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## Article

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## Strength of the HRM system: The development of a measure

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### **Abstract:**

**Purpose:** The aim of this study is to operationalize the construct Strength of the HRM System theoretically defined by Bowen and Ostroff (2004) as a set of process metafeatures to convey signals to employees about desired and appropriate work behaviors, as well as to develop and validate a questionnaire to measure it, the HRMSQ.

**Design/methodology/approach:** Three studies contribute to this purpose. In the first study we develop a questionnaire and test it with employees from several organizations. In the second study we applied the refined questionnaire in a sample of employees from a large company, and assessed different types of validity. The final study replicated results from the second study.

**Findings:** Psychometric properties reveal good internal consistency reliability, item reliability and construct reliability, as well as convergent and discriminant validity.

**Practical implications:** Results indicate that the HRMSQ can be used in the study of strategic HRM.

**Originality/value:** The HRMSQ is a friendly instrument that can help HR practitioners to assess whether the HRM system is unambiguously perceived by employees, and identify possible problem areas in terms of the implementation process. It also contributes to research in the strategic HRM field by operationalizing a construct that is likely to improve the understanding of the link between the HRM System and organizational performance.

**Keywords:** strength of the HRM system, questionnaire validity, questionnaire development

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## 1. Introduction

The relationship between human resource management (HRM) and organizational performance has been empirically established in the last 25 years by many studies that focused either on the impact of HRM practices on employee skills, attitudes, and behaviors, or on strategically coherent work organization that can lead to operational effectiveness (e.g., Arthur, 1994; Delery, 1998; Huselid, 1995; Ichniowski, Shaw & Prennushi, 1997; Laursen & Foss, 2003). However, as Guest (1997; 2011) pointed out, these studies demonstrate an association rather than causation, which means that further methodological improvements are needed to understand how HRM and performance are connected, and what goes on in the black box (Boselie, Dietz & Boon, 2005). As argued by these and other authors, such complex linkage between HRM and performance is insufficiently studied with existing theories and with panel and cross-sectional data; rather, better theories and longitudinal researches with more powerful instruments should be developed.

Following this plea, Bowen and Ostroff (2004) proposed that the relationship between the HRM system and organizational performance is mediated by organizational climate, defined as a shared perception of what the organization is like, in terms of practices, policies, procedures, routines, and rewards. The sole consideration of HRM content, i.e., the set of HRM practices designed with a certain strategic focus, is insufficient because these practices may be idiosyncratically interpreted by employees, not allowing the desired type of organizational climate to materialize in the organization. Hence, they argue, it is important to understand how HRM practices are perceived by individual employees, if one wants to comprehend how HRM is linked to organizational performance. Following this reasoning, they coin the term 'strength of the HRM system' (SHRMS), which indicates the ability of the HRM function to send unambiguous signals about collective and desired responses and actions regarding organizational goals and purposes. The new concept, according to Bowen and Ostroff (2004) (see also Ostroff & Bowen, 2000), is composed of three features: distinctiveness, consistency and consensus.

The contribution of this article to the strategic HRM literature is threefold: first, we refine and simplify the theoretical elaboration of strength of the HRM system, and highlight that it must be conceived as a situational characteristic that sends powerful signals to employees, and allows them to develop shared interpretations of organizationally desired behaviors; second, we develop and validate a questionnaire to measure SHRMS, which we include in the Appendix A; third, using several different samples, we obtained support for the impact of SHRMS on organizational climate and perceived organizational performance.

We start by outlining Bowen and Ostroff's model of strength of the HRM system and discuss its theoretical elaboration. We then describe and present the results of the three studies in which the new measure was developed and validated. In the first study we developed a preliminary version of the questionnaire and tested it with employees from several organizations. In the second we applied the refined questionnaire, in a sample of employees from a hotel chain and assessed its criterion-related validity; and the third is a replication study to assess the stability of the proposed new model. In closing we discuss our findings relative to Bowen and Ostroff's model.

## **2. Strength of the HRM System**

In order to explain how the HRM practices influence employees' behaviors, Bowen and Ostroff (2004) introduce the concept of 'strength of the HRM system' (SHRMS), and argue that strong HRM systems lead to strong organizational climates, by sending consistent messages to employees about which behaviors are valued by the organization. Bowen and Ostroff (2004) argue that with strong HRM systems the process of collective sense making is likely to produce the intended organizational climate, whereas weak HRM systems are likely to produce variability and unintended climates. Following Kelley's attribution theory (1967; 1973; also Kelley & Michela, 1980), they propose that strong HRM systems are the result of three features: distinctiveness, consistency and consensus.

Distinctiveness translates the ability to capture the attention of employees and increase their identification and acceptance of HRM practices. It includes four metafeatures: visibility, understandability, legitimacy of authority, and relevance. Visibility denotes the degree to which practices are salient and easily observable. Understandability refers to the absence of ambiguity and to the easy comprehension of the content of HRM practices. Legitimacy of authority refers to the perception of a high status and credibility of the HRM function. Finally, a situation is considered to be relevant if employees regard it as promoting the achievement of individual and organizational goals.

