	**Knowledge, skills & attitudes of HR professionals:** Business acumen (positive).	**Knowledge, skills & attitudes of HR professionals:** Business acumen (positive); Long-term planning – educating others about HR Analytics possibilities (positive).
	Technological: Data quality (negative); Functionality of HRIS (negative).	**Technological:** Data quality (negative); Functionality of HRIS (negative); Getting data in the same format (negative).	**Technological:** Data quality (negative); Availability of data (positive); Getting data from multiple databases (negative); Functionality of systems and tools (positive and negative); Manual data collection processes (negative).
	Organizational: Cooperation among stakeholders (positive).	**Organizational:** Lack of unification of work within the analytics community – different approaches, tools & formats (negative). **Legal:** Not all HR data can be used for analysis.	**Organizational:** Lack of understanding of analytics among employees and management (negative).
Elements of HR Analytics Practice	**Descriptive Analytics** Employee and organizational surveys; HR metrics and indicators; External benchmarks; Workforce planning (demand/supply, segmentation).	**Descriptive, Predictive & Prescriptive Analytics** Employee and organizational surveys; HR metrics and indicators; External benchmarks; HRIS data mining and analysis; Organizational behavior research and modeling.	**Descriptive Analytics** Employee and organizational surveys; HR metrics and indicators; External benchmarks; Ad-hoc research.

Outcomes	Comparing the company's performance in the HR area with that of the other companies; Obtaining feedback on HR initiatives; Supporting managerial decision making; Influencing performance – keeping costs low; Obtaining visibility on large headcount; Tracking progress towards specific goals (e.g. diversity); Executing people strategy, supporting decision-making and action planning for critical role recruitments, critical competency development, and workforce productivity evolvement.	Comparing the company's performance in the HR area with that of the other companies; Supporting different HR processes; Predicting and avoiding accidents and incidents; Forecasting salary evolution over time; Supporting customer insight; Identifying areas for employee development.	Comparing the company's performance in the HR area with that of the other companies; Identifying key areas for people development and creating action plans for HR; Obtaining visibility on the company's headcount and talent pool; Gaining a better understanding of the company's workforce; Improving data alignment and accuracy of HR reporting; "Learning own numbers".

Table 4. Cross-case comparison

Across all the three cases, I find that companies utilize several systems and tools in their HR Analytics practice and use ERP systems as a source of data for analysis. While case companies 1 and 2 already have HRIS in place, the case company 3 is only planning to adopt such system. Case companies 1 and 3 have pointed out that they rely on Excel to perform analytical tasks. Regarding the human aspect of the practice, I find that within case companies 1 and 3 HR Analytics is overseen by the HR function. In case company 2 projects within HR Analytics domain are managed by wellbeing & people and customer experience departments, while HR data is administered by employees within the wellbeing & people department. The number of employees performing HR Analytics tasks vary significantly among the companies – from approximately fifty people in case company 1 to two people in case company 3.

Knowledge, skills, and attitudes of HR professionals, technological and organizational factors have been identified as having an effect on HR Analytics in all the three case companies. In addition, the representative of the case company 2 has underscored the importance of legal factors affecting HR Analytics. Among the first group of factors business

acumen of HR professionals is seen to have a positive effect on the practice across all the cases. Among the technological factors, poor data quality and limited functionality of HRIS and other systems are seen as hindrances for HR Analytics application in all the companies. Regarding the organizational factors affecting the practice, I find that every case company has its unique moderators stemming from organizational context.

The research results indicate that all the three case companies utilize employee and organizational surveys, HR metrics and indicators and external benchmarks as elements of HR Analytics practice. However, there is a difference in types of metrics that case companies use: while case companies 1 and 2 are utilizing HR-related metrics along with metrics linking HR, organizational and financial performance, case company 3 is focusing only on HR-related metrics at the moment. Having the largest workforce among the three case companies, the company 1 has a well-developed workforce planning method in place. The case company 2 has the most advanced HR Analytics practice among the three companies and uses HRIS data mining and analysis as well as organizational behavior research and modeling as part of its HR Analytics practice. The case company 3 uses ad-hoc research to explore HR data.

