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Validation of a Multidimensional HR Flexibility Measure

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Wright and Snell (1998) contend that HR flexibility is an important construct that may enable managers and management scholars to gain a greater understanding of the role of human resource management in enhancing firm performance. However, there is limited evidence

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regarding the psychometric properties of the measures that have been used to assess the HR flexibility construct and examine its effects. A primary objective of this study was to develop and validate a psychometrically sound measure of the HR flexibility construct. In this article, we present evidence of content validity/adequacy, internal consistency reliability, convergent validity, discriminant validity, and criterion-related validity that provides support for the use of this study's multidimensional HR flexibility measure in subsequent empirical inquiries and theory testing efforts. Implications and limitations of this current research as well as avenues for future research are discussed.

Keywords: *HR flexibility; multidimensional HR flexibility measure; validation; strategic HRM*

Consistent with research on strategic flexibility (Sanchez, 1995) and dynamic capabilities (Teece, Pisano, & Shuen, 1997), organizational and strategic management scholars contend that one of the most crucial managerial roles is to develop the firm's capacity to respond quickly to changes in customer and competitive demands, as well as to emerging market threats and opportunities (cf. Gibson & Birkinshaw, 2004; Oktemgil & Greenley, 1997; Sanchez & Heene, 1997). Human resource management scholars have extended these ideas to human resource management, proposing that HR flexibility may be instrumental in fostering the capacity of firms to be responsive to changes in market demands, be adaptive, and operate successfully in dynamic environments, and thus may positively influence firm performance (see Lepak, Takeuchi, & Snell, 2003; Milliman, Von Glinow, & Nathan, 1991; Snell, Shadur, & Wright, 2001; Wright & Snell, 1998). Recently five published empirical studies have presented evidence linking measures of HR flexibility to a variety of indicators of firm performance, including subjective measures of customer service effectiveness (Beltrán-Martín, Roca-Puig, Escrig-Tena, & Bou-Llusar, 2008), market performance (Ngo & Loi, 2008), and financial performance (Ketkar & Sett, 2009, 2010), as well as an objective measure of financial performance (Bhattacharya, Gibson, & Doty, 2005).

While these five published empirical studies have contributed to our knowledge about the substantive relationships between HR flexibility and firm performance, the HR flexibility measures employed in these studies have not been subjected to construct validation efforts that meet commonly accepted standards (see Hinkin, 1998; Schwab, 1980) and do not accurately reflect how HR flexibility has been conceptualized in previous research (see Snell et al., 2001; Wright & Snell, 1998).[1] Without careful consideration to the operationalization of the HR flexibility construct, it is extremely difficult to advance our understanding of its role and influence. Indeed, as Schwab (1980) noted, even in fields with substantial empirical bases, our knowledge of substantive relationships is not as insightful as it would be if adequate attention had been devoted to construct validity of the measures employed to assess the focal constructs. To enhance our understanding about the link between HR flexibility and firm performance, we contend that additional research is needed to develop and validate new measures of the HR flexibility construct that are more firmly embedded in the theoretical literature (e.g., Wright & Snell, 1998).

This research study extends HR flexibility research in three noteworthy ways. First, we present a new measure that corresponds more directly with the construct description offered by Wright and Snell (1998). Second, this new measure provides a more comprehensive explanation of the means by which the HR flexibility construct may influence firm performance. Third, we

utilize a rigorous empirical procedure to establish the construct validity of the new HR flexibility measure, which exhibits superior psychometric properties and predictive validity than the three scales previously developed by Bhattacharya et al. (2005).[2]

HR Flexibility

The most comprehensive description of the HR flexibility construct was presented by Wright and Snell (1998), who conceptualized HR flexibility as a firm-level capability consisting of (1) people who possess a variety of skills and behavioral repertoires and (2) the HR practices that can be used to effectively utilize those people to be responsive to changes in market demands, be adaptive, and be successful in a dynamic environment. Building on the work of Sanchez (1995), Wright and Snell identified resource flexibility and coordination flexibility as two general types of HR flexibility and proposed that HR practices, employee skills, and employee behaviors could be characterized in terms of these two general types. As a basis for developing a construct valid measure of HR flexibility, we begin by presenting a refined description of the six aspects of the HR flexibility construct that were articulated by Wright and Snell.

Resource Flexibility

The first general type of flexibility is resource flexibility (Sanchez, 1995), which refers to the extent to which a firm asset/resource can be applied to alternative uses (cf. Sanchez & Heene, 1997). Resource flexibility reflects the capacity of an asset/resource to be usefully applied in a variety of contexts. Consistent with Wright and Snell (1998) we contend that this first general type of HR flexibility includes three aspects: resource flexibility in HR practices, resource flexibility in employee skills, and resource flexibility in employee behaviors.

Wright and Snell (1998: 762) defined resource flexibility in HR practices as "the extent to which they can be adapted and applied across a variety of situations." However, Wright and Snell were not clear about how they defined "situations." Since an HR practice is only valuable to the extent that it promotes the skills and behaviors of employees, the resource flexibility of the practice is best understood in terms of the versatility of the skills and behaviors it promotes. Thus, we conceptualize these situations as a variety of employees performing a variety of work activities (tasks, roles, jobs, etc.). More specifically, resource flexibility in HR practices exists when the firm's current HR practices can be effectively applied across a variety of employees in different contexts (settings or jobs) and/or performing different work activities.

Therefore, resource flexibility in HR practices reflects the versatility or general applicability of the firm's current HR practices (Wright & Snell, 1998). For example, a cognitive ability test has high resource flexibility because it can be used across a variety of jobs, assesses an ability to develop a broad set of skills, and can help in promoting employees who can perform a wide variety of tasks across a variety of jobs. In contrast, a work sample test has limited resource flexibility because it only taps a narrow set of skills and behaviors relevant to a single work activity within a narrow job or job family.

Resource flexibility in employee skills is "the number of potential alternative uses to which employee skills can be applied" (Wright & Snell, 1998: 764). This reflects the extent to which the firm's current standard employees possess the skills (or can quickly acquire the skills) necessary to perform a wide array of alternative work activities successfully. In contrast, resource flexibility in employee behaviors reflects the extent to which the firm's existing standard employees are willing (motivated) to perform a variety of alternative work activities. Therefore, the focus of resource flexibility in employee skills is on what existing standard employees potentially *can do* (Mager & Pipe, 1984), while the focus of resource flexibility in employee behaviors is on what existing standard employees potentially *will do* (Mager & Pipe, 1984).

As an example, if a firm's customers desire a wider range of services than the firm currently offers, resource flexibility in employee skills exists when the firm's current employees possess the skills (or can quickly acquire the skills) necessary to perform a wider variety of work activities to meet the changing customer desires. While employees may have the requisite skills, resource flexibility in employee behaviors signifies that the firm's current employees are willing to perform these new work activities. When resource flexibility in both employee skills and behaviors exist, the firm can more easily expand the range of services it offers to its customers.

However, Wright and Snell (1998: 766) note that "distinguishing between skills and behaviors does not require them to be independent." Therefore, consistent with Wright and Snell, we assert that while a valid measure of HR flexibility would include both the resource flexibility in employee skills and behaviors aspects of HR flexibility, resource flexibility in employee skills and behaviors may not be separate forms of HR flexibility (i.e., may form a single dimension of HR flexibility).

Coordination Flexibility

The second general type of flexibility is coordination flexibility (Sanchez, 1995), which refers to the capacity of the firm to acquire and deploy, in a timely manner, the resources necessary to meet the firm's current strategic goals as well as pursue strategic alternatives (Sanchez & Heene, 1997). Congruent with Wright and Snell (1998) and others (e.g., Snell et al., 2001) we contend that the second general type of HR flexibility is coordination flexibility. Similar to resource flexibility, this second general type of HR flexibility includes three aspects: coordination flexibility in HR practices, coordination flexibility in employee skills, and coordination flexibility in employee behaviors.

Coordination flexibility in HR practices refers to "how quickly the practices can be resynthesized, reconfigured, and redeployed" (Wright & Snell, 1998: 763). As such, this aspect of HR flexibility is the firm's capacity to deploy/implement alternative HR practices readily and effectively. Following Wright and Snell (1998) we assert that resource flexibility and coordination flexibility in HR practices are distinct. For example, a firm's general training process may reflect resource flexibility in HR practices if the content and procedures enable employees to learn broad skills that can be used to perform a variety of alternative work activities. In contrast, coordination flexibility in HR practices would include the

development and implementation of training programs to address new or emerging skill demands.

Coordination flexibility in employee skills reflects "how individuals with different skills can be redeployed quickly in the value chain" (Wright & Snell, 1998: 765) and includes the extent to which the firm can acquire and deploy standard employees and/or "contingent workers" (Wright & Snell, 1998: 767) who *can* successfully perform current and alternative work activities. This aspect of HR flexibility is exemplified when individuals possess the variety of skills needed to perform the work activities they are assigned successfully or when they are redeployed or dismissed because they lack the requisite skills. In contrast, coordination flexibility in employee behaviors reflects the degree to which the firm can acquire and deploy standard employees or contingent workers who possess the requisite variety of behavioral scripts and who are willing to apply those scripts in a variety of work activities. Again, while a valid measure of HR flexibility would include both aspects, coordination flexibility in employee skills and behaviors may not be separate forms of HR flexibility (i.e., may form a single dimension of HR flexibility).

For instance, IBM's workforce management project (see Leibs, 2005) entailed developing a comprehensive list of skills possessed by their global workforce. Given IBM's global customer base, the company sought to provide any given project with a project team possessing the necessary skills at the lowest cost anywhere in the world (Leibs, 2005). This list of skills represents the pool of skills that can be deployed to address a given project's needs. However, IT consultants may have the skills necessary for a given project but be so culturally and behaviorally inflexible that they are unable to work effectively with clients (or potential team members) from cultures different from their own. IBM's resource flexibility in IT consultant skills and behaviors is reflected by the breadth of its IT consultants' skills and their willingness to work on a variety of different projects across a variety of geographic locations. And IBM's coordination flexibility in IT consultant skills and behaviors is reflected by the firm's ability to identify the set of IT consultants with the skills necessary for a given project, quickly assign these consultants to that project, and have them work effectively as a project team with the client.