The second feature, consistency, focuses on the three components that promote constant perceptions over time, people, and contexts: instrumentality, validity, and consistent HRM

messages. Instrumentality refers to the establishment of an unambiguous perception of the cause-effect relationship between the desired employee behaviors and their consequences. Validity encompasses the consistency between what is said will be done and what really is done. Consistent HRM messages are present when there is compatibility and stability between the signals sent by the HRM practices.

The final feature is consensus, which represents the clear agreement among employees regarding the relationship between an event and its outcome, and it includes two metafeatures: agreement among principal HRM decision makers and fairness. The first promotes shared perceptions on people management, whereas the latter includes the three types of fairness, commonly referred to in the literature: distributive (ends achieved), procedural (means used), and interactional (information provided).

As a result, the strength of the HRM system is likely to enhance employee attitudes and behavioral patterns, such as work motivation, organizational commitment and skill development, and will thus have a positive effect on organizational performance.

Empirical research to test Bowen and Ostroff's theory is still scarce. Several empirical studies were made (e.g., Li, Frenkel & Sanders, 2011; Sanders, Dorenbosch & Reuver, 2008; Stanton, Young, Bartram & Leggat, 2010; Sheehan, Cooper, Holland & De Cieri, 2007; Ferris, Hochwarter, Buckley, Harrell-Cook & Frink, 1999; Pereira & Gomes, 2012; Ribeiro, Coelho & Gomes, 2011). However these have used measures which were not validated, as up to very recently there were no available instruments to capture the full content of Bowen and Ostroff's concepts. One important exception is the work of Delmotte, De Winne and Sels (2012), who have developed and validated a self-reported questionnaire based on line managers and union representatives in Belgium.

The current work differs from Delmotte et al.'s (2012) study in two ways. Firstly, it is based on employee data, and not on managerial or union-representative data. As in fact recognized by Delmotte et al. (2012), their results are limited to perceptions of two important functional groups, but did not take into account employees' perceptions of HR practices. As put forward by Nishii, Lepak and Schneider (2008), employees' perceptions are paramount in explaining the linkages between HRM and performance. And secondly, their results showed a surprisingly distinct construct arrangement from that proposed by Bowen and Ostroff (2004). Distinctiveness, for example, showed two metafeatures, instead of four, as theoretical advanced by Bowen and Ostroff (2004). Likewise, Delmotte et al.'s results showed that consistency was composed of two metafeatures, instead of three. The current work also follows Delmotte et al.'s call to test Bowen and Ostroff's theory through more empirical investigations looking at construct measurement and instrument validation.

All in all, the above-mentioned arguments justify that a measure of SHRMS, as an organizational signaling process, needs to be developed and validated to improve the

understanding of the HRM-organizational performance link, not only for the advancement of theory on HRM but also for practitioners who want HRM to have a significant impact on their organizations.

### **3. Method**

#### **3.1. Study 1**

##### **3.1.1. Item generation**

The development of the questionnaire began with a brainstorming among the authors. Some items were later modified and others were added as a result of interviews with HR managers. To assess content validity, these items were presented to a group of graduate students in one executive post-experience OB/HRM master's program, together with the definitions of the nine metafeatures. We asked these experts to classify the items in the nine metafeatures and retained only those that reached a minimum of 75% agreement (Hinkin, 1998). We then evaluated the terminology to ensure that it was distilled from the theoretical model and to enhance readability, clarity, and relevance and ended up with 72 items, 8 in each characteristics, which is considered an adequate number (Harvey, Billings & Nilan, 1985). We used a 7-point scale, where 1 = strongly disagree and 7 = strongly agree.

##### **3.1.2. Participants**

The initial version of the questionnaire was administered simultaneously in six different organizations from different sectors. The sample is made up of from 198 employees (23%return rate) of which 42% were male.

##### **3.1.3. Results and discussion**

Reliability, ranging from .80 to .92, for the nine metafeatures, well above the .70 threshold (Hair, Black, Babin, Anderson & Tatham, 2006).

In order to identify and confirm the underlying structure of each feature and to trim the questionnaire, an exploratory factor analysis (EFA) was run for each feature separately, to reduce multicollinearity, due to the strong correlations among the three features and their nine metafeatures. The principal axis factoring extraction method was used, with direct oblmin and Kaiser normalization rotation method. The final solution emerged, retaining 22 items for distinctiveness accounting for 66.12%, 12 items for consistency accounting for 64.46%, and 8 items for consensus accounting for 58.48% of the total variance. Based on the theoretical

model and the item reduction process, a new version of the questionnaire was tested in a new sample.

### 3.2. Study 2

#### 3.2.1. Participants

The study was conducted in 38 hotels of a hotel chain with several brands. The questionnaire was sent to a total of 666 employees, of which 455 provided valid replies (response rate of 68%). 57.7% were women.

#### 3.2.2. Results and discussion

In Table 1, we report the descriptive statistics of this sample. Cronbach alphas are all above the .70 cutoff (Hair et al., 2006).