Looking at the outcomes produced against the given elements of HR Analytics practice, I find that across all the cases the practice enables companies to compare their HR performance with that of other companies, identify areas for employee development and support HR processes. I also find that in the case companies 1 and 3 HR Analytics allows companies to obtain visibility on their large headcounts. While the case company 3 currently focuses on HR outcomes and outcomes related to the development of HR Analytics practice, the case companies 1 and 2 pay increasingly more attention to business outcomes such as supporting managerial decision making and customer insight.

Considering the larger organizational context of the case companies, it can be noticed that in case company 1 the need for HR Analytics practice is primarily driven by the necessity to gain visibility and understanding of its large headcount scattered across more than 100 countries. Besides, being a largely manufacturing company operating in a highly competitive environment, the case company 1 depends on HR Analytics to keep its operating expenses low. Case company 2, which competes on service in a challenging business environment and

takes care of a large customer base, needs HR Analytics to monitor the level of customer satisfaction with the service that its personnel provides and introduce changes to its service (e.g. through personnel training, introduction of new tools and etc.) as quickly as possible whenever it is needed. In case company 3, the need for HR Analytics is stipulated by the need to obtain visibility on its significant headcount spread across 33 countries, which is similar to the case of company 1. It is interesting to point out that even though case companies 2 and 3 are both focusing primarily on providing services to customers, they have a very different approach towards the practice and are very far away from each other in their HR Analytics journey. Given that both of the companies are large international organizations having resources to pursue the practice, the difference in HR Analytics application between the two companies can be stipulated by the fact that case company 2 see more value in the practice than case company 3. While case company 3 serves large business customers and has a personal approach and knowledge about each of them, case company 2 serving a large number of consumers has to rely on HR Analytics to gain insight and understanding of its customers.

Within the final part of the thesis, I combine empirical findings with the theory presented in the literature review chapter to answer my research question, consider limitations of the study and provide suggestions for the future research.

5. ANALYSIS AND DISCUSSION

Against the identified research gap, this research focuses on HR Analytics practice and its application within an organizational context. In particular, the study ties together key aspects pertaining to HR Analytics – its enablers, moderators, elements, and outcomes – to obtain a holistic outlook on the practice. In this chapter, the empirical findings resulting from the research are reflected against the theoretical frame of reference presented in the literature review chapter and answers to research questions are provided. Additionally, the limitations of the study and recommendations for future research are discussed.

5.1. Answering the research questions

Within this section, I am focusing on answering the research questions that I posed at the beginning of my work. At first, I provide answers to the sub-questions and then respond to the main question.

Q1: What are the technological and human enablers of HR Analytics practice in the case companies?

As it was stated earlier, academic articles provide very scarce information on technology and people behind HR Analytics practice. The survey conducted by Sierra-Cedar (2017) indicates that there is no single system or tool able to offer all the functionality needed to perform HR Analytics tasks and that majority of companies still use Excel for HR Analytics purposes. In line with these results, I find that the case companies rely on 2 to 4 systems and tools to conduct an analysis of employee-related data and that 2 out of 3 companies use Excel as one of the key analytics tools. The three case companies are currently at different stage of adoption of modern HRIS: while case company 1 has already been using HRIS (Oracle HCM system) for some time, case company 2 has just adopted HRIS (Workday HCM system) this year, and case company 3 is planning to adopt HRIS (Workday HCM system) next year. Contemporary HRIS have been criticized in the academic literature (e.g. Angrave et al., 2016; Douthitt & Mondore, 2014) for transfer of generic best practices and limited functionality that doesn't allow conducting analysis that companies need. Yet, comparing the case of company 3 that doesn't have modern HRIS in place to those of two other companies, I find that HRIS serves as an enabler of more advanced analytics: while company 3 has to spend

time on aggregating HR data from various sources and perform manual calculations of simple metrics such as headcount and turnover, companies 1 and 2 already have their HR data in one place and derive such metrics automatically from their HR systems and, thus, are able to concentrate their analytics efforts on more advanced tasks (e.g. support managerial decision-making).

