A META ANALYSIS OF THE VARIABILITY IN FIRM PERFORMANCE ATTRIBUTABLE TO HUMAN RESOURCE VARIABLES

Lloyd Kapondoro*, Chux Gervase Iwu**, Michael Twum-Darko***

Abstract

The contribution of Human Resource Management (HRM) practices to organisation-wide performance is a critical aspect of the Human Resource (HR) value proposition. The purpose of the study was to describe the strength of HRM practices and systems in influencing overall organisational performance. While research has concluded that there is a significant positive relationship between HRM practices or systems and an organisation's market performance, the strength of this relationship has relatively not received much analysis in order to explain the degree to which HRM practices explain variance in firm performance. The study undertook a meta-analysis of published researches in international journals. The study established that HRM variables accounted for an average of 31% of the variability in firm performance. Cohen's f^2 calculated for this study as a meta effect size calculation yielded an average of 0.681, implying that HRM variables account for 68% of variability in firm performance. A one sample Kolmogorov-Smirnov test showed that the distribution of R2 is not normal. A major managerial implication of this study is that effective HRM practices have a significant business case. The study provides, quantitatively, the average variability in firm success that HRM accounts for.

Keywords: Human Resource Best Practices, Human Resource-Firm Performance Relationship, Labour Productivity, Coefficient of Determination, Mean

** Graduate Centre for Management, Faculty of Business and Management Sciences, Cape Peninsula University of Technology, South Africa*
*** Faculty of Business and Management Sciences, Cape Peninsula University of Technology, South Africa*
**** Faculty of Business and Management Sciences, Cape Peninsula University of Technology, South Africa*

INTRODUCTION

This paper examines the distribution of the coefficient of determination (R^2) observed in researches on the relationship between HRM practices and firm performance. Essentially, the aim is to describe the variability in firm performance (productivity) that is attributable to HRM variables by analysing the distribution of the values of R^2 from existing studies on the HRM-firm performance relationship. As noted by Cascio (2005:17), a substantial number of distinct researches have been conducted on the impact of HRM practices on firm level performance. These studies generally use regression and correlation analysis to test the hypothesis that the aforementioned relationship exists. A measure that is used by most of the researchers to determine the variation in firm performance or productivity that is caused by HR factors in a model is R^2 (Stolzenberg, 2009:169) [R^2= explained variation divided by total variation (Frost, 2013)].

Most studies on the HRM-firm performance link have been conducted in the United States of America and the United Kingdom (Bae & Lawler, 2000). While other countries such as China and India have had such studies, there have not been significant researches of this nature in South Africa. The essence of this paper, therefore, is to reveal, using studies conducted elsewhere, the average size of the change in productivity that HR variables accounted for in the several models that have been used to study the HRM-firm performance relationship. A study of this nature is useful in South Africa as it specifies in numerical terms the contribution of HRM to firm performance given the limited availability of similar studies. Furthermore, with scholars increasingly arguing that HRM practices are key sources of competitive advantage (Pfeffer, 1994:4; Ulrich & Brockbank, 2005:6), the relevance of this paper to HR practitioners, the business community and to management scholarship becomes apparent.

Studies that inspired the current focus on the HRM-firm performance relationship have a long history as noted by Wright, Gardner, Moynihan and Allen (2005). According to Wright *et al.* (2005), the renowned management theorist, Peter Drucker, wrote in 1954 that personnel managers are worried about

their inability to show the value that they add to firm performance. From the 1990s, much attention has been directed at the HRM-firm relationship with the work of Huselid (1995) assuming a seminal position for the introduction of the concept of high performance work systems (HPWS). Huselid's (1995) studies demonstrated a set of HR practices (HPWS) which were related to turnover, profits and firm market value (Wright *et al.*, 2005). Since the introduction of HPWS, widespread studies have been conducted to support the idea of HPWS and to offer new perspectives for instance; Macduffie (1995) argued in favour of the concept of HR bundles that compliment organisational performance while Pfeffer (1998) proposed some HR best practices. Interest in HPWS and HR best practices has led to similar researches being done in other countries such as Korea (Bae & Lawler, 2000), China (Tang, Wang, Yan & Liu, 2012), Russia (Fey & Bjorkman, 2001), India (Singh, 2000). South Africa, however, has no notable research in this area. At the same time, there is a total absence of HRM standard practices for South African organisations and yet other business activities such as Production, Accounting and Engineering have clear standards of practice (Meyer, 2013; South Africa Board for People Practice (SABPP), 2013). According to the SABPP, the absence of HR standards has led to inconsistencies in HR practices within organisations, between organisations, within and across sectors and nationally. The SABPP further explains that without standards, there is high variance in HR practices and lack of benchmarks on what constitutes poor as opposed to best practices. With a problem such as this, the legitimacy of the HR profession could be questionable. Meyer (2013) further argues that the absence of HR standards is the single biggest obstacle to sound people practices in organisations. In a critique of the appropriateness of current HR practices in the South African (SA) socio-economic conditions, Abbott, Goosen and Coetzee (2013) made reference to Crous (2010) and Sibiya (2011) who argued that most HR practices in the developing countries (including South Africa) mirror those from the developed world resulting in them failing to address the socio-economic problems of developing countries in general and South Africa in particular.

