HRM-Performance Relationship: An Overview of Methodological Challenges and Prospects

Ahmed Ullah Shah[*], [†]Shahzad Khan Durrani,[‡]Saqib Ullah Khan

Abstract

The research over the past twenty years on human resource management (HRM) and performance provide a substantial relationship. Unfortunately, the results are not clear. The objective of this study is to review the existing scientific literature regarding common methodological challenges and to recommend realistic solutions. This study reviews the literature on the aforementioned relationship and concludes that there are major methodological challenges. This systematic review helps us to conclude that the researchers have mainly focused on the measurement error that occurs due to items; while error due to time, and ratters have been largely disregarded. This review further helps us to conclude that single respondent bias highly prevails in literature. Furthermore, researchers have greatly employed cross-sectional design at the cost of a longitudinal design. A review of specification errors enables us to conclude that, research scholars did a satisfactory job regarding this error. Finally, researchers have mostly used a small sample size at the cost of a large sample size.

Keywords: HRM, performance, methodological challenges.

Introduction

Human resource management (HRM) and performance have been the most interesting areas of research to the scholars of this field for the last two decades (Paauwe, 2009). A large number of researchers have devoted their time and efforts, as a result, they have developed a considerable amount of literature, but their results are not consistent (Boselie, Dietz, & Boon, 2005). Some researchers found a significant positive relationship between HRM and performance (Glaister, Karacay, Demirbag, & Tatoglu, 2017; Chang, Son, Pak, 2020; Boselie, Dietz, & Boon, 2005; Paauwae & Richardson, 1997; MacDuffie, 1995); while, some reported weak relationship (Wright & Gardner, 2003); others doubt

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[*] Assistant Professor, Kohat University of Science & Technology, Kohat, Pakistan
Email: dr.ahmed@kust.edu.pk
[†] Lecturer, Kohat University of Science & Technology, Kohat, Pakistan
Email: shahzaddurrani@hotmail.com
[‡] Lecturer, Kohat University of Science & Technology, Kohat, Pakistan
Email: saquibwazir@gmail.com

or even deny this relationship (Wall & Wood, 2005; Guest, Michie, Conway, & Sheehan, 2003).

The researchers of this field have done a reasonable job to extend and expand the HRM-Performance debate over the last two decades, however; significant theoretical and methodological errors still exist (Paauwe & Boselie, 2005; Boselie, Dietz, & Boon, 2005; Shah & Khan, 2019). Contemporary research on the HRM-Performance relationship indicates that this field has been dominated by a number of dualities and balance issues (Boselie, Brewester, & Paauwe, 2009; Weller & Gerhart, 2018). More recently, Weller & Gerhart (2018) have proposed multiple solutions to mitigate methodological challenges prevalent in this vein of research. Similarly, other researchers have also reported significant methodological and theoretical challenges in this relationship (Wright & Gardner, 2003). Likewise, Shah & Khan (2019) have also referred to theoretical and methodological challenges in the aforementioned relationship.

Theoretically, there is no clear picture of HRM, no clear picture of performance, and how they are linked (Savaneviciene & Stankeviciute, 2010; Shah & Khan, 2019). While, methodologically some researchers have doubted this relationship due to a number of analytical errors (Wall & Wood, 2005; Weller & Gerhart, 2018), and other claims a positive relationship (Boselie, Dietz, & Boon, 2005; Paauwae & Richardson, 1997; MacDuffie, 1995). While, some other researchers have also reported weak relationships (Wright & Gardner, 2003). This reflects there is no consensus among researchers regarding the aforementioned relationship; hence, a knowledge gap exists in this area. The methodological challenges are related to methodological validity, such as research method applied (Gerhart, 1999; Gerhart *et al*., 2000; Rogers & Wright, 1998; Wright *et al*., 2001).

Many sources of literature have confirmed that, although prior research claims a positive and significant relationship in this research area, there exist equal possibilities that they might have reported biased results. Similarly, the majority of research scholars in this field are very much concerned about their empirical results. Therefore, there is a great need for research, which could not only identify methodological challenges but could also address them.