Metafeature	Mean	SD	Pearson's Correlations								
			(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(1) Visibility	3.94	.81	(.92)								
(2) Understandability	4.05	.88	.76	(.94)							
(3) Legitimacy of Authority	4.61	.72	.55	.52	(.81)						
(4) Relevance	4.45	.87	.66	.61	.80	(.83)					
(5) Instrumentality	4.17	.90	.56	.52	.69	.80	(.70)				
(6) Validity	4.46	.77	.58	.54	.72	.73	.74	(.75)			
(7) Consistent HRM Messages	4.62	.68	.59	.54	.75	.71	.69	.78	(.79)		
(8) Agreement among principal HRM decision makers	4.58	.69	.55	.51	.81	.76	.71	.75	.83	(.83)	
(9) Fairness	4.29	.89	.61	.52	.58	.70	.69	.64	.60	.64	(.76)

Cronbach's alpha in parentheses

Table 1. Descriptive and reliability statistics

### 3.2.3. Confirmatory factor analysis (CFA)

A CFA was conducted to assess goodness of fit of the integrated SHRMS model. The solution was not admissible because the covariance matrix was not positive definite. So, the model was re-specified, considering both theory and modification indices (Figure 1).

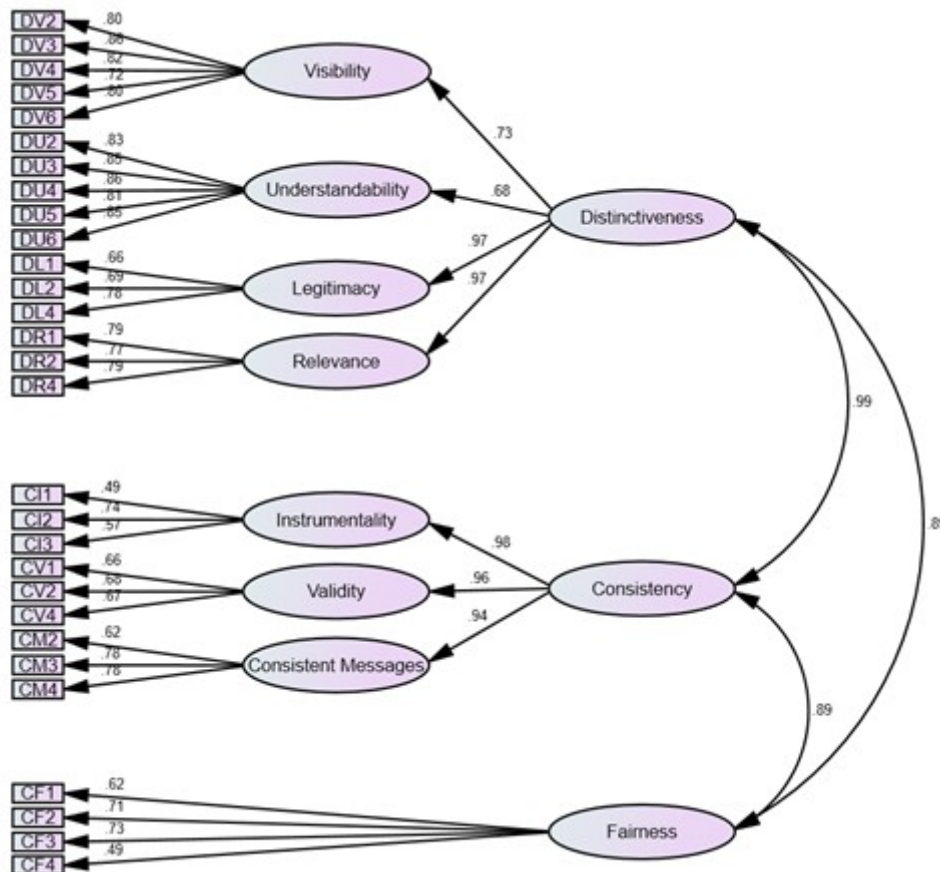


Figure 1. Hypothetical SHRMS' model

Agreement among principal HRM decision makers (a metafeature of consensus), was excluded from the model, because respondents did not consider it as independent from the other ones, particularly consistent HRM messages (a metafeature of consistency). The Pearson correlation ( $r=.83$ ) between these two features was the highest one and it explains why the covariance matrix before re-specification was not positive definite.

This model showed a good fit ( $\chi^2_{(359)} = 834.43$ ,  $\chi^2/df = 2.32$ ,  $CFI = .94$ ,  $PCFI = .84$ ,  $RMSEA = .05$ ,  $CI$  90% for  $RMSEA$  [.05; .06]). The composite reliabilities (Fornell & Larcker, 1981) were: .94 for visibility, .96 for understandability, .84 for legitimacy, .89 for relevance, .73 for instrumentality, .80 for validity, .85 for consistent HRM messages, and .82 for fairness.



### 3.2.4. Reliability, convergent and discriminant validity

Two methods were used to assess reliability:

- internal consistency reliability, measured by Cronbach's alpha, reflects the extent to which the multiple items for a latent variable belong together; and
- individual reliability of the items, measuring the amount of variance in a descriptor due to the underlying construct rather than to error (Chau, 1997).