If one considers the lack of standard HR practices among South African organisations as discussed above, the need for evidence on the extent to which certain standard HR practices positively influence performance becomes important. The objectives of this study, therefore, are:

a) To describe the extent to which HR variables account for variability in firm level performance using the coefficient of determination (R^2) observed among studies conducted on the HRM-firm performance relationship.

b) To determine the parameters of the distribution of R^2 and how the strength of HRM influences the variability in firm performance.

This study is unique in its attempt to provide some specific knowledge on the strength of contribution that HR practices add to firm performance. It adds value by demonstrating the strategic value of HRM in organisations.

The next section of this paper is a review of literature on the HRM-firm performance relationship. The methodologies used in the referred studies would also come under scrutiny. After the review of literature, the research questions for this study as well as a discussion of the research design follows. Thereafter, the main findings are discussed followed by directions for future research.

LITERATURE REVIEW

The literature on the HRM-firm performance relationship forms part of a group of studies associated with the paradigmatic shift of the role of HR from a transactional function to a strategic source of competitive advantage (Grobler & Warnich, 2012:39). Studies on HR practices and firm performance relationship are in line with the 'best practices' paradigm which has been supported by evidence from numerous studies. Grobler and Warnich (2012:42) grouped approaches to the studies on this relationship into three, namely: the universal approach, contingency approach and the configurational approach. According to Truss, Mankin and Kelliher (2012:89), the universalistic approach asserts that there is a 'one best way' of managing people that is applicable to all organisations, while the contingency perspective argues that the one best way of managing people vary from one organisation to another. Armstrong (2009:33-37) uses the term 'best fit' for the contingency approaches and identified another perspective, the 'bundling' approach which involves '…combining vertical or external fit and horizontal or internal fit.' Within these perspectives, this paper is oriented to the universalistic approach where certain HR practices are deemed to be linked to higher firm performance. Interest in this view is based on the argument that universal approaches face the inherent challenge of demonstrating their 'universalism'. As such, a meta summary condenses similar studies to provide the core element associated with an issue of interest. The element of interest that this paper focuses on is the degree to which HRM best practices explain the variability observed in firm performance in the various models that researchers have used to investigate the relationship. However, one problem with best practices in the literature is lack of consensus among scholars on what best practices entail (Grobler & Warnich, 2012:42). The question of components of best practice systems is not addressed in this paper, rather the paper focuses on the degree

of influence that HR variables have on firm performance without actually considering the type of practices that have such impact or the environments in which such studies were undertaken. The following sections describe the methodologies of most studies on the HRM-firm performance relationship including the models that researchers have used to investigate the relationship.