Extant HR Flexibility Research and Scales

Four of the five empirical HR flexibility studies published to date have used (Bhattacharya et al., 2005) or adapted (Ketkar & Sett, 2009, 2010; Ngo & Loi, 2008) Bhattacharya et al.'s (2005) HR practices flexibility, skill flexibility, and behavior flexibility scales. Hence, the Bhattacharya et al. scales are the focus of the following synopsis of the extant HR flexibility scales.

Bhattacharya et al. (2005: 628) generated an initial set of items that were "collected from an extensive literature review and discussions with managers, business faculty, and senior doctoral students"; these items were modified based on the suggestions provided by a panel of HR practitioners and scholars. The modified list was then administered online to a sample of 28 members of the Academy of Management to verify "the face validity" of the items (Bhattacharya et al., 2005: 628). Next, using data obtained from 117 HR executives from

117 publicly traded U.S. firms with 50 or more employees from the Industrial Machinery and Equipment (SIC 35) and Food and Grocery Stores (SIC 54) industries, the authors subjected the 50 items that emerged from the aforementioned process to exploratory factor analysis. The authors' exploratory factor analysis results supported a 22-item, three-factor solution.

Moreover, using data obtained from the same sample that they used to establish the factor structure ($n = 117$), Bhattacharya et al. (2005) tested their hypothesized positive relationships between firm financial performance and HR practice flexibility, skill flexibility, and behavior flexibility. Bhattacharya et al. report that their HR practice flexibility (seven items), skill flexibility (seven items), and behavior flexibility (eight items) scales were all positively related to their objective measure of firm financial performance.

Although the Bhattacharya et al. (2005) study provided some insights regarding the relationship between HR flexibility and firm financial performance, the first and most obvious concern is that the measure is not consistent with the conceptualization offered by Wright and Snell (1998). Given that Bhattacharya et al., as well as the other four empirical HR flexibility studies that have been published to date (i.e., Beltrán-Martín et al., 2008; Ketkar & Sett, 2009, 2010; Ngo & Loi, 2008), omitted consideration of contingent workers and did not differentiate between resource and coordination flexibility, the measures that have been employed to date do not accurately reflect the HR flexibility construct. The exclusion of contingent workers is important because Wright and Snell and others (e.g., Lepak et al., 2003; Way, Lepak, Fay, & Thacker, 2010) have suggested that HR flexibility logically includes the strategic option of using contingent workers. Furthermore, the failure to distinguish between resource flexibility and coordination flexibility is theoretically significant because while the literature on strategic flexibility (e.g., Sanchez & Heene, 1997) and strategic human resource management research (e.g., Snell et al., 2001; Wright & Snell, 1998) has made much of the distinction between resource and coordination flexibility, empirical HR flexibility research has ignored this distinction in favor of only an HR practices/skills/behaviors distinction (e.g., Bhattacharya et al., 2005). Thus, the failure to adequately capture the fundamental nature of the HR flexibility construct substantially limits our ability to interpret the role and relevance of this important construct.

The second major concern is that Bhattacharya et al. (2005), as well as the other empirical HR flexibility studies that have been published to date, did not follow the steps necessary to establish the construct validity of their scales. For example, Bhattacharya et al.'s use of a single sample to establish the underlying factor structure (conduct exploratory factor analysis) and assess criterion-related validity makes the authors' results problematic (see Hinkin, 1998). Given that all five empirical HR flexibility studies published to date lack proper, rigorous construct validation efforts, the contributions of these studies to our knowledge of substantive relationships are not as great as they should or could have been if these studies had devoted adequate attention to construct validity of the measures they employed to assess HR flexibility (cf. Schwab, 1980).

We contend that a better set of HR flexibility scales is needed. Management theory would benefit by understanding the precise nature of what constitutes HR flexibility, in particular identifying which construct distinction (resource/coordination flexibility vs. HR practices/skills/behaviors flexibility) provides a more theoretically accurate and thus, more substantively revealing understanding of the HR flexibility–firm performance relationship.

Development and Validation of a New HR Flexibility Measure

In line with the recommendations of Hinkin (1998) and others (e.g., Schwab, 1980), we developed a new measure of HR flexibility using the following procedure: Step 1 involved item development and content validity assessment (Sample 1). Step 2 involved exploratory factor analysis using data from 142 Canadian firms to establish the initial factor structure and reliability of our new HR flexibility measure (Sample 2). Step 3 involved confirmatory factor analyses using data from 221 U.S. firms to confirm the factor structure and assess convergent and discriminant validity (Sample 3). Step 4 involved using data from 160 U.S. firms to assess criterion-related validity (Sample 4). Step 5 involved assessments of the content adequacy of our (Sample 5) and Bhattacharya et al.'s (2005) (Sample 6) HR flexibility measures. Step 6 involved using data from 132 Chinese firms to compare the psychometric properties and predictive value of Bhattacharya et al.'s and our HR flexibility measures (Sample 7).

Item Development and Content Validity Assessment (Sample 1)

Item Development

Based on the prior conceptual work of Wright and Snell (1998) and others (e.g., Sanchez & Heene, 1997) and the deductive approach to scale development (see Hinkin, 1998), we developed an initial set of 71 items that corresponded to each of the six aspects of HR flexibility described previously. Consistent with the approach taken by Bolino and Turnley (1999), these initial 71 items were next subjected to an assessment of content validity.

Content Validity Assessment (Sample 1)

We selected four individuals enrolled in graduate-level human resource management studies at a major state university in the northeastern United States with at least two years of management work experience as "naïve" respondents for a Q-sort activity. A form that included the initial 71 items listed in random order and descriptions of each of the six aspects of HR flexibility was distributed to each respondent. In the space beside each of the items, each respondent was instructed to insert the aspect of HR flexibility that he or she believed the item matched, or "NA" if he or she believed the item described none or more than one of the aspects described on the form. Thirty-six of the initial 71 items were matched with the appropriate description by at least three (75%) of the four respondents and were thus "retained for further analysis" (Bolino & Turnley, 1999).

Initial Factor Structure Assessment (Sample 2)

Sample and Procedures

Next, these 36 items were included in a survey that was administered to 142 senior HR managers. The Environment, Behavior and Risk Research Laboratory, University of Arizona

(EBRRL) was contracted to collect the data via computer-assisted telephone interviews. The sample frame was a Dun and Bradstreet Canada listing of 1,950 senior HR managers from 1,950 for-profit Canadian firms with 100 or more employees. From this list, EBRRL randomly selected 649 senior HR managers and asked them to participate in this study. Data were obtained from 142 senior HR managers from 142 Canadian firms, representing a 22% response rate. In this sample of 142 Canadian firms with 100 or more employees (Sample 2), 39% were from the manufacturing sector, 37% were unionized, and the average number of employees per firm was 419.

Exploratory Factor Analysis Results (Sample 2)

The responses to the 36 survey items were factor analyzed using principal axis factor extraction with a varimax (orthogonal) rotation (see Hinkin, 1998). Eigenvalues greater than 1.0 and a scree test were used to retain factors, and items with loadings of .40 or higher on only one factor were used to define the factor.

These exploratory factor analysis (EFA) results (presented in Table 1) yielded a five-factor solution that accounted for 48% of the variance, with 21 items loading uniquely (>.40) on only one factor (the appendix presents a list of the 21 items): Factor 1 was labeled coordination flexibility in contingent worker skills and behaviors (CFCW) and included three items associated with coordination flexibility in contingent worker skills (CFCW1-CFCW3) and an item associated with coordination flexibility in contingent worker behaviors (CFCW4). Factor 2 was labeled resource flexibility in HR practices (RFHRP) and included five items associated with the focal dimension (RFHRP1-RFHRP5).[3] Factor 3 was labeled resource flexibility in employee skills and behaviors (RFE) and included four items associated with the resource flexibility in employee skills and behaviors aspects of HR flexibility (RFE1-RFE2 and RFE3-RFE4, respectively). Factor 4 was labeled coordination flexibility in employee skills and behaviors (CFE) and included four items associated with the coordination flexibility in employee skills and behaviors aspects of HR flexibility (CFE1-CFE2 and CFE3-CFE4, respectively). Factor 5 was labeled coordination flexibility in HR practices (CFHRP) and included four items associated with the focal dimension (CFHRP1-CFHRP4).

The EFA results presented in Table 1 lend support for Wright and Snell's (1998: 766) assertion that "distinguishing between skills and behaviors does not require them to be independent." Indeed, as Wright and Snell suggested may be the case, these results indicate that skills and behaviors associated with HR flexibility appear to converge. Hence, these results (see Table 1) are consistent with our assertions that while a valid measure of HR flexibility would include (1) both the resource flexibility in employee skills and behaviors aspects of HR flexibility, these may not be separate forms of HR flexibility, and (2) both the coordination flexibility in employee skills and behaviors aspects of HR flexibility, but again, these may not be separate forms of HR flexibility. It should be noted, however, that resource flexibility in employee skills and behaviors (Table 1, Factor 3) was clearly distinct from coordination flexibility in employee skills and behaviors (Table 1, Factor 4).

The internal consistency reliability estimates for the five HR flexibility scales identified in the EFA results presented in Table 1 met accepted standards for scale development (see Table 2). The Cronbach's alpha coefficients and correlations (corrected for reliability) among these five HR flexibility scales (Sample 2) are presented in Table 2.