This paper, therefore, focuses on *methodological challenges* only and more precisely on: (1) random measurement errors (2) single respondent bias (3) specification error (4) cross-sectional data, and (5) small sample size. These challenges would provide the basis for this study.

The study at hand reviews and analyzes the aforementioned *five methodological challenges* in the HRM-Performance relationship, which may be used to build practical research design for future research.

The purpose of this paper is to identify and review the key methodological challenges in the HRM-Performance relationship and to provide practical solutions.

This study is qualitative in its nature and using a systematic review of scientific literature. The research method for this paper is to analyze and combine existing available scientific literature on the abovementioned relationship. The proposed research method is adopted from (Shah & Khan, 2019; & Savaneviciene & Stankeviciute, 2010). The remaining paper is divided into two parts. The first part review and identifies the general methodological challenges in the existing literature; while, the second part critically analyzes the literature pertaining to common methodological challenges and provides the appropriate remedies and solutions pertaining to the above-stated challenges.

Common Methodological Challenges

The review of the scientific literature reveals that HRM-Performance challenges have been tripled over the last two decades; the present count of these challenges has crossed a single digit (table 1). Becker & Gerhart (1996) were among the earlier researchers who identified the challenges of measurement errors, single respondent bias, and specification errors. Similarly, other researchers have also reported the challenges of measurement and single respondent bias (Wright et al., 2000; Wright et al., 2001). After a comprehensive review of 104 papers Boselie, Dietz, & Boon (2005) confirmed the problems of single respondent bias and specification errors; and further adds cross-sectional design and correlation to the list. Likewise, Wall & Wood (2005) reviewed 25 papers and reported the challenges of measurement errors, single respondent bias, specification errors, and cross-sectional design; while, Gerhart (2007) not only confirmed the stated challenges but further extended this list to construct validity, and sample selection bias.

Table 1: Methodological Challenges and HRM-Performance Relationship

Methodological Challenge	Author	Number of papers reviewed	Number
Random Measurement error	(Becker & Gerhart, 1996)	07	1

Single respondent bias	(Becker & Gerhart, 1996)	07	2
Specification error	(Becker & Gerhart, 1996)	07	3
Cross sectional studies	(Huselid & Becker, 1996)		4
Correlation	(Wood, 1999)		5
Small samples	(Wall & Wood, 2005)	25	6
Mediation	(Guest, 1997)		7
Moderation	(Becker & Gerhart, 1996)	07	8
Statistical significance testing	(Becker & Gerhart, 1996)	07	9
Construct Validity	(Gerhart, 2007)	-	10
Sample selection Bias	(Gerhart, 2007)	-	11
Propensity Scores	(Gerhart, 2007)	-	12
Individual practices effects	(Wall & Wood, 2005)	25	13

The literature on the HRM-Performance relationship reviewed in (table 1) reflects a total of 13 important methodological challenges; with some challenges are more common in literature than others. Wall & Wood (2005) after reviewing 25 research papers mentioned that the most paramount HRM-Performance methodological challenges are single respondent bias, small sample size, and lack of sophisticated longitudinal studies. Similarly, Patterson et al., (2010) reviewed 99 papers and confirmed the challenges of single respondent bias, small sample size, and cross-sectional design. However, the similarities among the above-referred lists according to frequency include single respondent bias, cross-sectional studies, specification error, measurement error, and small sample size. The sources of literature indicate much advancement pertinent to HRM-Performance challenges; wherever, researchers have reported these challenges they have also advocated the scholar's concerned to avoid repeating these challenges.