HR variables that influence firm performance

In a meta analytic study of how HRM influences organisational level outcomes, Jiang,, Lepak, Hu and Baer (2012) acknowledged that scholars do not concur on which HR practices constitute High Performance Work Systems (HPWS). The literature generally contends that HPWS involve complimentary HR practices that function as a system. However, the impact of each individual HR practice that contributes to the system is not equivalent. Studies of HPWS are actually based on the premise that HRM practices have a cumulative effect rather than an individual impact (Subramony, 2009). Systems and bundles of HR practices have been found to influence performance. Macduffie (1995) separated innovative HR practices (work teams, problem solving groups, job rotation, decentralised quality related tasks and employee suggestions) from traditional practices; Ji, Tang, Wang, Yan and Lin (2012) distinguished between collective-oriented HRM practices (collectivism in recruitment, training, evaluation, reward and compensation) from ordinary HR practices; Bartel (2004) mentioned three dimensions of HPWS namely – high skills, opportunity to participate and effective incentives. The literature is actually divergent, wide and inconclusive on which HR variables, practices, bundles and systems have the most significant influence on firm performance. An attempt to summarise these practices through a meta-analysis by Subramony (2009) resulted in the identification of three HRM bundles: (1) empowerment-enhancing; (2) motivating-enhancing; and (3) skill-enhancing. According to this classification, empowerment-enhancing bundles include employee involvement, formal grievance procedures, job enrichment, employee participation and self-managed teams while motivation–enhancing bundles include formal performance appraisal, incentive plans, linking pay to performance, opportunities for internal career mobility, healthcare and employee benefits. On the other hand, skill–enhancing bundles include job descriptions generated through job analysis; job based skill training, recruitment for the ability of a large pool of applicants and structured personnel selection. The study of what constitutes HPWS is still unclear and might need more investigation.

The following sections give details of the variable measurement techniques that researchers of the HRM-firm performance relationship have used.

Measurement of variables

The HRM-firm performance relationship is based on studies of HRM variables as predictors of firm performance. HR practices form the independent variables of the studies while firm performance is the dependent variable of such studies. Methodologies used by researchers to investigate the HRM-firm performance relationship can basically be grouped into two: (1) those that are based on a single regression model in which changes caused by HRM variables are analysed; and (2) those that group HRM practices into systems and then correlate each system with measures of firm productivity. Researchers who group HRM activities into systems normally have one system that is considered to be made up of 'best practices' while the other systems lack some of the practices (Arthur, 1994; Bae & Lawler, 2000; Fey & Bjorkman, 2001; Lin, 2012; Messersmith & Guthrie, 2010; Ichniowski, Shaw & Prennushi, 1997). On the other hand, researches that are based on single regression models normally make use of an index (e.g. the Human Capital Index) that sums up all HR practices into a single value and compares it with the productivity measure (e.g. Wyatt, 2001). These models have shown significant correlative relationships between HRM practices and firm performance. In these studies, R^2 is often used to determine the quality of multiple regression analysis (Stolzenberg, 2009:177).

All the 27 studies analysed in this study were based on linear regression models, mainly the least squares regression. Only a few of the studies had other kinds of linear regression models. Ichniowski, Shaw and Prennushi (1997) used the model: $(1\text{-}d_{it}) = \alpha_i + \beta' X_{it} + \gamma' HRM_{it} + \varepsilon_{it}$. One advantage of a model like this is that it shows the error term (ε_{it}) and also the effect of moderators (α_i). In this study error variables and the moderators were not considered.

Measurements of firm performance in the literature include financial performance (Hurmelinna-Laukkanen & Gomes, 2012; Huselid, 1995). Singh (2000:7) states that corporate financial performance is often measured by using indicators such as Price-Cost-Margin (PCM), Return on Capital Employed (RoCE), Return on Net Worth (RoNW) and share value. Another measure of firm performance found in the literature is labour productivity, often measured by considering employee outputs (Bartel, 2004; Macduffie, 1995). Armstrong (2006:21-23) provided a list of researches that were undertaken to investigate the link between HR practices and organisational performance. Table 1 below is a summary of the findings.

Table 1. Outcomes of research on the link between HR and organisational performance

Researchers	Outcomes
Arthur (1990; 1992; 1994)	Firms with a strategy of high commitment to HR matters had significant higher levels of both productivity and quality than those with a control strategy.
Huselid (1995)	Productivity is influenced by employee motivation; financial performance is influenced by employee skills, motivation and organisational structures.
Huselid& Becker (1996)	Firms with high performance values on HR systems index had economically higher levels of productivity.
Becket *et al.* (1997)	High Performance Work Systems (HPWS) make an impact as long as they are embedded in the management infrastructure.
Patterson *et al.*(1997)	HR practices explained significant variations in profitability among organisations.
Thompson (1998)	HR practices were linked to organisational success.

Source: Armstrong (2006)

Another review of the business case for standards or best practices is provided in Ingham (2007:65-81) as shown in Table 2 below.