Table 1
Exploratory Factor Analysis Results

Factors	1 CFCW	2 RFHRP	3 RFE	4 CFE	5 CFHRP
Resource flexibility in HR practices (RFHRP): Factor 2					
RFHRP1	–.10	**.50**	–.02	.17	.32
RFHRP2	–.04	**.70**	.23	–.03	.03
RFHRP3	.17	**.57**	.03	.04	.25
RFHRP4	.15	**.57**	.13	.14	.21
RFHRP5	.07	**.50**	.10	.06	.27
Resource flexibility in employee skills and behaviors (RFE): Factor 3					
RFE1	.01	.10	**.77**	.01	.14
RFE2	.03	.15	**.81**	.07	.01
RFE3	.19	.07	**.43**	.17	.05
RFE4	.15	.09	**.46**	.27	.13
Coordination flexibility in HR practices (CFHRP): Factor 5					
CFHRP1	.15	.15	.05	–.03	**.55**
CFHRP2	.00	.17	.09	.15	**.52**
CFHRP3	.15	.17	.21	.09	**.55**
CFHRP4	.09	.22	.00	–.03	**.46**
Coordination flexibility in contingent worker skills and behaviors (CFCW): Factor 1					
CFCW1	**.83**	.09	.09	.12	.15
CFCW2	**.91**	.05	.17	.09	.10
CFCW3	**.57**	.09	.05	.29	.12
CFCW4	**.74**	.04	.09	.18	.11
Coordination flexibility in employee skills and behaviors (CFE): Factor 4					
CFE1	.22	.38	.20	**.49**	.19
CFE2[a]	.21	.17	.26	**.40**	.29
CFE3	.13	.04	.19	**.78**	.12
CFE4[a]	.31	.04	.04	**.63**	–.16
Eigenvalues	2.77	2.02	1.98	1.72	1.62
Total variance explained by each factor	13%	10%	9%	8%	8%
Cumulative variance explained by the factors	13%	23%	32%	40%	48%

Notes: $n = 142$ (Sample 2). Bold is used to highlight the loading between an item (e.g., RFHRP1) and its respective scale/factor (e.g., RFHRP).
[a]In Sample 2, CFE2 and CFE4 were reverse-scored (negatively worded) items (see appendix).

Convergent and Discriminant Validity Assessment (Sample 3)

Sample and Procedures

The 21 items retained in the EFA described previously were included in a survey that was administered to a second independent sample of senior HR managers. Customer Follow Up, Inc., in collaboration with The Environment, Behavior and Risk Research Laboratory, University of Arizona, was contracted to administer our senior HR manager survey via

Table 2
Cronbach's Alpha Coefficients and Correlations (Corrected for Reliability) Among Our Five Proposed HR Flexibility Scales

Sample 2 (n = 142)					
Scales	1	2	3	4	5
1. Resource flexibility in HR practices	(.75)				
2. Resource flexibility in employee skills and behaviors	.27	(.74)			
3. Coordination flexibility in HR practices	.43	.22	(.66)		
4. Coordination flexibility in contingent worker skills and behaviors	.23	.28	.30	(.88)	
5. Coordination flexibility in employee skills and behaviors	.33	.41	.30	.43	(.74)
Sample 3 (n = 221)					
Scales	1	2	3	4	5
1. Resource flexibility in HR practices	(.81)				
2. Resource flexibility in employee skills and behaviors	.58	(.81)			
3. Coordination flexibility in HR practices	.51	.38	(.71)		
4. Coordination flexibility in contingent worker skills and behaviors	.29	.28	.23	(.80)	
5. Coordination flexibility in employee skills and behaviors	.49	.51	.47	.41	(.85)
Sample 4 (n = 160)					
Scales	1	2	3	4	5
1. Resource flexibility in HR practices	(.82)				
2. Resource flexibility in employee skills and behaviors	.54	(.80)			
3. Coordination flexibility in HR practices	.46	.35	(.67)		
4. Coordination flexibility in contingent worker skills and behaviors	.26	.20	.23	(.79)	
5. Coordination flexibility in employee skills and behaviors	.45	.45	.43	.30	(.82)
Sample 7 (n = 132)					
Scales	1	2	3	4	5
1. Resource flexibility in HR practices	(.83)				
2. Resource flexibility in employee skills and behaviors	.74	(.86)			
3. Coordination flexibility in HR practices	.62	.59	(.82)		
4. Coordination flexibility in contingent worker skills and behaviors	.37	.41	.43	(.87)	
5. Coordination flexibility in employee skills and behaviors	.68	.72	.70	.56	(.86)

Notes: Cronbach's alpha coefficients are in parentheses; all correlations are significant at the $p < .01$ level (one-tailed).

computer-assisted telephone interviews. EBRRL extracted a calling list of 905 senior HR managers from 905 for-profit U.S. firms that operated in 48 different industries and with 100 or more employees from the Dun and Bradstreet Million Dollar Database. From this list, Customer Follow Up, Inc. randomly selected 765 senior HR managers and asked them to participate in this study. Data were obtained from 273 senior HR managers from 273 for-profit U.S. firms, representing a 36% response rate. A listwise deletion of cases with missing values for this study's HR flexibility items reduced Sample 3 to 221 firms. In this sample of 221 U.S. firms with 100 or more employees (Sample 3), 49% were from the manufacturing sector, 25% were unionized, and the average number of employees per firm was 447.

Measures

High-performance HR practices. The survey administered to Sample 3 respondents included nine high-performance HR practice items adopted from scales employed in published strategic human resource management studies (e.g., Huselid, 1995; Way et al., 2010). A sample item (labeled *Selection ratio* in Table 5) was "For every employee hired over the last two years, your firm's staffing process has generated a large pool of qualified candidates." Response options ranged from 1 (*strongly disagree*) to 5 (*strongly agree*).

Contingent labor. The survey administered to Sample 3 respondents also included three contingent labor items. A sample item (labeled *Workforce mixing* in Table 5) was "Over the last two years, how often has your firm employed contingent workers who have worked alongside and performed the same work as your firm's standard employees." Consistent with Way et al. (2010), response options ranged from 1 (*never*) to 5 (*always*).

HR flexibility. Again, each of our proposed measure's five scales demonstrated acceptable internal consistency reliability. The Cronbach's alpha coefficients and correlations (corrected for reliability) among our five proposed HR flexibility scales (Sample 3) are presented in Table 2.

Confirmatory Factor Analyses Results (Sample 3)

We used Amos 19 (IBM SPSS Amos 19, 2011) to conduct confirmatory factor analyses; model fit was assessed by examining five conventional fit indices (see Table 3). The confirmatory factor analysis (CFA) of the proposed five-factor, first-order (see Byrne, 2001) HR flexibility model demonstrated a very good fit with the data ($n = 221$): $\chi^2_{179} = 320.17$, $p < .001$; standardized root mean square residual (SRMR) = .06, root mean square error of approximation (RMSEA) = .06, Comparative Fit Index (CFI) = .93, Incremental Fit Index (IFI) = .93, Tucker-Lewis Index (TLI) = .92. Additionally, the CFA of the proposed five-factor, second-order (see Byrne, 2001) HR flexibility model demonstrated a very good fit with the data ($n = 221$): $\chi^2_{184} = 341.30$, $p < .001$; SRMR = .07, RMSEA = .06, CFI = .92, IFI = .92, TLI = .92.

Convergent Validity Assessment (Sample 3)

To assess the convergent validity of our proposed HR flexibility measure, we first used a technique similar to the technique utilized by Tracey and Tews (2005). For this assessment, we used Amos 19 (IBM SPSS Amos 19, 2011) to conduct confirmatory factor analyses in which we compared the fit statistics for the proposed five-factor, first- and second-order (see Byrne, 2001) HR flexibility models to the fit statistics for three alternative models: single-factor, two-factor, and three-factor HR flexibility models. As shown in Table 3, the CFAs of the proposed five-factor, first- and second-order HR flexibility models demonstrated a very

Table 3
Confirmatory Factor Analyses and Convergent Validity Assessment Results[a]

Model	χ^2	*df*	*p*	SRMR	RMSEA	CFI	IFI	TLI
Proposed five-factor, first-order HR flexibility model	320.17	179	.000	.06	.06	.93	.93	.92
Proposed five-factor, second-order HR flexibility model	341.30	184	.000	.07	.06	.92	.92	.91
Alternative single-factor HR flexibility model[b]	970.81	189	.000	.10	.14	.60	.61	.56
Alternative two-factor HR flexibility model[b]	839.09	188	.000	.09	.13	.67	.67	.63
Alternative three-factor HR flexibility model[b]	585.27	186	.000	.07	.10	.80	.80	.77

Note: $n = 221$ (Sample 3).
[a]The fit of each model was assessed by examining five conventional fit indices: SRMR (standardized root mean square residual) values less than .08 indicate a good fit with the data. RMSEA (root mean square error of approximation) values less than .06 indicate a good fit, values above .06 and as high as .08 indicate an adequate fit, values above .08 and less than .10 indicate a mediocre fit, and values above .10 indicate a poor fit (Browne & Cudeck, 1993). CFI (Comparative Fit Index), IFI (Incremental Fit Index), and TLI (Tucker-Lewis Index) values between .90 and .95 are considered a good fit, while values of .95 and higher are considered an excellent fit.
[b]The alternative single-factor HR flexibility model collapsed our 21 HR flexibility items into a single factor. The alternative two-factor HR flexibility model collapsed our 21 HR flexibility items into (a) flexibility in HR practices (resource flexibility in HR practices and coordination flexibility in HR practices items) and (b) flexibility in workforce skills and behaviors (resource flexibility in employee skills and behaviors, coordination flexibility in contingent worker skills and behaviors, and coordination flexibility in employee skills and behaviors items) factors. The alternative three-factor HR flexibility model collapsed our 21 HR flexibility items into (a) flexibility in HR practices, (b) flexibility in employee skills and behaviors (resource flexibility in employee skills and behaviors and coordination flexibility in employee skills and behaviors items), and (c) coordination flexibility in contingent worker skills and behaviors factors.

good fit with the data, while the CFAs of the three alternative HR flexibility models demonstrated a poor fit with the data.

Furthermore, a weak condition for convergent validity is that the estimated standardized path coefficients between latent variables and their indicators are statistically significant, while a stronger condition is that these estimated standardized path coefficients are substantial (i.e., exceed the .50 threshold) (Steenkamp & van Trijp, 1991). As shown in Table 4, the CFA of the proposed five-factor, first-order HR flexibility model yielded statistically significant ($p < .001$) and substantial (>.50) estimated standardized path coefficients between our 21 HR flexibility items and their respective scales. As shown in Table 4, the CFA of the proposed five-factor, second-order HR flexibility model yielded statistically significant ($p < .001$) and substantial (> .50) estimated standardized path coefficients between our 21 HR flexibility items and their respective scales as well as statistically significant ($p < .001$) estimated path coefficients between our five HR flexibility scales and second-order HR flexibility measure. As shown in Table 4, although the estimated standardized path coefficient between our coordination flexibility in contingent worker skills and behaviors scale and second-order HR flexibility measure was .42 (and thus not substantial), the estimated standardized path coefficients between our other four HR flexibility scales and second-order HR flexibility measure were substantial (> .50).