Overview of Methodological Challenges
Random measurement Error
Most of the researchers have reported the random measurement error in the HRM-Performance relationship (Becker & Gerhart, 1996; Huelid & Becker, 1996; Wright et al., 2000; Wright et al., 2001; & Gerhart, 2007). This type of error can come from a number of sources, the

most common of which are (1) items, (2) time, and (3) raters (Huelid & Becker, 1996; Wright et al., 2000; Wright et al., 2001; & Gerhart, 2007). Huselid & Becker (1996) used longitudinal data to estimate the effects of both heterogeneity bias and random measurement error in HR systems measures. They found that the two types of challenges mainly compensate each other. Their results of first difference (fixed effects) HRM and performance link were similar to cross-sectional results when the former was adjusted for random measurement error. Becker & Gerhart (1996) have also mentioned that the prior research on the HRM-Performance relationship has been based on measures with less reliability; results of the above-stated relationship are probably understated.

Many studies mentioned that the random measurement error due to item can be assessed through internal consistency; the measurement error due to time is generally assessed through test-retest correlations; while, the measurement error due to raters can be measure through computing inter-rater reliability indices (Huelid & Becker, 1996; Wright et al., 2000; Wright et al., 2001; & Gerhart, 2007). These studies also mentioned that researchers in the field of HRM–performance relationship have largely focused on assessing measurement error due to items and there is a lack of research to assess the amount of measurement due to time and have largely ignored measurement due to raters.

Wright et al., (2000) have suggested that these problems can be best addressed by collecting data from multiple respondents. They have also recommended other methodological changes that will help researchers to draw more confident conclusions regarding how HR practices impact firm performance. The prime method of minimizing this error is through increasing the number of raters rather than adding items. The second method to increase reliability would be to prepare better scales of HRM interventions. Another method to improve reliability may be through adopting different rating scales.

Similarly, Becker & Gerhart (1996) recommended that researchers should concentrate on several raters while collecting data from each organization and its business unit, particularly where subjectivity or judgment is required. Concerning this issue Gerhart (2007) suggested that it can be best addressed by estimating a generalizability coefficient which is equivalent to reliability that recognizes multiple sources of error.

Single Respondent Bias

Many researchers have talked about single respondent bias, which usually occurs if data is collected from a single person on both HRM and

performance, and firm performance is measured subjectively (Becker & Gerhart, 1996; Wright et al., 2000; Wright et al., 2001; Wall & Wood, 2005; Purcell & Kinnie, 2007; Gerhart, 2007; & Patterson et al., 2010). Such type of error generally occurs regardless of the size or complexity of the organization and it makes the interpretations of effect sizes more difficult (Wright et al., 2000).

Becker & Gerhart (1996) mentioned that the rater might be positively or negatively biased in reporting both HRM and performance. Wright et al., (2000) after reviewing three papers demonstrated that measures of HRM practices from a single respondent contain significantly high levels of measurement error irrespective of size or complexity of the organization. Doty and Glick (1998) have earlier concluded that reliance on a single respondent results in more than 25 percent bias in observed relationships. Moreover, even if the data pertaining to performance is collected from a separate source, the use of a single respondent might still affect the nature of relationships (Gardner & Wright, 2009). Researchers generally have questioned the reliability and validity of measures due to heavy reliance on a single HR manager or line manager (Boswell, Colvin & Darnold, 2008; Gerhart, Wright, McMahan & Snell, 2000; Gerhart, Wright & McMahan, 2000; Guest, 2001).

Although a single respondent provides biased results, contemporary researchers still observed the wide prevalence of this challenge. For example, Purcell & Kinnie (2007) mentioned that most of the papers employed survey methods distributed to HR executives to rate HRM practices and to report their performance relative to others. This type of design is open to single respondent bias containing a high level of measurement error (Gerhart, 2007). Similarly, Wall & Wood (2005) reported that a considerable number of researchers have committed this error (21 out of 25 papers have used a single respondent). It was also mentioned that heavy reliance on a single respondent could produce spurious results. Likewise, many other researchers also reported that a large majority of papers shared the problem of a single respondent (Patterson et al., 2010).