Table 2. Review of the HRM-firm performance relationship

Researchers	Findings
Guest *et al.* (2000)	There are some basic people management practices that generally contribute to organisational performance.
Purcell et al. (2002)	Dissatisfaction with existing HR policies has a greater demotivating effect than the absence of the same HR policies.
West *et al.* (1997)	Some management actions are significant predictors of both change in profitability and change in productivity (acquisition and development of skills and design.).
Wyatt (2002)	There is a link between companies' Human Capital Index (HCI) score and their market value.
Pfeffer (1998)	Identified seven dimensions of people management practices that improve organisational performance differences and information sharing.

Source: Ingham (2007:65-81)

As shown in the summaries of the researches (see Table 1 and Table 2 above), a positive relationship has been observed between HRM practices and firm performance. Wright *et al.* (2005) observed that the existing literature lack the methodological rigour to establish whether the HRM-firm performance relationship is causal or simply correlative.

Goodness of fit of models

As a measure of goodness of fit of models, R^2 is always between 0% and 100% (or 0 and 1): 0% indicates that the model used explains none of the variability in the response data around its mean while R^2=100% indicates that the model explains all the variability of the response data around its mean (Frost, 2013). An analysis of R^2 for the models used to investigate the HRM-firm relationship reveals the change in productivity or firm performance that is explained by HRM. The business case for HRM practices on firm productivity is therefore based on the change in productivity that HRM variables account for. As an index of fit, R^2 is interpreted as the total proportion of variance in the dependent variable (Y) that is explained by the independent variable (X) (Schindler, 2011). In view of the above, the research questions were formulated as follows:

(a) What is the mean size of R^2 for the HRM-firm performance relationship?
(b) Which parameters of the distribution of R^2 influence HRM-firm performance?

Given the above research questions, this study seeks to advance the existing arguments that there is a strong business case for the adoption of certain HRM practices based on the numerous research findings that have established a significant positive relationship between HRM practices and firm performance.

RESEARCH DESIGN AND METHODOLOGY

A meta correlation technique was used to address the research question, whereby values of R^2 observed from the existing studies on the HRM-firm

performance were analysed using correlation techniques.

According to DeCoster (2004), meta-analysis is a process involving some steps one of which is the computation of 'effect sizes.' Higgins and Thompson (2002) explain that 'effect sizes' calculate the degree to which a phenomenon is present. There are several effect sizes such as: *p* values, *r* values and mean values of the phenomenon being studied. These effect sizes are calculated in various ways. The effect size analysed in this paper is R^2. The use of meta-analytic correlations in studies of this nature is also found in Crook , Todd, Combs, Woehr and Ketchen (2011) and Jiang ,Lepak, Hu and Baer (2012). Jiang *et al.* (2012) used the correlation model

$$r_{XY} = \frac{\sum rxiyj}{\sqrt{n+n(n-1)\bar{r}xiyj}\sqrt{m+m(m-1)\bar{r}yiyj}}$$

to calculate the effect size in their study of how human resource management influence organisational outcome. In the model:

"***x*** represents a dimension of HR systems (e.g. skill-enhancing HR practices) while ***y*** represents a category of organizational outcomes (e.g. employee motivation); *rxiyj* is the sum of the correlations between HR practices (e.g., recruitment, selection, and training) and outcome variables (e.g., collective satisfaction and commitment); *n* and *m* are the numbers of HR practices and outcome variables respectively; *rxixj* is the average correlation among HR practices; and *ryiyj* is the average correlation among outcome variables." (Jiang *et al.*, 2012: 1271).

On the other hand Crook *et al.* (2011) estimated the effect size by calculating the mean of the sample size weighted correlations $\bar{r}$from primary studies corrected for error using:

$$\overline{r_c} = \frac{\bar{r}}{\sqrt{\bar{r}_{xx}}\sqrt{\bar{r}_{yy}}}$$

The most suitable meta correlation method which was used for this study was to calculate Cohen's f^2 for the values of R^2 recorded in the various studies analysed. Cohen's f^2 is a measure of the variance that is explained by a variable within a multivariate regression model (Selya, Rose, Dierker, Hedeker & Mermelstein, 2012).The distribution of R^2 was analysed using IBM SPSS software version 22. . As mentioned earlier, R^2 is an effect size that considers the degree to which a factor causes variation in the outcome of a multivariate model. Cohen's f^2 measures the variability that a certain factor (HRM in this case) accounts for in a multivariate model. From Cohen's measurement, the average effect size of Cohen's f^2 was determined. Therefore:

$$f^2 = \frac{R^2}{1 - R^2}$$

where R^2 is the coefficient of determination found in the various multivariate models used to argue that there is a relationship between HRM practices and firm performance.