Discriminant Validity Assessment (Sample 3)

We assessed discriminant validity by following a technique similar to that used by Tracey and Tews (2005). Because prior research (e.g., Beltrán-Martín et al., 2008; Lepak et al.,

Table 4
Convergent Validity Assessment Results Standardized Path Coefficients Between Our HR Flexibility Items and Scales[a]

	Sample 3					Sample 7				
Items/Scales	RFHRP	RFE	CFHRP	CFCW	CFE	RFHRP	RFE	CFHRP	CFCW	CFE
RFHRP1	.56					.59				
RFHRP2	.74					.71				
RFHRP3	.72					.81				
RFHRP4	.70					.74				
RFHRP5	.71					.67				
RFE1		.68					.83			
RFE2		.87					.88			
RFE3		.50					.79			
RFE4		.88					.61			
CFHRP1			.66					.59		
CFHRP2			.51					.68		
CFHRP3			.67					.82		
CFHRP4			.70					.81		
CFCW1				.59					.79	
CFCW2				.51					.63	
CFCW3				.87					.88	
CFCW4				.90					.85	
CFE1					.74					.68
CFE2[b]					.77					.80
CFE3					.76					.84
CFE4[b]					.70					.80

Standardized Path Coefficients Between Our HR Flexibility Scales and Second-Order Measure[a]

	HR Flexibility	
Scales/Measure	Sample 3	Sample 7
Resource flexibility in HR practices (RFHRP)	.87	.87
Resource flexibility in employee skills and behaviors (RFE)	.74	.86
Coordination flexibility in HR practices (CFHRP)	.72	.83
Coordination flexibility in contingent worker skills and behaviors (CFCW)	.42	.59
Coordination flexibility in employee skills and behaviors (CFE)	.70	.94

Notes: $n = 221$ (Sample 3); $n = 132$ (Sample 7).
[a]Estimated standardized path coefficients (via Amos 19) between our 21 HR flexibility items and their respective scales as well as our five proposed HR flexibility scales and second-order measure reported in Table 4; all of the estimated standardized path coefficients reported in Table 4 are statistically significant ($p < .001$) and values of .50 or greater (>.50) are considered to be substantial (Steenkamp & van Trijp, 1991).
[b]In Sample 3, CFE2 and CFE4 were reverse-scored (negatively worded) items, whereas in Sample 7 these items were positively worded (see appendix).

Table 5
Discriminant Validity Assessment Results: Pattern Matrix Factor Loadings From Principal Components Analysis[a]

	Component								
Items	1	2	3	4	5	6	7	8	9
RFHRP1	.59								
RFHRP2	.67								
RFHRP3	.65								
RFHRP4	.61								
RFHRP5	.67								
RFE1									.63
RFE2									.70
RFE3									.52
RFE4									.81
CFHRP1						.80			
CFHRP2						.40			
CFHRP3						.71			
CFHRP4						.66			
CFCW1				–.73					
CFCW2				–.55					
CFCW3				–.89					
CFCW4				–.87					
CFE1								–.55	
CFE2[b]								–.73	
CFE3								–.78	
CFE4[b]								–.90	
Selection ratio					.66				
Orientation					.81				
Training					.68				
Decision making (information)		–.88							
Decision making (act)		–.91							
Voice		–.89							
Developmental performance appraisal							.64		
Performance-based promotions							.84		
Performance-based incentives							.62		
Workforce mixing			.88						
Supplemental contingent worker use			.88						
Extent of contingent labor use			.79						

Notes: n = 221 (Sample 3). RFHRP = resource flexibility in HR practices; RFE = resource flexibility in employee skills and behaviors; CFHRP = coordination flexibility in HR practices; CFCW = coordination flexibility in contingent worker skills and behaviors; CFE = coordination flexibility in employee skills and behaviors.
[a]Pattern matrix factor loadings from principal components analysis with direct oblimin (oblique) rotation (see Tracey & Tews, 2005) of our 21 HR flexibility (see appendix), the nine high-performance HR practices, and the three contingent labor items are presented in Table 5. Only loadings of .40 (absolute value) or above are reported in Table 5.
[b]In Sample 3, CFE2 and CFE4 were reverse-scored (negatively worded) items (see appendix).

2003; Way et al., 2010) indicates that HR flexibility may be associated with the use of high-performance work systems and contingent labor, comparisons among indicators of these constructs should provide a fairly robust assessment of the empirical distinctiveness and

practical utility of our proposed HR flexibility measure. We first included our 21 HR flexibility items, the nine high-performance HR practice items, and three contingent labor items in a principal components analysis using an direct oblimin (oblique) rotation (see Tracey & Tews, 2005). This analysis yielded a nine-component (nine-factor) model that accounted for 68% of the variance. As shown in Table 5, the nine high-performance HR practice items loaded uniquely onto three components (factors), and the three contingent labor items loaded uniquely onto a single factor. Moreover, all of our HR flexibility items had loadings above .40 (absolute value) on their corresponding HR flexibility factors, and none of the high-performance HR practice or contingent labor items cross-loaded on any of the five HR flexibility factors (see Table 5).

Next, based on the principal components analysis results presented in Table 5, we used Amos 19 (IBM SPSS Amos 19, 2011) to conduct a CFA to assess a nine-factor model in which our HR flexibility items were specified to load onto the five proposed HR flexibility factors, the nine high-performance HR practice items were specified to load onto three distinct factors, and the three contingent labor items were specified to load onto one distinct factor. As shown in Table 6, the CFA of the posited nine-factor HR flexibility–high-performance work systems–contingent labor model demonstrated a good fit with the data ($n = 221$): $\chi^2_{459} = 724.13$, $p < .001$; SRMR = .06, RMSEA = .06, CFI = .96, IFI = .92, TLI = .90. We also assessed the fit of four alternative models: seven-factor, five-factor, four-factor, and three-factor HR flexibility–HPWS–contingent labor models (see Table 6). As shown in Table 6, the CFAs of these four alternative models did not demonstrate a good fit with the data.

Criterion-Related Validity (Sample 4)

The next step in construct validation is to demonstrate criterion-related validity, which entails an assessment of the relationships between the focal measure and outcomes that are consistent with the posited theoretical domain. Consistent with the prior conceptual work of Wright and Snell (1998) we assert that HR flexibility is a key determinant of the capacity of the firm to be responsive to changes in market demands. Thus, we posit the following:

Hypothesis 1: HR flexibility and firm market performance will be positively related.

Sample and Procedures

To avoid common source/common method problems (see Gerhart, Wright, McMahan, & Snell, 2000; Hinkin, 1998) we used a matched set of responses from 160 senior HR managers (a subset of Sample 3) and 160 senior non-HR managers[4] from 160 for-profit U.S. firms to assess criterion-related validity. Each firm's senior HR manager responded to the 21 HR flexibility items, and a senior non-HR manager responded to the four firm market performance items presented in the following. In this sample of 160 U.S. firms with 100 or more employees (Sample 4), 52% were from the manufacturing sector, 29% were unionized, and the average number of employees was 498.

Table 6
Confirmatory Factor Analyses and Discriminant Validity Assessment Results[a]

Model	χ^2	*df*	*p*	SRMR	RMSEA	CFI	IFI	TLI
Posited nine-factor HR flexibility–HPWS–contingent labor model	724.13	459	.000	.06	.05	.91	.91	.90
Alternative seven-factor HR flexibility–HPWS–contingent labor model[b]	966.31	474	.000	.09	.07	.84	.84	.82
Alternative five-factor HR flexibility–HPWS–contingent labor model[b]	1,532.48	485	.000	.11	.10	.65	.66	.62
Alternative four-factor HR flexibility–HPWS–contingent labor model[b]	1,647.23	489	.000	.09	.10	.61	.62	.58
Alternative three-factor HR flexibility–HPWS–contingent labor model[b]	1,801.01	492	.000	.12	.11	.56	.57	.53

Notes: n = 221 (Sample 3). RFHRP = resource flexibility in HR practices; RFE = resource flexibility in employee skills and behaviors; CFHRP = coordination flexibility in HR practices; CFCW = coordination flexibility in contingent worker skills and behaviors; CFE = coordination flexibility in employee skills and behaviors.

[a]SRMR (standardized root mean square residual) values less than .08 indicate a good fit with the data. RMSEA (root mean square error of approximation) values less than .06 indicate a good fit, values above .06 and as high as .08 indicate an adequate fit, values above .08 and less than .10 indicate a mediocre fit, and values above .10 indicate a poor fit (Browne & Cudeck, 1993). Comparative Fit Index (CFI), Incremental Fit Index (IFI), and Tucker-Lewis Index (TLI) values between .90 and .95 are considered a good fit, while values of .95 and higher are considered an excellent fit.

[b]The alternative seven-factor HR flexibility–high-performance work systems (HPWS)–contingent labor model collapsed our 21 HR flexibility (RFHRP, RFE, CFHRP, CFCW, and CFE) items, the nine high-performance HR practice, and the three contingent labor items into (a) resource flexibility in HR practices (RFHRP items), (b) resource flexibility in employee skills and behaviors (RFE items), (c) coordination flexibility in HR practices (CFHRP items), (d) coordination flexibility in contingent worker skills and behaviors (CFCW items), (e) coordination flexibility in employee skills and behaviors (CFE items), (f) HPWS (high-performance HR practice items), and (g) contingent labor (contingent labor items) factors. The alternative five-factor HR flexibility–HPWS–contingent labor model collapsed the HR flexibility, high-performance HR practice, and contingent labor items into (a) coordination flexibility in HR practices, (b) other HR practices (RFHRP and high-performance HR practice items), (c) resource flexibility in employee skills and behaviors, (d) coordination flexibility in employee skills and behaviors, and (e) contingent worker/labor (CFCW and contingent labor items) factors. The alternative four-factor HR flexibility–HPWS–contingent labor model collapsed the HR flexibility, high-performance HR practice, and contingent labor items into (a) coordination flexibility in HR practices, (b) other HR practices, (c) resource flexibility in employee skills and behaviors, and (d) workforce coordination flexibility (CFE, CFCW, and contingent labor items) factors. The alternative three-factor HR flexibility–HPWS–contingent labor model collapsed the HR flexibility, high-performance HR practice, and contingent labor items into (a) HR practices (RFHRP, CFHRP, and high-performance HR practice items), (b) flexibility in employee skills and behaviors (RFE and CFE items), and (c) contingent worker/labor factors.