Cronbach's alphas are: .94 for distinctiveness (16 items), .85 for consistency (9 items) and .76 for fairness (4 items). The variance explained by the respective latent variable measured by the squared multiple correlation value is higher than .25 (Johnson & Stevens, 2001), with the exception of items CI1 (.24), underlying consistency, and CF4 (.24), underlying fairness, as shown in Figure 1.

Convergent validity measures the extent to which the items, reflecting a factor, truly represent that factor. Regression weights for in their latent metafeatures were significant and higher than .50, with the exception of one in consistency (.49) and one in fairness (.49). Convergent validity was measured by the average variance extracted (AVE), which represents the overall amount of variance in the items, accounted for by the latent construct (Fornel & Larcker, 1981). The AVE results are adequate for each metafeature: .76 for visibility, .81 for understandability, .64 for legitimacy, .74 for relevance, .53 for instrumentality, .58 for validity .66 for consistent HRM messages and .53 for fairness, since all are above .50 (Hair et al., 2006).

Discriminant validity measures the extent to which the constructs are conceptually distinct. Discriminant validity was analyzed with two different methods. Firstly, we used the chi-square difference test of the final baseline model and alternative nested models specifying equality between each pair of features (Anderson & Gerbing, 1988). These differences were all significant ( $\chi^2_{diff(1)}=65.5$ ,  $p<.005$ , for distinctiveness with consistency;  $\chi^2_{diff(1)}=92.37$ ,  $p<.005$ , for distinctiveness and fairness;  $\chi^2_{diff(1)}=40.04$ ,  $p<.005$ , for consistency and fairness), which suggests discriminant validity. Second, we compared the AVE results for each metafeature with the squared correlation between any pair of metafeatures (Bhattacharjee, 2002). The AVE results for each metafeature are higher than the squared correlations, showing discriminant validity among all metafeatures (Table 2).

Metafeature	AVE	Squared correlations						
		(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) Visibility	.76							
(2) Understandability	.81	.58						
(3) Legitimacy	.64	.30	.27					
(4) Relevance	.74	.43	.38	.64				
(5) Instrumentality	.53	.31	.27	.47	.64			
(6) Validity	.58	.33	.29	.52	.53	.54		
(7) Consistent HRM messages	.66	.35	.29	.56	.50	.48	.61	
(8) Fairness	.53	.37	.27	.34	.49	.47	.41	.36

Table 2. Discriminant validity: Comparison of AVE with the squared correlation of the metafeatures

In summary, the hypothesized factor structure was confirmed, as well as reliability and convergent and discriminant validity of the model.

### 3.2.5. Criterion-related

Bowen and Ostroff (2004) propose that SHRMS induces the emergence of a strong organizational climate, which then leads to enhanced organizational performance. Organizational climate refers to shared beliefs among employees that allow them to make sense of the organization's environment, whereas organizational climate strength is the within-unit consensus, reflecting the variance and ambiguity (or clarity) of organizational norms and practices (Dickson, Resick & Hanges, 2006). Climate strength has been shown to be associated with positive individual and organizational outcomes (Lindell & Brandt, 2000).

In order to assess criterion-related validity of the HRMSQ, we used one measure of organizational climate, one measure of organizational climate strength and one measure of perceived organizational performance. Organizational climate was measured by the Brown and Leigh (1996) scale. Organizational climate strength was operationalized by the standard deviation of climate perceptions of individuals within each hotel to represent the strength of the climate variable, according to recommendations by Chan (1998), and to have a more reliable measure of the construct (Kinicki, Jacobson, Peterson & Prussia, 2013). Finally, we used a measure of perceived organizational performance, based on an aggregation of six items. Employees were asked how their organization compared to its closest competitor in terms of employee competence, work performance, work satisfaction, work motivation, work organization, and creativity and innovation. The structural equations model has a good fit ( $\chi^2_{(443)} = 1047.382$ ,  $\chi^2/df = 2.36$ ,  $CFI = .92$ ,  $PCFI = .82$ ,  $RMSEA = .06$ ,  $CI$  90% for  $RMSEA$  [.06; .07]). Regression weights estimates are all significant (.676,  $p = .000$  for organizational

climate,  $- .061$ ,  $p = .000$  for organizational climate strength and  $.679$ ,  $p = .066$  for perceived organizational performance) which supports criterion-related validity with those criteria.

HRMSQ criterion-related validity results, with organizational climate, organizational climate strength (2 levels), and perceived organizational performance as criterion variables.

### 3.2.6. Cross-validation

We cross-validated the HRMSQ, by creating two different random groups, with around 50% of the cases each. We then tested for measurement invariance (Cheung & Rensvold, 2002), using sequential chi-square difference tests. We denoted by Model 0 the unconstrained model; by Model 1, the model of fixed measurement weights; by Model 2, the model with fixed measurement covariances and by Model 3, the model with fixed measurement errors. Results are presented in Table 3.