Key parameters such as the mean and standard deviation of a variable are arguably important in order to create an understanding of the strength of that variable in influencing the phenomenon that is being investigated. Analysing the distribution of the effect size, R^2, provided the description of the variability in firm performance which HR variables accounted for in the models that were used in the 27 studies investigated. The ontological perspective held is that the reality of the link between HR concepts or practices and firm performance is an objective reality that can be analysed objectively using statistical methods. The researchers sought to provide a simple interpretation of the HRM-firm performance relationship that does not involve sophisticated statistical processes which are typical of full meta-analysis methodologies.

To answer the research questions stated above, relevant research papers from Wiley Online Library data base were retrieved. The database was accessed through the Library Portal of the Cape Peninsula University of Technology, South Africa. Cross reference searches were also conducted to seek the relevant studies. The phrase 'HRM firm performance relationship' was used to retrieve relevant studies from the database. Only studies that are quantitative and that have a computed R^2 were selected. Furthermore, relevant studies were restricted to those in which HR practices as independent variables were analysed with some measure of firm performance as the dependent variable.

Knowledge of the parameters of a distribution is crucial in describing that distribution. For this study the null hypothesis that R^2 follows a normal distribution was tested using the Kolmogorov-Smirnov test. The null hypothesis was set up based on the default assumption that most variables approximate a normal distribution.

FINDINGS

Table 3 below shows the 27 studies that were analysed. 'X' represents the independent variable while 'Y' is the dependent variable. The purpose of this analysis was to describe the variability in firm level outcomes that is caused by HR practices by analysing R^2. R^2 gives an indication of the extent to which 'X' explains 'Y'.

Table 3. R^2 in studies of the HRM-firm relationship

Authors	X	Y	N	R^2
01 Ichniowski, Shaw and Prennushi (1997)	Innovative HRM practices (System 1)	Productivity uptime	2190	R^2=0.283
02 Huselid, Jackson and Schuker (1997)	Strategic HRM	Firm performance (data from financial performance)	293	R^2=0.246
03 Macduffe (1995)	HRM policies (organisation wide policies affecting commitment and motivation)	Labour productivity (hours of actual working effort required to build a vehicle)	62	R^2=0.649
04 Bartel (2004)	High performance work environment (HR indexes)	Organisational performance (growth in deposits)	330	R^2=0.245
05 Bartel (2004)	High performance work environment (HR indexes)	Organisational performance (growth in loans)	330	R^2=0.560
06 Huselid (1995)	High Performance work practices	Productivity (corporate financial performance)	85	R^2=0.167 when elements of HPWS's are included in the calculation model
07 Huselid (1995)	High Performance Work Practices	Productivity	85	R^2 = 0.498 when elements of HPWs were included in the model
08 Arthur (1994)	Human resource systems	Manufacturing performance (labour hours)		R^2=0.65 for High commitment work systems
09 Chadwick, Ahn and Kwon (2012)	HR practice variables	Total sales	1579	AdjustedR^2=0.489 (for the model with the highest R^2 out of the four models used.
10 Tang, Wang, Yann and Liu (2012)	Collectivism – oriented HRM	Firm performance	314	R^2=0.21 (for model 4, with highest R^2 as moderated by product diversification)
11 Bae and Lawler (2000)	Presence of high-involvement HRM strategy	Firm performance	138	Adjusted R^2 = 0.35
12 Huang (n.d)	Strategic HRM	Organisational performance (behavioural performance, financial performance and overall performance)	315	R^2 = 0.168 (relationship most strongest for behavioural performance)
13 Singh (2000)	HR practices (HR practices index, HRPI)	Firm performance (productivity)	82	R^2=0.07)
14 Sigh (2000)	HR practices (HR practices index, HRPI)	Firm performance (Price-Cost margin)	82	R^2 = 0.06
15 Sigh (2000)	HR practices (HR practices index, HRPI)	Firm performance (Return on Capital employed)	82	R^2= 0.04
16 Sigh (2000)	HR practices (HR practices index, HRPI)	Firm performance (Return on Net Worth)	82	R^2 = 0.06
17 Fey and Bjorkman (2001)	HRM-strategy fit	Firm performance	101	R^2=0.339
18 Lin (2012)	HRM systems	Non-financial firm performance (products, services and programs)	324	R^2=0.270
19 Lin (2012)	HRM systems	Non-financial firm performance (customer satisfaction)	324	R^2=0.245 Adjusted R^2=0.209