Measures

Firm market performance. We asked the senior non-HR manager respondents for their assessments of their firm's market performance using a synthesis of items from previous scales (e.g., Blankson, Kalafatis, Cheng, & Hadjicharalambous, 2008; Miles, Covin, & Heeley, 2000). Specifically, senior non-HR manager respondents were asked to rate their firm's: (1) growth in market share, (2) brand name (product/service) recognition, (3) firm/

company image, and (4) growth in sales. Response options ranged from –2 (*very dissatisfied*) to 2 (*very satisfied*). The Cronbach's alpha coefficient for this four-item firm market performance scale was .71.

HR flexibility. As before, each of the scales associated with the five HR flexibility factors demonstrated acceptable internal consistency reliability (see Table 2). The Cronbach's alpha coefficients and correlations (corrected for reliability) among our five proposed HR flexibility scales (Sample 4) are presented in Table 2.

Analyses and Results

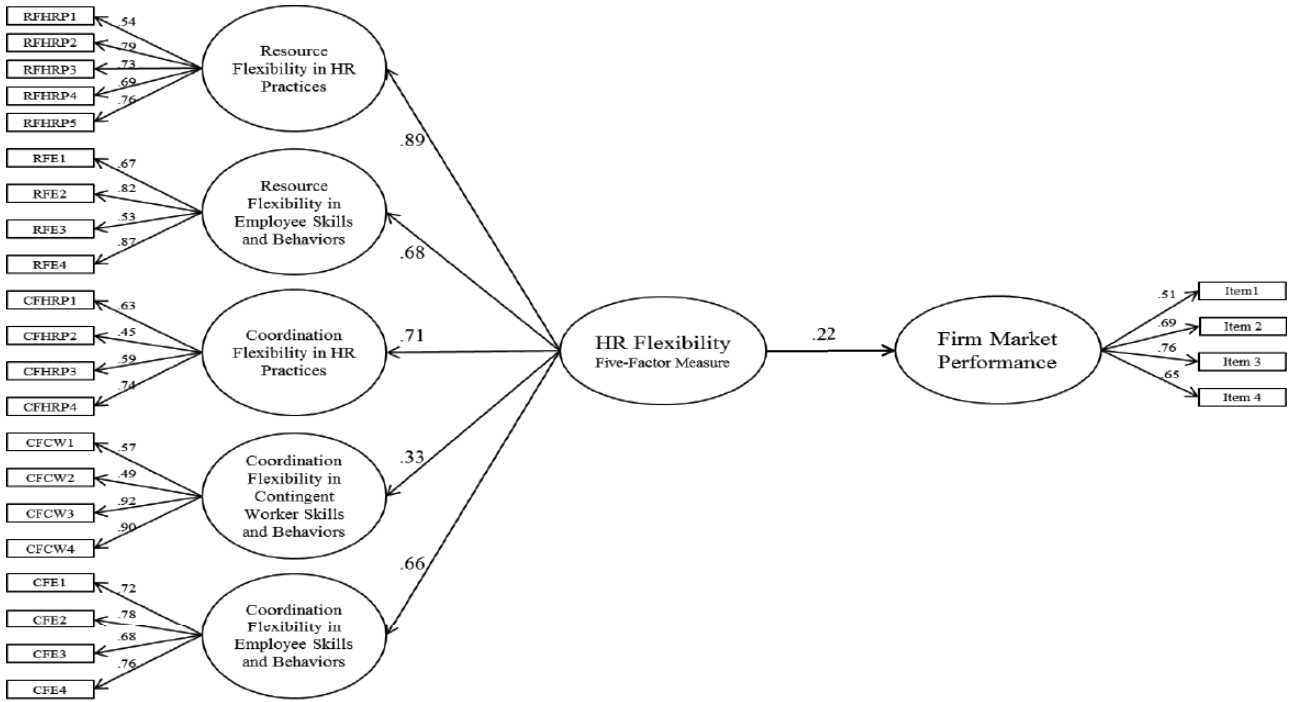
We used Amos 19 (IBM SPSS Amos 19, 2011) to conduct confirmatory factor analyses and assess the fit of our five-factor, second-order (see Byrne, 2001) HR flexibility model and to assess the posited positive relationship between HR flexibility and firm market performance (Hypothesis 1). The CFA of our proposed five-factor, second-order (see Byrne, 2001) HR flexibility measurement model demonstrated a good fit with the data (n = 160): χ^2_{184} = 325.81, $p < .001$; SRMR = .07, RMSEA = .06, CFI = .90, IFI = .90, TLI = .88. Moreover, the posited HR flexibility—firm market performance model depicted in Figure 1 demonstrated a good fit with the data (see Figure 1). As shown in Figure 1, the estimated standardized path coefficient between HR flexibility (i.e., our proposed five-factor, second-order measure) and firm market performance was .22 ($p < .05$). These results provide support for Hypothesis 1 and the criterion-related validity of our proposed five-factor HR flexibility measure.

Content Adequacy Assessments (Sample 5 and Sample 6)

Thus far, we have focused only on demonstrating the psychometric qualities and construct validity of our proposed five-factor HR flexibility measure. However, an important question arises regarding the relative merits of our proposed HR flexibility measure compared to Bhattacharya et al.'s (2005) measure. Thus, we conducted a series of analyses to compare these measures directly.

An important and often overlooked procedure for establishing construct validity is an assessment of a scale's content adequacy. Content adequacy consists of the extent to which respondents perceive that individual items represent the specific construct dimensions. As such, we followed the procedures offered by Hinkin and Tracey (1999) to assess the content adequacy of our proposed HR flexibility measure's items and the items developed by Bhattacharya et al. (2005). The primary benefit of using the procedures offered by Hinkin and Tracey include (1) small samples with as few as 30 respondents can be used; (2) the rating task does not require subject matter experts, only that respondents are not biased and possess the intellectual ability to complete the rating task; and (3) subjective judgments regarding item retention are minimized through the use of an analysis of variance procedure.

Figure 1
Criterion-Related Validity: Posited HR Flexibility–Firm Market Performance Model



Notes: The posited HR flexibility–firm market performance model depicted in Figure 1 demonstrated a good fit with the data (Sample 4, $n = 160$): $\chi^2_{268} = 422.37$, $p < .001$; standardized root mean square residual = .07, root mean square error of approximation = .06, Comparative Fit Index = .90, Incremental Fit Index = .90, Tucker-Lewis Index = .89. The estimated standardized path coefficient (via Amos 19) between HR flexibility (our proposed five-factor, second-order measure) and firm market performance reported in Figure 1 is significant at the $p < .05$ level, while all of the other estimated standardized path coefficients (via Amos 19) reported in Figure 1 are significant at the $p < .001$ level.

Content Adequacy Assessment of our Proposed HR Flexibility Measure's Items (Sample 5)

Sample. The sample that we used for this content adequacy assessment consisted of 31 students enrolled in an introductory undergraduate business course at a large, private university located in the northeastern United States. The respondents participated on a voluntary and anonymous basis. Fifty-five percent of respondents were female and the average age was about 19 years old.

Procedures. A content adequacy survey was developed with the definition of one of our five HR flexibility factors presented at the top of each page of the survey, followed by a random listing of our 21 HR flexibility items. We administered two versions of the survey to control for response bias that may occur from order effects. Each respondent rated each of the 21 items on the extent to which he or she believed that the item was consistent with each of our five HR flexibility factor definitions. Response options ranged from 1 (*not at all*) to 5 (*completely*). We found no statistically significant differences among the responses across the two versions of the survey.

Analyses and results. We conducted a series of one-way ANOVAs to compare an item's mean rating on the purported HR flexibility factor definition to the item's ratings on the other four HR flexibility factor definitions. We used Duncan's Multiple Range Test to address concerns regarding Type I error rates by holding the probability of making a Type I error for the entire set of comparisons to an a priori defined p value (Tracey & Tews, 2005). In this case, we used a liberal .10 level given the small sample size. The results showed that 19 of the 21 items had significantly higher ratings on the purported HR flexibility factor definition compared to the other four factor definitions (i.e., a 90% content adequacy hit rate).

Content Adequacy Assessment of Bhattacharya et al.'s HR Flexibility Items (Sample 6)

Sample. The sample that we used for this content adequacy assessment consisted of 79 students enrolled in an introductory undergraduate business course at a large, private university located in the northeastern United States. The respondents participated on a voluntary and anonymous basis. Fifty-two percent of respondents were female and the average age was 18 years old.

Procedures. A content adequacy survey was developed with one of Bhattacharya et al.'s (2005) three HR flexibility factor definitions presented at the top of each page of the survey, followed by a random listing of the respective 22 items. Again, two versions of the survey were administered to control for response bias that may occur from order effects. Each respondent rated each of the items on the extent to which he or she believed that the item was consistent with the three factor definitions. Response options ranged from 1 (*not at all*) to 5 (*completely*). We found no statistically significant differences among the responses across the two versions of the survey.

Analyses and results. We conducted a series of one-way ANOVAs to compare an item's mean rating on the purported HR flexibility factor definition to the item's ratings on the other two factor definitions. We used Duncan's Multiple Range Test to address concerns regarding Type I error rates by holding the probability of making this type of error for the entire set of comparisons to an a priori defined p value (Tracey & Tews, 2005). Although this sample (Sample 6, $n = 79$) was over twice as large as the sample that we used to assess the content adequacy of our proposed HR flexibility measure's 21 items (Sample 5, $n = 31$), to remain consistent we used a liberal .10 level of significance. (Note that this biases the results in favor of the Bhattacharya et al. measure.)