To solve this problem, researchers generally suggest that data regarding HRM, and performance might be collected from different respondents (Becker & Gerhart, 1996). This suggestion was also endorsed by (Wright et al., 2000; & Wright et al., 2001); they suggest collecting data from multiple raters. In addition, some scholars have also suggested SEM, marker variables, multiple raters, and longitudinal data in order to overcome this problem (Gerhart, 2007). It was also suggested the use of

the multitrait-multimethod matrix to assess convergent and discriminant validity, with later approaches applying structural equation modeling. In the absence of multiple methods, a more recent suggestion is to use a marker variable which theory says should have no relationship with other constructs in the study. Any observed relationship is thus assumed to be due to common method variance only. This relationship is then partial from the relationships of substantive interest. Longitudinal data and multiple raters can also be used to remove person-specific, time-invariant omitted variables of this sort.

Boselie, Dietz, & Boon (2005) after reviewing many sources mentioned that researchers have repeatedly suggested the use of multiple respondents for data collection to overcome this problem. They referred to Gerhart and his colleagues, Gerhart et al. (2000) who suggested at least four raters per unit of analysis for HRM indicators and at least three for performance indicators. While, some researchers also suggest selecting respondents according to research design, so the data regarding HRM effectiveness might be collected from senior executives Wright et al., (2001) while, the data regarding individual HRM practices might be collected from employees, the intended recipients of HRM practices (Paul & Anantharaman, 2003). Furthermore, researchers should use two or more persons, same raters across different organizations, raters who through knowledge of the use of practices in a range of organizations are able to benchmark the development of the practice against that elsewhere, and raters who are ignorant of the performance or the organization in question in order to solve the problem (Wall & Wood, 2005).

Specification Error

Specification errors occur when a model misses' variables that are relevant to the HR system and also influence firm performance (Miles, 2017; Huselid & Becker, 1996; Becker & Gerhart, 1996; Wall & Wood, 2005; Gerhart, 2007; Boselie, Dietz, & Boon, 2005). One of the major challenges in the HRM-Performance relationship is omitted variable (Huselid and Becker, 2000). Pertaining to the performance, missing variables may include industry, size, business strategy, capital structure, and the quality of management in areas other than HR (e.g., finance and marketing). This study also reported that when researchers omit relevant variables, it may produce biased results (Becker & Gerhart, 1996). Likewise, when a model misses a control variable, the estimates are more likely to be biased (Huselid & Becker, 1996).

Overall, researchers did well in this regard. For example, Wall & Wood (2005) reported that 23 out of 25 studies have used the relevant variable; while, only two studies miss it. While, Boselie, Dietz, & Boon (2005) after reviewing 104 papers reported that 64 studies used organizational size as a control variable, 25 studies used age; while, 32 used trade union influence. This reflects that researchers, by and large, have incorporated relevant control variables in their model. However, it is to be noticed that in the HRM-Performance relationship, specification error is largely confined to control or moderating variable; whereas, Gujarati, (2004) mentioned that it occurs when a model misses a relevant variable. The relevant variable may be independent, mediating, or moderating variables. In this context, it was reported that when several mediators are tested separately through a simple mediation model, such a model may be plagued with the problem of omitted variables and can provide biased results (Judd & Kenny, 1981). While, on other hand, Gujarati (2004) has not only explained the problem of specification error due to omitted relevant independent variables, he further explained that this error also occurs when irrelevant independent variables are included in the model.

Becker & Gerhart (1996) mentioned that such types of problems might be solved through the incorporation of control variables but if in principle these omitted variables are measurable, they are not always accessible. This study also suggested that, if missing variables changes across organizations, but are somewhat fixed over time, longitudinal data might be collected to produce accurate results. This study further suggests selecting a homogenous sample to minimize the chances of specification error.

Gerhart (2007) has referred to two methods to minimize the challenge of an omitted variable. The first method is said to be a randomized experiment, which is more useful in a large sample size. While, the second method is statistical control and is largely used in regression analysis and comparing groups, analysis of covariance (ANCOVA). In addition, when many relevant mediators are included in the model, the probability of biased results due to the omission of relevant variables is minimized (Preacher & Hayes, 2008; Judd & Kenny, 1981).