Assuming Model 0 to be correct	$\chi^2$	df	p	CFI
Model 1	27.98	21	.14	.93
Model 2	32.09	27	.23	.93
Model 3	112.30	66	.00	.92
Assuming Model 1 to be correct				
Model 2 vs. Model 1	4.11	6	.66	
Model 3 vs. Model 2	84.32	45	.00	
Assuming Model 2 to be correct				
	80.32	39	.00	

Table 3. CFAs for the cross-validation of the HRM SQ model, using an analysis of factorial invariance

The unconstrained model (Model 0), results showed good fit ( $\chi^2/df = 1.90$ ,  $CFI = .93$ ,  $PCFI = .81$ ,  $RMSEA = .04$ ,  $CI$  90% for  $RMSEA$  [.04; .05]), i.e. the same factor model was able to fit the data from each group, and suggests the equivalence of the factorial structure invariance. Neither the chi-square difference test between Model 0 and Model 1 ( $p = .14$ ) or between Model 0 and Model 2 ( $p = .23$ ) are significant suggesting factor loadings and covariance invariance respectively. The chi-square difference between Models 1 and 2 is not significant ( $p = .66$ ), suggesting also factor covariance invariance. The chi-square difference between models 0, 1 and 2 on one hand and Model 3 on the other hand indicate that the hypothesis of invariant item uniqueness or measurement error was rejected ( $p < .01$ ). However, the assumption of invariant errors is too restrictive and not always required in invariance analysis. Cheung and Rensvold (2002) suggest that decreases in CFI greater than .01 may be important to refuse invariance hypotheses, which does not happen in this case. So, these results (Table

3) indicate that factor structure, factor loadings and factor variances were invariant across the two random samples.

Finally, we compared the means of the latent variables between the two groups using the Multiple Imputation and Multiple Causes model. There is no significant difference between the means of each latent variable in the 2 groups (visibility: diff. = .05,  $p = .52$ ; understandability: diff. = .02,  $p = .77$ ; legitimacy: diff. = .02,  $p = .70$ ; relevance: diff. = -.00,  $p = .97$ ; instrumentality: diff. = .09,  $p = .35$ ; validity: diff. = .21,  $p = .05$ ; consistent HRM messages: diff. = .01,  $p = .85$  and fairness: diff. = 1.46,  $p = .09$ ).

In summary, results obtained in study 2 strongly suggest the HRMS Questionnaire is a valid measurement instrument.

### 3.3. Study 3

The generalization of the HRMSQ was explored with one additional independent sample collected in two organizations. The total sample is composed of 427 participants: 325 (78% return rate) worked in a global producer of lead acid batteries, of which 85% were men and 102 (32% return rate) worked in a subsidiary of an international insurance company, of which 62% were men.

Analyzing the new independent sample, the HRMSQ model revealed good fit:  $\chi^2_{(90)} = 241.18$ ,  $\chi^2/df = 2.68$ ,  $CFI = .98$ ,  $PCFI = .73$ ,  $RMSEA = .06$ ,  $CI$  90% for  $RMSEA$  [.05; .07]. In terms of cross-validation, the model was able to fit the data from both samples. For the unconstrained model in which no equality constraints were imposed, results showed good fit ( $\chi^2_{(180)} = 321.11$ ,  $\chi^2/df = 1.78$ ,  $CFI = .97$ ,  $PCFI = .73$ ,  $RMSEA = .04$ ,  $CI$  90% for  $RMSEA$  [.03; .05]), thus pointing to factor structure model invariance.

The composite reliabilities are: .95 for visibility, .96 for understandability, .88 for legitimacy, and .94 for relevance. .75 for instrumentality, .88 for validity .88 for consistent HRM messages and .92 for fairness. The average variances extracted are: .80 for visibility, .84 for understandability, .72 for legitimacy, .83 for relevance, .70 for instrumentality, .73 for validity .71 for consistent HRM messages and .74 for fairness.

The difference of the  $\chi^2$  between the HRMSQ model ( $\chi^2_{(90)} = 241.18$ ) and that of the perfect correlations model among the metafeatures ( $\chi^2_{(96)} = 365.52$ ) is significant:  $\chi^2_{diff(6)} = 124.34$ ,  $p < .005$ . As presented in Table 4, the AVE results for each metafeature are higher than their squared correlations, thereby showing discriminant validity among all metafeatures (Bhattacharjee, 2002).

Metafeature	AVE	Squared correlations						
		(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) Visibility	.80							
(2) Understandability	.84	.76						
(3) Legitimacy	.72	.47	.48					
(4) Relevance	.83	.60	.62	.60				
(5) Instrumentality	.70	.30	.47	.41	.56			
(6) Validity	.73	.60	.61	.58	.70	.66		
(7) Consistent HRM messages	.71	.56	.58	.65	.70	.51	.70	
(8) Fairness	.74	.59	.58	.50	.66	.43	.70	.59

Table 4. Discriminant validity of the HRM SQ model: Comparison of the AVE with the squared correlation of the metafeatures

In terms of criterion-related validity, we used organizational climate and perceived organizational performance as criteria. Organizational climate strength was not used because there were no separate organizational units. Both regression weights are significant (.73,  $p = .00$  for organizational climate and .84,  $p = .00$  for perceived organizational performance) which supports criterion-related validity.