20 Lin (2012)	HRM systems	Non-financial firm performance (productivity)	324	R^2=0.255 Adjusted R^2=0.218
21 Lin (2012)	HRM systems	Financial firm performance (sales growth)	324	R^2=0.226 Adjusted R^2=0.188
22 Lin (2012)	HRM systems	Financial firm performance (profitability)	324	R^2=0.211 Adjusted R^2=0.172
23 Wickramasinghe and Liyanage (2013)	HPWS	Job performance	220	R^2=0.415
24 Messersmithand Guthrie (2010)	HPWS	Sales growth	215	R^2=0.185
25 Katou, Pawan and Budhwar (2007)	HRM policies	Overall organisational performance	178	R^2=0.834 Adjusted R^2 =0.791
26 Hurmelinna-Laukkanen and Gomes (2012)	HRM strength	Financial performance	69	R^2=0.191
27 Lo, Mohamad and La (2009)	HRM factors	Firm performance	85	R^2=0.404 Adjusted R^2= 0.380

Summary of the studies

Table 4. Summary of the effect sizes of the studies on the HRM-firm performance relationship

Study	R^2	Cohen's f^2
01	0.283	0.3947
02	0.246	0.32626
03	0.649	1.849003
04	0.245	0.324503
05	0.56	1.272727
06	0.167	0.20048
07	0.498	0.992032
08	0.65	1.857143
09	0.489	0.956947
10	0.21	0.265823
11	0.35	0.538462
12	0.168	0.201923
13	0.07	0.075269
14	0.06	0.06383
15	0.04	0.041667
16	0.06	0.06383
17	0.339	0.512859
18	0.27	0.369863
19	0.245	0.324503
20	0.255	0.342282
21	0.226	0.29199
22	0.211	0.267427
23	0.415	0.709402
24	0.185	0.226994
25	0.834	5.024096
26	0.191	0.236094
27	0.404	0.677852
Average	0.308148	0.681776

Table 4 above provides a summary of the effect sizes of the HRM-firm performance relationship. The table shows that the average R^2 is 31% while the average Cohen's f^2 is 68%. This result is consistent with the 27 studies shown in Table 3 on the HRM-firm performance relationship that found a significant relationship between HRM and firm performance.

The distribution of R²

The initial assumption for the distribution of R^2 was that it follows a normal distribution with mean μ and standard deviation δ where the values of μ and δ are 0.31 and 0.20 respectively. Using the Kolmogorov-Smirnov test (based on the IBM SPSS version 22 software) to determine whether the normal distribution is a good fit for the data resulted in the rejection of the null hypothesis that the distribution of R^2 is normal with mean 0.310 and standard deviation 0.20 as shown in Figure 1 below.

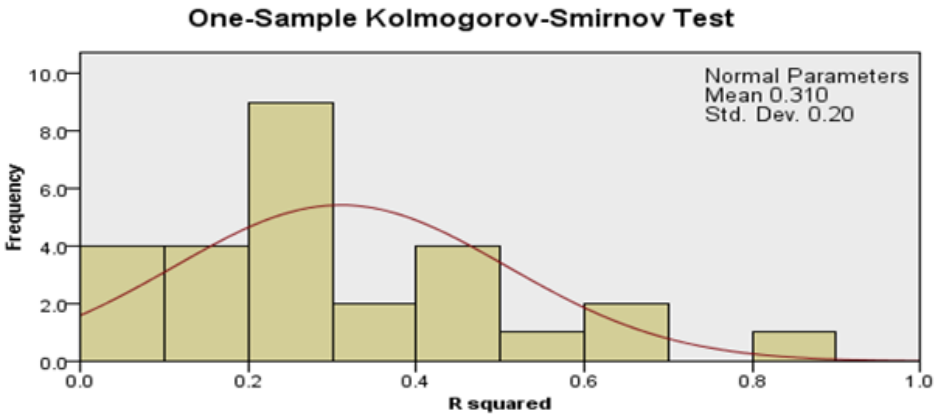
Figure 1. One sample Kolmogorov-Smirnov test for the normal distribution

Hypothesis Test Summary				
	Null Hypothesis	Test	Significance	Decision
1	The distribution of R square is normal with mean 0.310 and standard deviation 0.20.	One-Sample Kolmogorov-Smirnov Test	0.021*	Reject the null hypothesis.