Cross-sectional Design

The prior work in the field of HRM-Performance relationship has largely focused on cross-sectional design; while, longitudinal research designs have been largely ignored (Saridakis, Lai, & Cooper, 2017; Wright

& Gardner, 2003; Legge, 2005; Boxall, Purcell & Wright, 2007). This over-reliance on cross-sectional designs has been criticized by many researchers (Wall & Wood, 2005; Boselie et al., 2005; Purcell & Kinnie, 2007). It is also to be considered that this error confines the ability to conclude (Patterson et al., 2010). Moreover, many researchers mentioned that due to the problem of cross-sectional design, single respondent bias, and the problem of causality, the present results may be considered as little more than circumstantial (Wright & Gardner, 2003; Holman, Wall, Howard, 2003, Benson & Lawler, 2003; & Wood, 2003). Other researchers also endorsed that the relationship is based on a cross-sectional design using traditional financial data and asking about existing HRM practices, and there exists limited longitudinal design (Boxall, Purcell & Wright, 2007).

This indicates the paucity of longitudinal design, which is more required in the HRM-Performance relationship due to the reason that there may exist two-way causation (Paauwe & Boselie, 2005; Paauwae & Richardson, 1997; Boselie et al., 2005; Paauwae, 2009). However, it is also clear from the literature that cross-sectional design only measures the association between two or more than two variables but not causality (Purcell & Kinnie, 2007). Cross-sectional design does not lead to causality; hence, researchers should prefer longitudinal design over cross-sectional design (Sonnentag, 2003). Cook and Campbell (1979) have earlier presented time precedence of cause and effect as basic criteria for causation. Unfortunately, the sources of literature reflect this criterion is barely fulfilled in the HRM-Performance relationship, but even worse in some cases where HRM is measured after the performance (Wright et al. 2005). Keeping the above situation in mind, Gerhart (2007) concluded that longitudinal design is required to fulfill this criterion. Similarly, other researchers also concluded that longitudinal data of the organization, competing in one market, comparing at what is common and what are the differences between their HRM practices, would be particularly useful (Boxall, 2007).

Table 2: Methodological Challenges and Its Conclusion

Methodological Challenge	Conclusions
Random measurement error	The prior research has been based on measures with less-than-desirable reliability characteristics; estimates of the HRM and performance relationship are probably understated (Becker & Gerhart, 1996).

Single respondent bias	21 out of 25 studies relied on a single respondent to collect data regarding the HRM practices and often the same source has been used to measure the performance; hence, they might have reported biased results (Wall & Wood, 2005).
Specification error	It is equally plausible that prior estimates have underestimated the true relationship and respondents might be optimistically or pessimistically biased in reporting both HR and performance (Becker & Gerhart, 1996).
Cross-sectional	Many studies used cross-sectional designs which limit the ability to make causal inferences (Patterson et al., 2010).
Small samples	Many papers have small samples, low response rates, and concentrate on a limited range of sectors (Patterson et al., 2010).

Small Sample Size

The planned sample size largely depends on the expected effect size, statistical power of the test, and level of significance taken in significance testing. Hence, the expected effect size should be considered while calculating sample size (Cohen, 1988). In this connection, Gerhart (2007) referred to the challenge of small sample size in the HRM-Performance link. This problem is mainly due to data collection problems, given the unit or organizational level analysis, where data is difficult to obtain; hence, the most important relationship may not be captured because of the small sample size. While, in other fields, data is comparatively easy to collect, even a very small relationship could be significant due to the large sample size (Gerhart, 2007).

Likewise, Sonnentag (2003) has earlier mentioned that the small relationship between the independent and dependent variable, which may be very important but could not be identified due to small size. Hence, the challenge of sample size should be seriously considered. This study further suggests that sample size may be calculated based on power analysis. This could be useful in cases where a department or organization is big enough and provide an opportunity for a large sample size. In case, the requirement of sample size is greater than the available population within the department the options of sub-samples could be exercised. Moreover, qualitative methods might be more useful in such cases (Sonnentag, 2003).