Regarding the people side of HR Analytics, I find that within the case companies the practice is enabled by the teams of various sizes (from 2 to 50 individuals), which are partly or fully dedicated to the practice. In line with the proposition of Davenport et al. (2010), I further find that the way the case companies organize teams performing HR Analytics tasks corresponds to the general level of their analytics maturity. In particular, I notice that company 2, which has the most advanced HR Analytics practice among the three case companies, utilizes the centralized model (Davenport et al., 2010) as its analysts reside within one community, have access to the same data and perform analytical tasks for a variety of departments including HR. At the same time teams performing HR Analytics tasks in case companies 1 and 3, currently focused on descriptive analytics (Fitz-Enz & Mattox, 2014), are residing within HR function, which corresponds to the decentralized or functional models (Davenport et al., 2010). These findings are also aligned with projections of Rasmussen & Ulrich (2015) stating that as HR Analytics matures, the practice needs to transcend HR function.

Q2: What are the positive and negative moderating factors affecting the application of HR Analytics in the case companies?

Building on the review of academic literature on HR Analytics, I identified three groups of factors affecting the practice – skills, knowledge, and attitudes of HR professionals, technological and organizational. Through my study, I find that the factors from all the three groups have an effect on HR Analytics practice in case companies. In regard to the first group of factors – skills, knowledge, and attitudes of HR professionals – the academic literature states that lack of business focus, analytical skills and analytical mindset among HR professionals are among the major hindrances for adoption and development of HR Analytics practice (e.g. Angrave et al., 2016; Bassi, 2011; Levenson, 2011; Rasmussen & Ulrich, 2015). Yet, the cases of the companies under study provide a vivid example of how the presence of

the mentioned qualities among HR professionals facilitates the development of HR Analytics. Of particular interest is the case of the company 3, which is just at the begging of its HR Analytics journey, yet, its HR professionals already have a clear vision of how the practice should develop over time (e.g. more focus on business-relevant analysis, combining HR data with data from other sources) and what needs to be done to ensure its development (e.g. work closely with management, make people interested in numbers, provide training for managers on how to use new HRIS).

Regarding technological factors affecting HR Analytics, I find that negative moderation attributed to data quality issues (Coco et al., 2011), limited functionality of HRIS (Angrave et al., 2016; Douthitt & Mondore, 2014) and dealing with incompatible or redundant systems (Coco et al., 2011), discovered through the literature review, is also relevant to the case companies. All the three companies described data quality as one of the key challenges in HR Analytics application. While the limited functionality of HRIS was identified as a hindering factor across all the cases, the case company 3 also provided a positive evaluation of the modern HRIS as the new system that the organization is about to adopt would enable the company to move beyond basic metrics. Other technological moderating factors discovered through the study and not covered in the literature review include the availability of data (positive moderation) and manual data collection processes (negative moderation).

Organizational moderating factors stemming from the broader business context are the least covered in the academic literature. Angrave et al. (2016) and Coco et al. (2011), for instance, attribute negative moderation of HR Analytics practice to organizational silos. In contrast to that, I find that cooperation among stakeholders facilitates application of HR Analytics based on the case of company 1. Overall, I notice that organizational moderators are company-specific – in the company 2 development of HR Analytics is hindered by lack of unification of work within analytics community, while in case company 3 negative moderation of the practice results from lack of understanding of analytics and its possibilities among employees and management.

Legal factors limiting and restricting the use of sensitive HR data were also identified during the research as having an effect on HR Analytics practice. Yet, the laws guiding utilization

of employee data are unlikely to change drastically in the near or midterm future, so the moderations resulting from these laws, like the moderation stemming from established accounting practices (Becker et al., 2001), is expected to stay unchanged.

Q3: What elements of HR Analytics practice do the case companies utilize?