#### 4. Conclusions

In this article, a questionnaire of strength of the HRM system was developed and validated. Psychometric properties of the new instrument reveal good internal consistency reliability, item reliability and construct reliability, as well as convergent and discriminant validity. Criterion-related validity was tested using organizational climate, organizational climate strength and perceived organizational performance as criteria. The questionnaire was cross-validated using two random sub-samples and the replication was conducted with an independent sample. The results in all samples suggested factor structure, factor loadings and factor variances invariance, as well as invariance in the means of all metafeatures of the model.

There are three important theoretical contributions that surface in this study. Firstly, the HRMSQ (presented in Appendix A) represents strength of the HRM system as a situational variable, with no normative considerations in terms of adequacy of the HRM content. It is a process construct that allows researchers to capture whether the employees perceive HRM practices as clear and unambiguous and whether they have shared perceptions regarding the influence of the HRM function to implement them and to have an impact on organizational performance. This characteristic is an important theoretical contribution.

Secondly, as obtained by Delmotte et al. (2012), the current study could not confirm the theoretical structure proposed by Bowen and Ostroff (2004). Along with the Belgian study, this investigation shows that Bowen and Ostroff's nine metafeatures do not seem to be perceived by employees, line managers, and union representatives. This might mean that the way these three organizational representatives notice and interpret HR practices is different of what is considered in theory. Hence, empirical research should explore how employees, in general,

look at organizational activities, including HR ones. This is one possible through qualitative investigation, as it is necessary to elicit employees' subjective and mental constructions of organizational realities.

And thirdly, the current text contributes to the emerging area in strategic HRM that highlights the active role of employees in interpreting and reacting to HR practices and instruments, as observed in other studies (e.g. Nishii et al., 2008; Li et al., 2011). This area is only marginally addressed in a recent review of the literature (Jackson, Schuler & Jiang, 2014), which still seems dominated by a process-oriented view. The present text contends that advancements in the field, as challenged by Jackson et al. (2014), cannot be achieved without considering some of the elements of modern social-constructivist theory, such as meaning-construction mechanisms (e.g. Weick, Sutcliffe & Obstfeld, 2005).

The results above should be tempered by some limitations. The HRMSQ was developed and validated using self-report data from employees. Although, as proposed by Bowen and Ostroff (2004), the metafeatures were assessed by employees. Multiple sources might have provided richer information. However, we collected data from a wide set of companies of in diverse industries and the results were very robust across companies and industries, as reported above.

These findings have practical implications for HR practitioners and top managers. In our experience working with HR managers, the lack of real power to effectively implement a consistent Strategic HRM is routinely mentioned as a constraint. Our research suggests that focusing on distinctiveness, consistency and fairness of the HRM system might create strong organizational climates that encourage employees to exhibit the strategically appropriate behaviors. In order to have strong HRM systems, HR managers must be able to deeply understand the business so that consistent HR strategies and practices can be designed and, consequently, clearly communicated to the organization. If the HRM system lacks vertical strategic fit (with the organizational strategy) and horizontal fit (among practices), visibility, understandability, consistent HRM messages, validity, instrumentality and fairness are likely to be low and organizational support absent. On the other hand, legitimacy of authority and relevance, having to do with formal and informal power, can be fostered by the representation of the HRM function at the top management team level and by capturing CEO support; this symbolic mechanism might provide opportunities for the HRM function to create the shared mindset among senior managers (Sheehan et al., 2007) that will then, over time, be able to flow down to the organization, with consistent messages. Legitimacy of authority and relevance are also likely to be enhanced by an assessment of the HR outcomes, in terms of value created for employees and the organization.

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## References

- Anderson, J.C., & Gerbing, D.W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, 103, 411-423.  
<http://dx.doi.org/10.1037/0033-2909.103.3.411>
- Arthur, J. (1994). Effects of human resource systems on manufacturing performance and turnover. *Academy of Management Journal*, 37, 670–687. <http://dx.doi.org/10.2307/256705>
- Bhattacharjee, A. (2002). Individual trust in online firms: Scale development and initial test. *Journal of Management Information Systems*, 19(1), 211-241.
- Boselie, P., Dietz, G., & Boon, C. (2005). Commonalities and contradictions in HRM and performance research. *Human Resource Management Journal*, 15, 67-94.  
<http://dx.doi.org/10.1111/j.1748-8583.2005.tb00154.x>
- Bowen, D., & Ostroff, C. (2004) Understanding HRM-Firm performance linkages: The role of the 'strength' of the HRM system. *Academy of Management Review*, 29, 203-221.  
<http://dx.doi.org/10.5465/AMR.2004.12736076>
- Brown, S.P., & Leigh, T.W. (1996). A new look at psychological climate and its relationship to job involvement, effort and performance. *Journal of Applied Psychology*, 81, 358-368.  
<http://dx.doi.org/10.1037/0021-9010.81.4.358>
- Chan, D. (1998). Functional relations among constructs in the same content domain at different levels of analysis: A typology of composition models. *Journal of Applied Psychology*, 83, 234-246. <http://dx.doi.org/10.1037/0021-9010.83.2.234>
- Chau, P. (1997). Re-examining a model of evaluation information center success using a structural equation modeling approach. *Decision Sciences*, 28, 309-334.  
<http://dx.doi.org/10.1111/j.1540-5915.1997.tb01313.x>
- Cheung, G.W., & Rensvold, R.B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling: A Multidisciplinary Journal*, 9, 233-255. [http://dx.doi.org/10.1207/S15328007SEM0902\\_5](http://dx.doi.org/10.1207/S15328007SEM0902_5)