The results showed that only 12 of Bhattacharya et al.'s (2005) 22 items had significantly higher ratings on the purported HR flexibility factor definition compared to the alternative factor definitions. Given the larger sample size (and the associated greater power), this content adequacy hit rate (12/22 or 55%; Sample 6, $n = 79$) does not compare favorably to the previously reported content adequacy results for our proposed HR flexibility measure's 21 items (19/21 or 90%; Sample 5, $n = 31$). These results indicate that (1) Bhattacharya et al.'s HR flexibility items may not accurately reflect the HR flexibility construct and (2) the content adequacy of our proposed HR flexibility measure appears to be quite strong.

Psychometric and Predictive Validity Comparison (Sample 7)

The last step of construct validation involves the replication of validation assessment results and the application of the focal measure in a substantive test (Hinkin, 1998). Additionally, we compared the psychometric properties and predictive validity (criterion-related validity) of Bhattacharya et al.'s (2005) and our HR flexibility measures.

Consistent with the prior conceptual work of Wright and Snell (1998) and others (e.g., Dyer & Shafer, 1999) we posit that HR flexibility will enable firms to be responsive to changes in market demands, be adaptive, and be successful in dynamic environments. Thus, HR flexibility is expected to have a positive effect on the financial performance of firms that operate in dynamic (turbulent) environments. Therefore, within a sample of 132 Chinese firms that operate in high-technology (turbulent) industry sectors, we posit the following:

Hypothesis 2: HR flexibility and firm financial performance will be positively related.

Sample and Procedures

To avoid common source/common method problems (see Gerhart et al., 2000; Hinkin, 1998) we used another (independent) matched set of responses from 132 HR executives and 132 CEOs from 132 Chinese firms to assess and compare the psychometric properties and predictive validity (criterion-related validity) of Bhattacharya et al.'s (2005) and our proposed HR flexibility measures. HR executive respondents were asked to complete a survey that included the two HR flexibility measures and a high-performance work systems measure, while CEOs were asked to complete a survey that included the items used to assess firm financial performance.[5] Sample 7 is comprised of 132 firms from the following high-

technology industry sectors: the computer electronics sector (24%), the telecommunications sector (21%), miscellaneous high-tech industries (20%), the software and system integration sector (18%), the Internet and value-added services sector (12%), and the biotechnology and pharmaceuticals sector (5%).

We collected data through two channels. First, we surveyed 104 clients of a consulting firm. This consulting firm had a total of 168 client firms located in Shenzhen, China, that operated in one of the high-technology industry sectors listed previously. The CEOs from 104 of these agreed to participate in this study and provided the name and contact information of an HR executive from his or her firm. A complete matched set of responses were obtained from 104 firms, representing a 62% response rate. Second, a complete set of responses were obtained from 44 firms located in Nanjing, China. The employers of 3,600 MBA/EMBA alumni of a university in Nanjing were identified. Based on a firm's core business and an interview with the firm's CEO, we identified 220 firms that operated in one of the high-technology industry sectors listed previously. We obtained a complete matched set of responses from 44 of these 220 firms, representing a 20% response rate.

To be consistent with the sampling criteria applied to generate Samples 2 to 4, which only included firms with 100 or more employees, 16 of the 148 firms for which we were able to obtain a complete matched set of responses (10 from Shenzhen and 6 from Nanjing) were not included in Sample 7 because they employed fewer than 100 employees. In this sample of 132 Chinese firms with 100 or more employees (Sample 7) the average number of employees per firm was 941.

Measures

Firm financial performance. The CEO respondents were asked for their assessments of their firm's financial performance using a synthesis of items from previous scales (e.g., Gong, Law, Chang, & Xin, 2009; Luo & Park, 2001). More specifically, each CEO respondent was asked to "rate how your firm's performance compares to your firm's closest competitors in each of the following areas: (1) profitability (profit margin), (2) return on assets, and (3) return on sales." Consistent with Luo and Park (2001), response options ranged from 1 (*lowest 20%*) to 5 (*top 20%*). The Cronbach's alpha coefficient for this three-item firm financial performance scale was .82.

High-performance work systems. We assessed high-performance work systems (HPWS) using 9 items adopted from Huselid's (1995) 13-item, two-factor HPWS measure. A sample item from the four-item HPWS: employee motivation scale was "This firm's workforce receives formal performance appraisals"; a sample item from the five-item HPWS: employee skills and organizational structures scale was "This firm's workforce has access to company incentive plans, profit-sharing plans, and/or gain-sharing plans." Response options ranged from 1 (*strongly disagree*) to 5 (*strongly agree*). The Cronbach's alpha coefficient was .68 for the four-item HPWS: employee motivation scale and .80 for the five-item HPWS: employee skills and organizational structures scale.

HR flexibility. We assessed HR flexibility using the Bhattacharya et al. (2005) HR practices flexibility, skill flexibility, and behavior flexibility scales, as well as our proposed HR flexibility measure's five scales (see the appendix). The Cronbach's alpha coefficients and correlations (corrected for reliability) among our five proposed HR flexibility scales (Sample 7) are presented in Table 2.

Psychometric Properties

The internal consistency reliability estimates for Bhattacharya et al.'s (2005) three scales were acceptable: The Cronbach's alpha coefficient was .87 for the seven-item HR practice flexibility scale, .80 for the seven-item skill flexibility scale, and .84 for the eight-item behavior flexibility scale. As before, each of the scales associated with our five HR flexibility factors demonstrated acceptable internal consistency reliability. As shown in Table 2, the Cronbach's alpha coefficients ranged from .82 for the four-item coordination flexibility in HR practices scale, to .87 for the four-item coordination flexibility in contingent worker skills and behaviors scale.

Although the internal consistency reliability estimates for the Bhattacharya et al. (2005) scales were acceptable, the results from a series of confirmatory factor analyses to assess the dimensionality of Bhattacharya et al.'s three-factor HR flexibility measure did not demonstrate a good fit with the data (see Table 7). As shown in Table 7, for example, the CFA of the three-factor, first-order (see Byrne, 2001) HR flexibility model did not demonstrate a good fit with the data ($n = 132$): $\chi^2_{206} = 353.06$, $p < .001$; SRMR = .07, RMSEA = .07, CFI = .88, IFI = .88, TLI = .86. In contrast, the CFA of our proposed five-factor, first-order HR flexibility model demonstrated a good fit with the data ($n = 132$): $\chi^2_{179} = 263.18$, $p < .001$; SRMR = .06, RMSEA = .06, CFI = .95, IFI = .95, TLI = .94. Similar results were found for the CFA of our proposed five-factor, second-order (see Byrne, 2001) HR flexibility model (see Table 7). Furthermore, as shown in Table 4, all of the estimated standardized path coefficients for our proposed five-factor, second-order HR flexibility models were significant ($p < .001$) and substantial (> .50).

We next used Amos 19 (IBM SPSS Amos 19, 2011) to conduct a CFA and assess the fit of a five-factor HR flexibility–high-performance work systems model in which the 22 items developed by Bhattacharya et al. (2005) were specified to load onto their three respective HR flexibility factors, while the nine HPWS items adopted from Huselid (1995) were specified to load onto the two proposed HPWS factors. The CFA of this five-factor HR flexibility–HPWS model demonstrated a poor fit with the data (see Table 7). In contrast, as shown in Table 7, the CFA of a seven-factor HR flexibility–HPWS model, in which the 21 items included in our HR flexibility measure were specified to load onto our five proposed HR flexibility factors and the 9 HPWS items were specified to load onto the two proposed HPWS factors, demonstrated a good fit with the data.

Table 7 presents a summary of the results from these comparative analyses. These results highlight concerns regarding the convergent and discriminant validity of the Bhattacharya et al. (2005) HR practices flexibility, skill flexibility, and behavior flexibility scales, but lend further construct validity support for our proposed five-factor HR flexibility measure.

Table 7
Results of Confirmatory Factor Analyses Conducted to Compare the Psychometric Properties of Bhattacharya et al.'s (2005) and Our HR Flexibility Measures[a]

Model	χ^2	*df*	*p*	SRMR	RMSEA	CFI	IFI	TLI
Three-factor, first-order HR flexibility model[b]	353.06	206	.000	.07	.07	.88	.88	.86
Five-factor HR flexibility–high-performance work systems model[b]	684.85	424	.000	.07	.07	.85	.85	.83
Proposed five-factor, first-order HR flexibility model[c]	263.18	179	.000	.06	.06	.95	.95	.94
Proposed five-factor, second-order HR flexibility model[c]	278.11	184	.000	.07	.06	.94	.94	.93
Seven-factor HR flexibility–high-performance work systems model[c]	588.30	384	.000	.07	.06	.90	.90	.89

Note: $n = 132$ (Sample 7).
[a]SRMR (standardized root mean square residual) values less than .08 indicate a good fit with the data. RMSEA (root mean square error of approximation) values less than .06 indicate a good fit, values above .06 and as high as .08 indicate an adequate fit, values above .08 and less than .10 indicate a mediocre fit, and values above .10 indicate a poor fit (Browne & Cudeck, 1993). Comparative Fit Index (CFI), Incremental Fit Index (IFI), and Tucker-Lewis Index (TLI) values between .90 and .95 are considered a good fit, while values of .95 and higher are considered an excellent fit.
[b]Three-factor, first-order (see Byrne, 2001) HR flexibility model was derived from the Bhattacharya et al. (2005) HR practice flexibility (seven items), skill flexibility (seven items), and behavior flexibility (eight items) scales. And the five-factor HR flexibility–high-performance work systems (HPWS) model was derived from the Bhattacharya et al. (2005) HR practice flexibility, skill flexibility, and behavior flexibility scales and 9 items adopted from Huselid (1995) HPWS: Employee motivation (four items) scale and HPWS: Employee skills and organizational structures (five item) scale.
[c]Proposed five-factor, first- and second-order (see Byrne, 2001) HR flexibility models were derived from our proposed HR flexibility measure's five scales. And the seven-factor HR flexibility—high-performance work systems model was derived from our proposed HR flexibility measure's five scales and 9 items adopted from Huselid (1995) HPWS: Employee motivation (four items) scale and HPWS: Employee skills and organizational structures (five item) scale.