Asymtomic significances are displayed. The significance level is 0.05.
* Lilliefors Corrected

The one sample Kolmogorov-Smirnov test approximated the distribution of R^2 graphically as shown in Figure 2 below.

Figure 2. Approximate distribution for R^2



Total N		27
Most Extreme Differences	Absolute	0.183
	Positive	0.183
	Negative	- 0.088
Test Statistic		0.183*
Asymptomic Sig. (2-sided test)		0.021

* Lilliefors Corrected

DISCUSSION OF FINDINGS

Research question 1

The research question was about the mean size of R^2 for the HRM-firm performance relationship. Table 5 below summarises some of the basic measures of central tendency (mean, median and mode) and measures of dispersion (sample variance, *s*; sample standard deviation, s^2; maximum value and minimum value) for the data. The mean of the observed R^2 is therefore 0.308148. This means that the models used to analyse the HRM-firm performance relationship accounted for about 31% of the variability in the observed R^2 values. This finding, thus, show that the models used in the studies established that HRM accounted for about 31 per cent of variation in productivity.

Table 5. Basic statistical computations for the studies

Mean ($\bar{x}$)	s	s^2	Max	Min	Median	Mode
0.308148	0.039533	0.198828	0.834	0.04	0.246	0.245

The range for the R^2 values (0.834-0.04) is 0.74 which is quite high suggests that there are some studies that have shown that HR variables account minimally for variability in performance while at the same time there are some that have indicated a high contribution of HRM. This could be logically explained by the differences in firms with regard to the moderating effects of industries and other unique firm specific or environmental specific factors.

Research question 2

The null hypothesis that the distribution of R^2 follows a normal distribution with mean 0.31 and standard deviation 0.20 was rejected after the one sample Kolmogorov-Smirnov test. Therefore the actual distribution of R^2 remains unknown after this study. Even though studies in many countries on the HRM-firm relationship have found correlation between HRM practices and firm performance, there is an absence of evidence for causality between the two variables (Katou & Budhwar, 2009; Wright *et al*., 2005). This has resulted in debates about whether HR practices have a direct business case or are mediated by some factors. Katou and Budhwar (2009) also mentioned the lack of clarity on the possibility of reverse causality with the HRM-firm relationship. The argument of 'reverse causality' is based on the likelihood that high firm performance could result in positive impact on the HR practices. Indeed this area still remains grey within the literature.

CONCLUSION AND RECOMMENDATION

An analysis of 27 empirical studies on the HRM-firm performance relationship has been done in this study. The specific focus was to calculate the mean R^2 value based on the R^2 values recorded in the different studies. This study has found that the mean R^2 is 31%. This means that HR factors accounted for 31% of the variability in productivity in the various studies conducted using the different models. Each of the studies had moderator variables such as industry type, strategy or management styles. It is therefore dependent on a number of circumstances whether a 31% contribution to productivity can have an effect on competitive advantage or not for the organisations. In addition, the average value of Cohen's f^2 was 0.681776. This can be interpreted to mean that about 68% of the variation in the multivariate regression models used for the HRM-firm performance relationship is accounted for by HRM factors. While the average for R^2 is lower than that for Cohen's f^2 both values shows that HRM variables account significantly for variability in firm performance.

Limitations of the study

This study has not considered the moderator variables of the HRM-firm performance relationship and also the error values of the regression models used in the studies. These moderator variables influence the relationship in various ways and may influence the magnitude of the variability in firm performance that is attributable to HRM variables. Another limitation of this study is the number of studies analysed. A larger number of empirical studies could give more reliable results than the ones examined in this study. In spite of these limitations, the paper has provided some basic understanding of the variability in firm performance that is explained by HR variables.

Suggestions for future research

While this study aimed to create an understanding of the strength of the impact of HR practices on firm level performance by calculating the mean value of R^2 observed from several studies, there is a need for more studies of this nature to understand the distribution of R^2. Further research is necessary to establish whether the distribution is normal or simply follows some other distribution. It might also help to establish key features of this distribution. More so, South Africa has no significant empirical studies that correlate assumed 'best practices' with firm level performance. Lastly, a more comprehensive and detailed meta-analysis that considers moderator variables and error is necessary in order to understand the implications of the HRM-firm performance relationship.

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