Wall & Wood (2005) have also suggested a large sample size for the above-mentioned relationship. They reported that the relationship between HRM and performance would be benefited from the

incorporation of moderating factors, individual HRM practices relative to each other, and the bundles of overall HRM. The inclusion of such relevant variables into the model of course provides a more convincing relationship; however, the large number of such variables would also require a large sample size. This study further mentioned that the challenge of sample size becomes more important when there is a need for interactions effects, such as, various kinds of fit, the limited knowledge of regression analysis, which implies that large sample size in this area is required (Busmeyer & Jones, 1993; Aiken & West, 1991). In this connection Wall & Wood (2005) further advocated that high response rates along with large sample sizes would lead to generalization.

Table 3: Methodological Challenge and Remedies

Methodological Challenge	Remedies/Solution
Random measurement error	Researchers should increase the number of ratters; prepare better measures/rating scales, using different rating scales, use knowledgeable ratters, and use different respondents (Wright et al., 2000).
Single respondent bias	SEM, Marker variable, and longitudinal data could be used to overcome this problem (Gerhart, 2007). Similarly, researchers should use two or more persons, same raters across different organizations, raters who through knowledge of the use of practices in a range of organizations are able to benchmark the development of the practice against that elsewhere, and raters who are ignorant of the performance or the organization in question (Wall & Wood, 2005).
Specification error	Longitudinal data and homogeneous sample should be used (Becker & Gerhart, 1996)
Cross-sectional	The cross-sectional design has limitations regarding causal inferences, so the longitudinal design should be applied. (Wall & Wood, 2005). A cross-sectional study can only reflect the associations between the two variables but not causality; hence, the longitudinal study should be preferred (Purcell & Kinnie, 2007).
Correlation	Correlation alone is not sufficient to define the system; rather, regression, SEM and other statistical tools should be used to draw more confident conclusions (Wood, 1999).
Small samples	Large sample size, high response rate, big science project should be considered (Wall & Wood, 2005)

Sources of literature reviewed so far reflect the large prevalence of "methodological challenges" in the existing literature. Thus, the literature provides strong support that existing research designs used for the HRM-Performance relationship are plagued with critical methodological challenges. Whereas, some of these challenges arise from the very basic design of the study, such as sample size; that is, the nature of data required mainly affects the sample size of the study. However, the majority of these problems are the result of inappropriate methodology.

The conclusions presented in (table 2) illustrate the researcher's conclusions pertaining to different methodological problems. The similarity among all conclusions is that, although prior research claims a positive and significant relationship between HRM and performance, there exist equal possibilities that they might have reported biased results. Similarly, the majority of existing conclusions draw our attention to this point that scholars in this field are very much concerned about the empirical results; hence, researchers need to focus on their research design to overcome the problems related to the research methods.

The solutions provided in (table 3) reflect that wherever researchers have criticized the stated methodological challenges they have also proposed appropriate solutions for all methodological challenges. Thanks to those critics, they have done a wonderful job by identifying the existing challenges and accordingly suggested appropriate solutions. Researchers now need to take notice of these remedies and apply appropriate solutions to minimize the challenges associated with their research design. These solutions are important to obtain meaningful results and draw confident conclusions.

Conclusions

This study helps us to conclude that there exist significant methodological challenges, and researchers need to avoid these challenges in the future. These challenges made researchers more concerned about their empirical results. Therefore, the link between HRM and performance should be seriously considered. Similarly, a considerable number of researchers have focused on measurement due to items; while, measurement due to time and raters have been largely ignored.

Despite the fact that researchers repeatedly ask to avoid single respondent bias, this challenge still exists in the literature. There is a dire need to collect data from different stakeholders, such as employees, managers, customers, and unions, etc. Further, of the 13 methodological challenges, researchers did a reasonable job concerning specification

error. Furthermore, including rather than ignoring all relevant variables (independent, mediating, and control variables) would lead us to the better specification of the model.