Additionally, the average correlation (corrected for reliability) among the three scales developed by Bhattacharya et al. (2005) was .67, while the average correlation (corrected for reliability) among our proposed HR flexibility measure's five scales was .58. These results complement those from the previous CFA assessments and indicate that the items and scales included in our HR flexibility measure are more distinctive and consistent with the conceptualization of the HR flexibility construct.

Predictive Validity

The next set of analyses was used to assess the predictive validity (criterion-related validity) of Bhattacharya et al.'s (2005) three scales and our proposed five-factor measure. First, we used Amos 19 (IBM SPSS Amos 19, 2011) to assess the fit of two structural equation models and the hypothesized positive relationship between HR flexibility and firm financial performance. Based on the hierarchical ordinary least squares (OLS) regression results for firm financial performance that we present in Table 8, these two structural

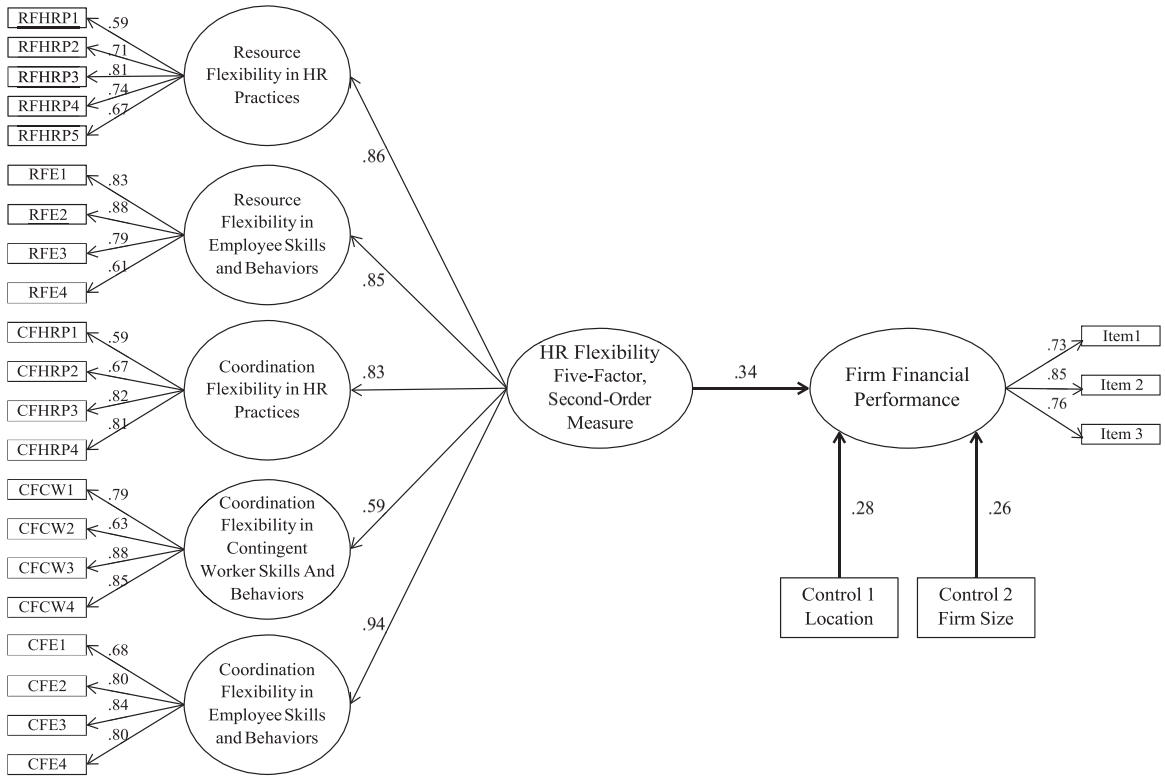
Table 8
Predictive and Criterion-Related Validity: Hierarchical Ordinary Least Squares Regression Results for Firm Financial Performance[a,b]

Variables	Model 1		Model 2A		Model 2B		Model 3	
Constant	1.33	(0.68)*	0.72	(0.74)	0.60	(0.71)	0.47	(0.74)
Computer electronics sector	0.01	(0.19)	0.02	(0.19)	0.00	(0.19)	0.01	(0.19)
Telecommunications sector	–0.02	(0.19)	0.00	(0.19)	0.05	(0.19)	0.05	(0.19)
Software and system integration sector	0.20	(0.19)	0.15	(0.19)	0.16	(0.19)	0.15	(0.19)
Internet and value-added services sector	0.00	(0.23)	–0.04	(0.23)	–0.11	(0.23)	–0.11	(0.23)
Biotechnology and pharmaceuticals sector	0.27	(0.33)	0.19	(0.33)	0.14	(0.33)	0.13	(0.33)
State-owned company	0.12	(0.29)	0.11	(0.29)	0.12	(0.29)	0.12	(0.29)
Joint venture	0.39	(0.23)$^{+}$	0.38	(0.23)$^{+}$	0.43	(0.23)$^{+}$	0.42	(0.23)$^{+}$
Foreign-owned subsidiary	0.28	(0.26)	0.24	(0.25)	0.25	(0.25)	0.24	(0.25)
Private domestically owned company	0.14	(0.23)	0.12	(0.23)	0.16	(0.22)	0.15	(0.22)
Location: Nanjing	0.38	(0.16)*	0.36	(0.16)*	0.41	(0.16)*	0.40	(0.16)*
Firm size – Ln (number of employees)	0.11	(0.06)$^{+}$	0.11	(0.06)$^{+}$	0.15	(0.06)*	0.15	(0.06)*
HPWS: employee motivation	0.15	(0.11)	0.10	(0.11)	0.15	(0.11)	0.13	(0.11)
HPWS: employee skills and organizational structures	0.13	(0.13)	–0.03	(0.15)	–0.17	(0.17)	–0.19	(0.17)
Three-factor, second-order HR flexibility measure			0.35	(0.18)*			0.15	(0.21)
Proposed five-factor, second-order HR flexibility measure					0.42	(0.16)**	0.35	(0.19)$^{+}$
Model F	1.64^{+}		1.84*		2.11*		2.00*	
Model R^2	0.15		0.18		0.20		0.21	
ΔR^2	—		0.03*		0.05**		0.03^{+}	

Note: n = 132 (Sample 7). HPWS = high-performance work systems.
[a]Table 8 reports unstandardized beta coefficients, standard errors are in parentheses, the change in R^2 (ΔR^2) for Models 2A and 2B are in comparison to the R^2 for Model 1, and ΔR^2 for Model 3 is in comparison to the R^2 for Model 2A.
[b]In Table 8, the three-factor, second-order HR flexibility measure (alpha = .86) was derived from Bhattacharya et al.'s (2005) HR practices flexibility, skill flexibility, and behavior flexibility scales, and the proposed five-factor, second-order HR flexibility measure (alpha = .87) was derived from our resource flexibility in HR practices, resource flexibility in employee skills and behaviors, coordination flexibility in HR practices, coordination flexibility in contingent worker skills and behaviors, and coordination flexibility in employee skills and behaviors scales.
$^{+}p < .10$ (two-tailed)
*$p < .05$ (two-tailed)
**$p < .01$ (two-tailed)

equation models included two controls: (1) location and (2) firm size (see Table 8).[6] HR flexibility–firm financial performance Model 1, which included the three-factor, second-order HR flexibility measure derived from Bhattacharya et al.'s (2005) three scales, demonstrated a poor fit with the data (n = 132): χ^2_{319} = 533.32, $p < .001$; SRMR = .12, RMSEA = .07, CFI = .85, IFI = .85, TLI = .83. In contrast, HR flexibility–firm financial performance Model 2, which included our proposed five-factor, second-order HR flexibility measure, demonstrated a good fit with the data (n = 132): χ^2_{292} = 437.42, $p < .001$; SRMR = .08, RMSEA = .06, CFI = .92, IFI = .92, TLI = .91. Moreover, as shown in Figure 2, the estimated standardized path coefficient between HR flexibility (our proposed five-factor,

Figure 2
Predictive Validity: HR Flexibility–Firm Financial Performance Model 2



Notes: HR flexibility–firm financial performance Model 2 depicted in Figure 2 demonstrated a good fit with the data (Sample 7, $n = 132$): $\chi^2_{292} = 437.42$, $p < .001$; standardized root mean square residual = .08, root mean square error of approximation = .06, Comparative Fit Index = .92, Incremental Fit Index = .92, Tucker-Lewis Index = .91. Each of the estimated standardized path coefficients (via Amos 19) reported in Figure 2 is significant at the $p < .01$ level.

second-order measure) and firm financial performance was .34 ($p < .01$). These results provide support for Hypothesis 2 as well as further support for the criterion-related validity of our proposed five-factor HR flexibility measure.

To directly compare the predictive validity (criterion-related validity) of the two measures, we next used hierarchical OLS regression analyses to determine if our HR flexibility measure explained unique variance in firm financial performance beyond that explained by the three scales developed by Bhattacharya et al. (2005). In these analyses we first entered several control variables (see Tables 8 and 9, Model 1). Next, we entered Bhattacharya et al.'s and then our proposed HR flexibility measures separately (see Tables 8 and 9, Models 2A and 2B). Finally, we entered both Bhattacharya et al.'s and our HR flexibility measures simultaneously (see Tables 8 and 9, Model 3). Tables 8 and 9 present these hierarchical OLS regression results.

As shown in Table 9, Model 2A, none of the scales developed by Bhattacharya et al. (2005) were related to firm financial performance, nor did these three scales explain significant incremental variance in firm financial performance ($\Delta R^2 = .03$, *ns*). In contrast, in Model 2B, our HR flexibility measure's five scales explained significant incremental variance in firm financial performance ($\Delta R^2 = .09$, $p < .05$) and our coordination flexibility in HR practices and coordination flexibility in contingent worker skills and behaviors scales were positively related to firm financial performance at the $p < .10$ level. Moreover, in Model 3, our scales explained significant incremental variance in firm financial performance ($\Delta R^2 = .07$, $p < .10$) beyond that accounted for by Bhattacharya et al.'s (2005) three scales (see Table 9, Models 2A and 3), and our coordination flexibility in contingent worker skills and behaviors scale was positively related to firm financial performance at the $p < .10$ level. These results indicate that our HR flexibility measure's scales explain unique variance in firm financial performance not accounted for by the Bhattacharya et al. HR practices flexibility, skill flexibility, and behavior flexibility scales.