- Delery, J.E. (1998). Issues of fit in strategic human resource management: Implications for research. *Human Resource Management Review*, 8, 286-309. [http://dx.doi.org/10.1016/S1053-4822\(98\)90006-7](http://dx.doi.org/10.1016/S1053-4822(98)90006-7)
- Delmotte, J., De Winne, S., & Sels, L. (2012). Towards an assessment of perceived HRM system strength: scale development and validation. *International Journal of Human Resource Management*, 23, 7, 1481-1506. <http://dx.doi.org/10.1080/09585192.2011.579921>
- Dickson, M.W., Resick, C.J., & Hanges, P.J. (2006). When organizational climate is unambiguous, it is also strong. *Journal of Applied Psychology*, 91, 351-364.  
<http://dx.doi.org/10.1037/0021-9010.91.2.351>
- Ferris, G.F., Hochwarter, W.A., Buckley, M.R., Harrell-Cook, G., & Frink, D.D. (1999). Human resources management: Some new directions. *Journal of Management*, 25, 385-416.  
<http://dx.doi.org/10.1177/014920639902500306>
- Fornel, C., & Larcker, D.F. (1981). Evaluating structural equation models with unobserved variables and measurement error. *Journal of Marketing Research*, 18, 1, 39-50.
- Guest, D. (1997). Human resource management and performance: A review and research agenda. *International Journal of Human Resource Management*, 8, 263-267.  
<http://dx.doi.org/10.1080/095851997341630>
- Guest, D. (2011). Human resource management and performance: Still searching for some answers. *Human Resource Management Journal*, 21,3-13. <http://dx.doi.org/10.1111/j.1748-8583.2010.00164>
- Hair, J.F., Black, W.C., Babin, B.J., Anderson, R.E., & Tatham, R.L. (2006). *Multivariate data analysis* (6th Ed). New Jersey: Pearson Education.
- Harvey, R.J., Billings, R.S., & Nilan, K.J. (1985). Confirmatory factor analysis of the job diagnostic survey: Good news and bad news. *Journal of Applied Psychology*, 70,461-468.  
<http://dx.doi.org/10.1037/0021-9010.70.3.461>
- Hinkin, T.R. (1998). A brief tutorial on the development of measures for use in survey questionnaires. *Organizational Research Methods*, 1, 104-121.  
<http://dx.doi.org/10.1177/109442819800100106>
- Huselid, M.A. (1995). The impact of human resource management practices on turnover, productivity and corporate financial performance. *Academy of Management Journal*, 38, 635-670. <http://dx.doi.org/10.2307/256741>
- Ichniowski, C., Shaw, K., & Prennushi, G. (1997). The effects of human resource management practices on productivity: A study of steel finishing lines. *The American Economic Review*, 87(3), 291-313.



- Jackson, S.E., Schuler, R.S., & Jiang, K. (2014). An aspirational framework for strategic human resource management. *The Academy of Management Annals*, 8(1), 1-56.  
<http://dx.doi.org/10.1080/19416520.2014.872335>
- Johnson, B., & Stevens, J.J. (2001). Confirmatory factor analysis of the school level environment questionnaire (SLEQ). *International Journal of Learning Environments Research*, 4, 325-344. <http://dx.doi.org/10.1023/A:1014486821714>
- Kelley, H.H. (1967). Attribution theory in social interception. In D Levine (Ed.), *Nebraska Symposium on Motivation* (pp. 192-238). Lincoln: University of Nebraska Press.
- Kelley, H.H. (1973). The processes of causal attribution. *American Psychologist*, 28, 107-128.  
<http://dx.doi.org/10.1037/h0034225>
- Kelley, H.H., & Michela, J.L. (1980). Attribution theory and research. *Annual Review of Psychology*, 31, 457-501. <http://dx.doi.org/10.1146/annurev.ps.31.020180.002325>
- Kinicki, A.J., Jacobson, K.J.L., Peterson, S.L., & Prussia, G.E. (2013). Development and validation of the performance management behavior questionnaire. *Personnel Psychology*, 66, 1-45. <http://dx.doi.org/10.1111/peps.12013>
- Laursen, K., & Foss, N.J. (2003). New human resource management practices, complementarities and the impact on innovation performance. *Cambridge Journal of Economics*, 27, 243-263. <http://dx.doi.org/10.1093/cje/27.2.243>
- Li, X., Frenkel, S., & Sanders, K. (2011). Strategic HRM as process: How HR system and organizational climate strength influence Chinese employee attitudes. *International Journal of HRM*, 22(9), 1825-1842.
- Lindell, M.K., & Brandt, C.J. (2000). Climate quality and climate consensus as mediators of the relationship between organizational antecedents and outcomes. *Journal of Applied Psychology*, 85, 332-348. <http://dx.doi.org/10.1037/0021-9010.85.3.331>
- Nishii, L.H., Lepak, D.P., & Schneider, B. (2008). Employee attributions of the “why” of HR practices: Their effects on employee attitudes and behaviors, and customer satisfaction. *Personnel Psychology*, 61, 503-545. <http://dx.doi.org/10.1111/j.1744-6570.2008.00121.x>
- Ostroff, C., & Bowen, D.E. (2000). Moving HR to a higher level: Human resource practices and organizational effectiveness. In K.L. Klein & S.W. Kozlowski (Eds.), *Multilevel theory, research, and methods in organizations* (pp. 211-266). San Francisco: Jossey-Bass.
- Pereira, C., & Gomes, J.F.S. (2012). The strength of human resource practices and transformational leadership: Impact on organizational performance. *International Journal of Human Resource Management*, 23, 4301-4318. <http://dx.doi.org/10.1080/09585192.2012.667434>