A significant number of researchers have used cross-sectional research design at the expense of longitudinal research design. Researchers, whereas criticized the greater emphasis on cross-sectional research designs, they give more preference to longitudinal research design in order to understand the complex nature of the HRM-Performance relationship. Researchers by and large have employed a small sample size at the stake of large sample size. They further suggest that future research should focus on a large sample size, high response rate, and big projects to draw more accurate conclusions.

References

Becker, B.E., & Gerhart, B. (1996). The impact of human resource management on organizational performance: progress and prospects. *Academy of Management Journal, 39, 779-801.*

Boselie, P., Brewester, C., & Paauwe, J. (2009). In search of balance-managing the dualities of hrm: an overview of the issues. *Personnel Review, 38 (5), 461 – 471.*

Boselie, P., Dietz, G. and Boon, C. (2005). Commonalities and contradictions in hrm and performance research. *Human Resource Management Journal, 15 (3), 67-94.*

Boswell, W. R., Colvin, A. J. S. & Darnold, T. C. (2008). *Organizational systems and employee motivation.* In: R. Kanfer, G. Chen & R. D. Pritchard (Eds.) Work motivation: Past, present and future (pp. 361-400). New York, NY: Routledge

Boxall, P., Purcell, J., & Wright, P. (2007). *The Oxford handbook of human resource management*. Oxford University Press.

Chang, H., Son, S.Y., & Pak, J. (2020). How do leader-member interactions influence the hrm–performance relationship? a multiple exchange perspective. *Human Performance, 33* (4)

Cook, T.D. & Campbell, D.T. (1979). *Quasi-experimentation*. Chicago: Rand McNally

Doty, D. H., & Glick, W. H. (1998). Common methods bias: does common methods variance really bias results? *Organizational Research Methods, 1*(4), 374-406.

Gardner, T. M., & Wright, P. M. (2009). Implicit human resource management theory: a potential threat to the internal validity of human resource practice

measures. *International Journal of Human Resource Management, 20, 57–74.*

Gerhart, B. (2007). *Modeling hrm and performance linkages. In: the oxford handbook of human resource management* (pp. 552-580). P. Boxall, J. Purcell, & P. Wright (Eds.). New York: Oxford University Press.

Gerhart, B., Wright, P.M. and McMahan, G. (2000). Measurement error in research on the human resource and firm performance relationship: further evidence and analysis. *Personnel Psychology, 53: 855-872.*

Gerhart, B., Wright, P.M., McMahan, G.C. and Snell, S.A. (2000). Measurement error in research on human resources and firm performance: how much error is there and how does it influence effect size estimates. *Personnel Psychology, 53 (4), 803-834.*

Gerhart, B., Wright, P.M., McMahan, G.C. and Snell, S.A. (2000). Measurement error in research on human resources and firm performance: how much error is there and how does it influence effect size estimates. *Personnel Psychology, 53 (4), 803-834.*

Glaister, A. J., Karacy, G., Demirbag, M., & Tatoglu, E. (2017). HRM and performance: The role of talent management as a transmission mechanism in an emerging market. *Human Resource Management Journal; 23. 148-166.*

Guest, D.E. (1997). Human resource management and performance: a review and research agenda. *The International Journal of Human Resource Management, 3(8): 263-76.*

Guest, DE, Michie, J, Conway, N & Sheehan, M (2003). Human resource management and corporate performance in the UK. *British Journal of Industrial Relations*, 41(2): 291-314.

Guest, D.E. (2001). Human resource management: when research confronts theory: *International Journal of Human Resource Management, Vol. 12: 1092-1106.*

Gujrati, D.N. (2004). *Basic econometrics.* Int'l Ed. McGraw Hill Publishers, New York.