Harris et al. (2011) state that when companies embark on HR Analytics journey, they follow the certain path towards the practice maturity. According to Fitz-Enz & Mattox (2014), this path starts with descriptive analytics, which then matures into predictive analytics, and finally reaches prescriptive analytics. Within my study, I find that case companies 1 and 3 are currently focusing on descriptive analytics while case company 2 has elements of descriptive, predictive and prescriptive analytics in place. Utilizing Falletta's (2014) classification of elements of HR Analytics, I notice that all the three companies use employee and organizational surveys, HR metrics, and indicators and external benchmarks in their practice. While approach towards surveys is similar across all the cases – companies conduct large employee surveys annually or biennially and compliment them with smaller surveys, e.g. exit surveys and training feedback surveys, approach towards metrics differ significantly depending on the general level of maturity of HR Analytics practice of a company. According to Boudreau & Ramstad (2002), all the HR metrics can be divided into three major types – efficiency, effectiveness, and impact. Through my research, I find that all the three companies utilize the first type of metrics, which deals with the efficiency of HR function. Yet, case companies 1 and 2 also use effectiveness and impact metrics, linking HR outcomes to business outcomes. Having a more mature HR Analytics practice, case companies 1 & 2 also use advanced techniques for data analysis that go beyond metrics. However, as Flink (2010) notices, use of less sophisticated methods, e.g. linking data from various sources, can also result in valuable business insights and the case of company 2 supports this statement: the company managed to uncover an important business issue by combining simple HR and financial data – number of sick leaves and cost of sick leaves. Overall, in contrast to the findings of Rasmussen & Ulrich (2015) stating that for the purposes of HR Analytics companies often follow technical path and explore data focusing on benefits and tasks of HR function, I find that case companies consider general value that HR Analytics can bring them

and choose elements of HR Analytics practice accordingly. For instance, even though case companies 1 and 2 have customized reports within their HRIS, they go beyond these reports to deliver analysis that would have value not only for HR but for their organizations at large, and case company 3, which just starts its HR Analytics journey, is heading towards the same goal.

Q4: What are the outcomes resulting from the use of HR Analytics in the case companies?

According to Dyer and Reeves (1995), there are three major types of outcomes that can result from HR practices – HR, organizational and financial. Through my study, I find that the application of HR Analytics within case companies results in various HR outcomes, some of which are common across all the cases, while others are company-specific. The focus on HR outcomes has been criticized in the academic literature for having little value for an organization at large (Boudreau & Ramstad, 2002). Yet, the case of the company 3 shows that concentrating on such outcomes could be a necessary learning step on a way to a more advanced HR Analytics practice. Case companies 1 and 2 also focus on organizational and financial outcomes of HR Analytics. While case company 1 uses the practice to achieve productivity gains and optimize costs, case company 2 utilizes HR Analytics to improve the quality of its customer service. This difference in focus areas of the practice stems from the difference in organizational contexts of the companies with company 1 being production and service organization having a very large headcount and company 2 being a pure service organization.

How is HR Analytics applied within an organizational context?

HR Analytics is a new complex phenomenon and companies are currently just learning how to apply the practice to harness its power. Even though organizations participating in the study seem to have a good vision of how the development of the practice should unfold and intuitively follow the logic outlined by Boudreau and Ramstad (2007) regarding practice evolvement – go beyond reports available in HRIS, focus on business challenges, link HR data to business data to obtain valuable insights and act upon the results of analysis – it will take time for them to get where they want to be as there are many factors that shape HR Analytics application. These factors related to people in charge of the practice, IT systems

and tools used for HR Analytics tasks and broader organizational context can hinder and/or facilitate the development of the practice. As research shows business-savvy and analytically-minded HR professionals can move HR Analytics forward to the certain extent, yet, without suitable HRIS and tools an organization can still get stuck with a very basic approach to metrics and analytics. The organizational context also plays an important role in shaping different aspect of the practice – from a choice of tools and practice elements to focus areas and goals. Thus, despite certain similarities among the case companies in factors affecting the practice and elements of the practice used, application of HR Analytics, in general, is company-specific, contingent upon the context within which it is applied. This circumstance is especially reflected in the outcomes of the practice that companies are focusing on. Even though this thesis doesn't provide any strikingly successful cases of HR Analytics application similar to Moneyball case, it shows that application of the practice within companies from different industries can still result in sets of positive outcomes such as obtaining better understanding of employees and their capabilities, boosting productivity and improving customer service, which has a potential to bring organization closer to their business goals. Ultimately, this is what all the case companies participating in the study are aiming at.