- Ribeiro, T., Coelho, J.P., & Gomes, J.F.S. (2011). HRM strength, situation strength and improvisation behavior. *Management Research: The Journal of the Iberoamerican Academy of Management*, 9, 118-136. <http://dx.doi.org/10.1108/1536-541111155245>
- Sanders, K., Dorenbosch, L., & Reuver, R. (2008). The impact of individual and shared employee perceptions of HRM on affective commitment considering climate strength. *Personnel Review*, 37, 412-425. <http://dx.doi.org/10.1108/00483480810877589>
- Sheehan, C., Cooper, B., Holland, P., & De Cieri, H. (2007). The relationship between HRM avenues of political influence and perceived organizational performance. *Human Resource Management*, 46, 611-629. <http://dx.doi.org/10.1002/hrm.20184>
- Stanton, P., Young, S., Bartram, T., & Leggat, S.G. (2010). Singing the same song: Translating HRM messages across management hierarchies in Australian hospitals. *The International Journal of Human Resource Management*, 21, 567-581.  
<http://dx.doi.org/10.1080/09585191003612075>
- Weick, K.E., Sutcliffe, K.M., & Obstfeld, D. (2005). Organizing and the process of sensemaking. *Organization Science*, 16, 409-421. <http://dx.doi.org/10.1287/orsc.1050.0133>

## Appendix A - HRMDQ

Below are some questions about Human Resource Management (HRM) in your organization. In each row, please indicate with a cross - ☒ - the box/option that best matches your opinion.

1. Please indicate the extent to which each of the HRM practices <i>has visibility</i> in your organization (easily observable)		Not at all visible	Hardly visible	Not very visible	Visible	Very visible	Extremely visible
1.1	Performance appraisal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.2	Career development	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.3	Communication	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.4	Performance-pay	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
1.5	Recruitment and selection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Please indicate to what extent you <i>understand</i> how each of the HRM practices works in your organization		I understand nothing about how this practice works	I understand very little about how this practice works	I have a limited understanding of how this practice works	I understand how this practice works	I have a good understanding of how this practice works	I have a very good understanding of how this practice works
2.1	Performance appraisal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.2	Career development	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.3	Communication	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.4	Performance-pay	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2.5	Recruitment and selection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3	Now please indicate your level of agreement with each statement. Remember that there are no right or wrong answers, only your opinion matters.	I very much disagree	I disagree	I partially disagree	I partially agree	I agree	I very much agree	I Don't Know
3.1	(L) In my organization, the HR Department is considered to be influential	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.2	(R)HRM practices in my organization help employees to achieve their personal goals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.3	(I) The HRM practices in my organisation contribute to have highly skilled employees	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.4	(V) HRM practices are consistent over time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.5	(M) The goals of the HRM practices are all consistent among themselves	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.6	(F) When deciding upon matters that concern me, my superiors seek my opinion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.7	(F) My superiors deal with me in an honest and ethical way	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.8	(L) In my organization, the HR Department is considered to be influential	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.9	(R) HRM practices in my organization help employees to achieve their personal goals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.10	(R) The HRM practices in my organisation contribute towards its competitiveness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.11	(I)If I change my behaviour in accordance with HR Department guidelines, I know this will be acknowledged	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.12	(V) I feel that there is a connection between what is assessed in the performance appraisal and what is done on a day-to-day basis	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.13	(M) I believe that the goals and values of my organisation's HRM will be the same six months from now	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.14	(F)In my organisation, the employees rewarded are those who deserve to be	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.15	(L) The guidelines provided by the HR Department are credible	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.16	(I)In my organisation, all employees know exactly when and what to do to be rewarded	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.17	(V) There is consistency between what the HR Department advocates and what it actually implements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.18	(M)All the HRM activities complement one another to reach my organisation's goals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.19	(F)My organisation has allowed me to choose my career direction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

L – Legitimacy of Authority; R – Relevance; I – Instrumentality; V – Validity; M - Consistent HR Messages; F – Fairness



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