Huselid, M. A., & Becker, B. E. (2000). Comment on "Measurement error in research on human resources and firm performance: How much error is there and how does it influence effect size estimates?" by Gerhart, Wright, McMahan, and Snell. *Personnel Psychology, 53(4): 835-854.*

Huselide, M.A., & Becker, B.E. (1996). Methodological issues in cross sectional and panel estimates of the human resource-firm performance link. *Industrial relations, 35, 400-422.*

Judd, C. M., & Kenny, D. A. (1981). Process analysis: Estimating mediation in treatment evaluations. *Evaluation Review, 5, 602-619.*

Legge, K. (2005). *Human Resource Management Rhetoric and Realities*. London: Palgrave Macmillan.

MacDuffie, J. P. (1995). Human resource bundles and manufacturing performance: organizational logic and flexible production systems in the world auto industry. *Industrial and Labor Relations Review, 48, 197–221.*

Paauwe, J. & Boselie, P. (2005). HRM and performance: what next? *Human Resource Management Journal, 15, 68–83.*

Paauwe, J. & Richardson, R. (1997). 'Introduction Special Issue on HRM and Performance'. *The International Journal of Human Resource Management, 3(8): 257- 62.*

Paauwe, J. (2009). HRM and Performance: Achievements, Methodological Issues and Prospects. *Journal of Management Studies, 46 (1).*

Patterson, M., Rick, J., Wood, S., Carroll, C., Balain, S., & Booth, A. (2010). Systematic review of the links between human resource management practices and performance. *Health Technology Assessment, 14(51).*

Paul, A.K., and Anantharaman, R.N. (2003). Impact of people management practices on organizational performance: analysis of a causal model. *International Journal of Human Resource Management, 14 (7), 1246-1266.*

Preacher, K. J., & Hayes, A. F. (2008). *Contemporary approaches to assessing mediation in communication research.* In A. F. Hayes, M. D. Slater, & L. B. Snyder (Eds.), The Sage sourcebook of advanced data analysis methods for communication research (pp. 13-54). Thousand Oaks, CA: Sage.

Purcell, J. and Kinnie, N. (2007). *Human resource management and business performance. In The oxford handbook of human resource management,* (eds) P. Boxall, J. Purcell and P. Wright. Oxford University Press, Oxford.

Rogers, E. W. & Wright, P. M. (1998). *Measuring organizational performance in strategic human resource management: Problems and prospects* (CAHRS Working Paper # 98-09).

Saridakis, G., Lai, Y., & Cooper, C. L. (2017). Exploring the relationship between HRM and firm performance: A meta-analysis of longitudinal studies. *Human Resource Management Review, 27(1), 87–96. doi: 10.1016/j.hrmr.2016.09.005*

Savaneviciene, A. and Stankeviciute, Z. (2010). The Models Exploring the "Black Box" between HRM and Organizational Performance. *Engineering Economics, 21(4), 426-434.*

Shah, A, U., & Khan, M, I. (2019). HRM-Performance relationship: An overview of theoretical challenges and prospects. *Journal of Engineering Economics, 30(3), 382–393.*

Wall, T. D., & Wood, S. J. (2005). The romance of human resource management and business performance, and the case for big science. *Human Relations, 58(4), 429-462.*

Wright, P.M. & Gardner, T.M (2003). *The human resource–firm performance relationship: Methodological and theoretical challenges.* In D. Holman, T.D. Wall, C.W. Clegg, P. Sparrow & A. Howard (Eds), The new workplace: A guide to the human impact of modern working practices. Chichester: Wiley.

Wright, P.M., Gardner, T.M., Moynihan, L.M., & Allen, M.R. (2005). The relationship between HR practices and firm performance: Examining the causal order. *Personnel Psychology, 52, 409-446.*

Wright, P.M., Gardner, T.M., Moynihan, L.M., Park, H.J., Delery, J.R., & Gerhart, B. (2001). Measurement error in research on human resources and firm performance: Additional data and suggestions for future research. *Personnel Psychology, 54, 875-901.*