5.2. Limitations of the study

There are certain limitations related to my study that I discuss within this section. First, this study relies on HR perspective in exploring HR Analytics phenomenon. HR professionals participating in the study have been identified by their colleagues as the most knowledgeable employees in regard to HR Analytics topic as they oversee and take part in the practice on the daily basis. However, I feel that the study would have been benefited from having a second perspective, e.g. perspective of managers regularly utilizing results of analysis of HR data in their work. Nevertheless, evidence obtained from HR professionals, while aligned with theory, also provides insights beyond theoretical propositions.

According to Yin (2009) case study should rely on analytical generalization linking research results to theoretical propositions. Johnston et al. (1999) also state that utilizing several cases results in better conditions for generalization. In my research, I utilize three cases and present

findings based primarily on the evidence found across the cases. However, in some instances, I present findings relying on evidence from a single case. Yet, I underline every such instance and discuss it in my work.

Finally, in line with the philosophical underpinnings of my study, the evidence found through the research is subject to my individual interpretation and, thus, can be viewed by other researchers differently. However, by connecting findings to the existing theory I make them more generally applicable.

5.3. Recommendations for future research

This study contributes to the fields of strategic HRM and management science by elevating and amplifying understanding of HR Analytics practice and its application within an organizational context. The aim of my work is to address blind spots in research related to key aspects of HR Analytics and tie them together to obtain a more holistic view of the phenomenon. In order to tackle this challenge and avoid limitations of former studies focusing on successful projects (Coco et al., 2011; Rasmussen & Ulrich, 2015), I present three diverse cases of companies at different levels of HR Analytics maturity and explore how these organizations apply the practice at the moment. In order to develop an understanding of HR Analytics further, I encourage future researchers to study key aspects pertaining to the practice – enablers, moderators, elements, and outcomes – in more detail and follow suggestions of Angrave et al. (2016) regarding methodology applicable for addressing complexities of real-world open systems. One of the possible ways to gain more knowledge regarding the application of HR Analytics within organizations could be conducting single case studies focusing on the development of detailed use cases of the practice. Another way to approach this goal could be arranging studies focusing on particular aspects of HR Analytics, e.g. moderators and their role in adoption and development of the practice as suggested by Marler and Boudreau (2016). All in all, HR Analytics represents an exciting new area of study and persistent research effort is needed to develop a better understanding of practice and its application within companies.

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APPENDICES

Interview Guideline

General Questions	1. What are your role and responsibilities in the company? 2. How many years of experience do you have in working with HR Analytics?
Business and HR Context	3. What are the major business challenges that your organization is currently facing? 4. What are currently the major challenges for HR?
HR Analytics practice – Background	5. Initially, how was the decision made to implement HR Analytics; was it a corporate decision or was it made locally? 6. Do you know what the trigger was for paying more attention to HR Analytics?
Technological and human enablers	7. What team or department – or maybe there are more than one – is responsible for implementing HR Analytics? 8a. What specific systems or tools do you use for HR reporting and analytics, and are they working well for your needs? 8b. What are the internal or external data sources that you use for HR Analytics, and is it easy to get the data and manage it?
Elements and outcomes of HR Analytics practice	9. What operational areas of HR do you focus your Analytics efforts on at the moment? 10. Why are these areas the most important right now? 11. Some companies use HR Analytics to better understand past performance or make predictions about future needs. What are the main goals in your company for using HR Analytics?

	12a. What are the top 3 HR Analytics practices that you currently use to achieve the goals that you just mentioned? 12b. Can you share one detailed example of a type of HR analytics that you currently use, and how that helps you fulfill the goals that you just mentioned? 13. Thinking about your use or HR Analytics so far: How and where have they been useful to HR or the company at large?
Moderating factors	14. Thinking about how you have used HR Analytics so far: What do you see as the biggest challenges in making even more and better use of analytics in the future? 15. Again, thinking about how you have used HR Analytics so far: What are the factors that help to move the practice forward in your company?
Future of HR Analytics	16. What plans has your team or the company got in place to tackle challenges related to HR Analytics application? 17. Are there any other development or expansion plans in place around HR Analytics?