As shown in Table 8, Model 2A, the three-factor, second-order HR flexibility measure (alpha = .86) derived from Bhattacharya et al.'s (2005) three scales explained significant incremental variance in firm financial performance ($\Delta R^2 = .03$, $p < .05$) and was positively related to firm financial performance at the $p < .05$ level. In Model 2B, our proposed five-factor, second-order HR flexibility measure (alpha = .87) explained significant incremental variance in firm financial performance ($\Delta R^2 = .05$, $p < .01$) and was positively related to firm financial performance at the $p < .01$ level. In Model 3, the three-factor, second-order HR flexibility measure derived from the Bhattacharya et al. scales was not related to firm financial performance, whereas our five-factor, second-order HR flexibility measure explained significant incremental variance in firm financial performance ($\Delta R^2 = .03$, $p < .10$) beyond that accounted for by the Bhattacharya et al. three-factor, second-order HR flexibility measure (see Table 8, Models 2A and 3) and was positively related to firm financial performance at the $p < .10$ level.

In sum, this study's results indicate that our proposed five-factor, second-order HR flexibility measure is positively related to firm financial performance (see Figure 2; Table 8, Model 2B) and explains unique variance in firm financial performance not accounted for by the three-factor, second-order HR flexibility measure derived from the Bhattacharya et al. (2005) HR practices flexibility, skill flexibility, and behavior flexibility scales (see Table 8, Models 2A and 3).

Table 9
Predictive and Criterion-Related Validity: Hierarchical Ordinary Least Squares Regression Results for Firm Financial Performance[a]

Variables	Model 1		Model 2A		Model 2B		Model 3	
Constant	1.33	(0.68)*	0.74	(0.74)	0.73	(0.75)	0.54	(0.78)
Computer electronics sector	0.01	(0.19)	0.03	(0.19)	0.07	(0.19)	0.08	(0.19)
Telecommunications sector	–0.02	(0.19)	–0.01	(0.20)	0.03	(0.19)	0.05	(0.20)
Software and system integration sector	0.20	(0.19)	0.14	(0.20)	0.17	(0.19)	0.16	(0.19)
Internet and value-added services sector	0.00	(0.23)	–0.03	(0.23)	–0.14	(0.23)	–0.13	(0.23)
Biotechnology and pharmaceuticals sector	0.27	(0.33)	0.16	(0.34)	0.09	(0.33)	0.10	(0.34)
State-owned company	0.12	(0.29)	0.12	(0.29)	0.08	(0.29)	0.07	(0.29)
Joint venture	0.39	(0.23)$^{+}$	0.36	(0.24)	0.34	(0.23)	0.31	(0.24)
Foreign-owned subsidiary	0.28	(0.26)	0.23	(0.26)	0.05	(0.27)	0.02	(0.27)
Private domestically owned company	0.14	(0.23)	0.11	(0.23)	0.01	(0.24)	–0.02	(0.24)
Location: Nanjing	0.38	(0.16)*	0.35	(0.16)*	0.27	(0.17)	0.25	(0.18)
Firm size – Ln (number of employees)	0.11	(0.06)$^{+}$	0.11	(0.06)$^{+}$	0.15	(0.06)*	0.15	(0.07)*
HPWS: employee motivation	0.15	(0.11)	0.10	(0.12)	0.17	(0.11)	0.15	(0.12)
HPWS: employee skills and organizational structures	0.13	(0.13)	–0.04	(0.15)	–0.19	(0.17)	–0.22	(0.18)
HR practice flexibility			0.13	(0.17)			0.13	(0.17)
Skill flexibility			0.22	(0.18)			0.02	(0.20)
Behavior flexibility			0.02	(0.19)			0.04	(0.19)
Resource flexibility in HR practices (RFHRP)					–0.13	(0.14)	–0.17	(0.14)
Resource flexibility in employee skills and behaviors (RFE)					0.01	(0.14)	0.00	(0.14)
Coordination flexibility in HR practices (CFHRP)					0.22	(0.12)$^{+}$	0.20	(0.13)
Coordination flexibility in contingent worker skills and behaviors (CFCW)					0.17	(0.09)$^{+}$	0.18	(0.10)$^{+}$
Coordination flexibility in employee skills and behaviors (CFE)					0.15	(0.14)	0.14	(0.14)
Model F	1.64^{+}		1.61^{+}		1.98*		1.72*	
Model R^2	0.15		0.18		0.24		0.25	
ΔR^2	—		0.03		0.09*		0.07^{+}	

Notes: n = 132 (Sample 7).
[a]Table 9 reports unstandardized beta coefficients, standard errors are in parentheses, the change in R^2 (ΔR^2) for Models 2A and 2B are in comparison to the R^2 for Model 1, and ΔR^2 for Model 3 is in comparison to the R^2 for Model 2A.
$^{+}p < .10$ (two-tailed)
*$p < .05$ (two-tailed)
**$p < .01$ (two-tailed)

Discussion

Although scholars have highlighted the importance of the HR flexibility construct to understanding the role of human resource management in developing the capacity of firms to be responsive to changes in market demands and successful in dynamic environments

(e.g., Dyer & Shafer, 1999; Wright & Snell, 1998), existing empirical studies have not offered adequate validity evidence for the HR flexibility construct (e.g., Beltrán-Martín et al., 2008; Bhattacharya et al., 2005). This current study's results support a multidimensional HR flexibility measure and generated some conceptual clarity of the HR flexibility construct.

Implications

The study's findings demonstrate that HR flexibility is a fairly broad, multidimensional construct that includes five distinct dimensions: (1) resource flexibility in HR practices, (2) resource flexibility in employee skills and behaviors, (3) coordination flexibility in HR practices, (4) coordination flexibility in contingent worker skills and behaviors, and (5) coordination flexibility in employee skills and behaviors. This five-dimension HR flexibility structure is similar to our original conceptualization, with one primary exception: Coordination flexibility in contingent worker skills and behaviors is a distinct dimension of the HR flexibility construct.

Consistent with the prior conceptual work of Wright and Snell (1998), we originally developed item sets for six aspects of HR flexibility, namely, resource and coordination flexibility in HR practices, employee skills, and employee behaviors. However, the empirical results across multiple samples demonstrated that the senior HR manager and HR executive respondents were able to distinguish between the resource flexibility and coordination flexibility of their employees and HR practices, but they did not distinguish between the skills and behaviors of their employees. In contrast to previously employed measures of HR flexibility (e.g., Beltrán-Martín et al., 2008; Bhattacharya et al., 2005), this current study's results indicate that resource and coordination flexibility in HR practices, as well as resource and coordination flexibility in employee skills and behaviors, are distinct dimensions of HR flexibility. This finding is important because extant measures of HR flexibility have not captured this resource versus coordination distinction, which appears to be central to understanding the nature of the HR flexibility construct.

This current study makes four key contributions to the literature on HR flexibility. First, as we emphasized earlier in this article, previous empirical research has not offered rigorous construct validity evidence for the HR flexibility measures that have been used. Thus, it's difficult to interpret previous results with confidence. In contrast, we used several independent samples and a comprehensive analytic procedure to develop and validate a measure that is strongly consistent with the original conceptualization. Thus, we can be quite confident that our measure reflects the focal construct domain accurately and is a valid indicator of the HR flexibility construct. While the results did not show perfect correspondence to the Wright and Snell (1998) conceptual framework, the repeated results across multiple samples suggests that the structure observed in this study is a more accurate reflection of the HR flexibility construct.

Second, previous studies have overlooked the distinctions between resource and coordination flexibility, as well as the use and utility of contingent workers. This is important because such distinctions demonstrate that firms have a wider array of options for managing dynamic competitive conditions. As such, we now have a more comprehensive explanation of the means by which HR flexibility may be used to leverage firm performance.

Third, while the Bhattacharya et al. (2005) measure has been useful in early research on HR flexibility, the results from the current study demonstrate the relative superiority of our proposed HR flexibility measure. Our 21-item, five-factor HR flexibility measure demonstrated substantially greater content adequacy than the Bhattacharya et al. scales. In addition, the scales in our measure demonstrated a higher degree of empirical distinctiveness and a clear and consistent factor structure. Finally, and most importantly from a substantive standpoint, the results indicate that our five-factor HR flexibility measure explains unique variance in a measure of firm financial performance beyond that explained by Bhattacharya et al.'s (2005) three scales.

Fourth, from both a theoretical and substantive standpoint, our results indicate that HR flexibility plays a pivotal role in explaining firm performance. For example, within a sample of 160 U.S. firms we found a positive relationship between HR flexibility and firm market performance. Additionally, within an independent sample of 132 Chinese firms operating in high-technology (turbulent) industry sectors we found empirical support for the contention that within dynamic environments, HR flexibility is positively associated with firm financial performance. Hence, this study's findings support the notion that HR flexibility is an important construct that may allow managers and management scholars to gain a better understanding of the process through which human resource management can influence firm performance.

In sum, we conclude that our proposed multidimensional HR flexibility measure provides a more theoretically accurate and thus more substantively revealing understanding of the HR flexibility–firm performance relationship and thus should be employed to assess HR flexibility in future substantive research.

Limitations and Avenues for Future Research

While this current study was based on a cogent analysis of the extant literature and utilized a rigorous empirical procedure, namely, multiple independent samples and data sources to develop and validate a new measure of HR flexibility and to test our hypotheses, there are some notable limitations. First, while we distinguish skills and behaviors on a conceptual level, this study's factor analyses results (Samples 2, 3, 4, and 7) consistently showed that respondents (senior HR managers and HR executives) did not distinguish them; namely, as Wright and Snell (1998) suggested may be the case, skills and behaviors converge. One explanation for this finding is that behaviors are guided or reflected by the skills an individual possesses; thus, while distinct, behaviors and skills are inextricably related. Although this current research provides strong support for our 21-item, five-factor HR flexibility measure, we encourage future studies to attempt to develop and validate additional or refine/revise our resource and coordination flexibility in employee skills and behaviors, as well as coordination flexibility in contingent worker skills and behaviors items so that these items may more clearly differentiate between skills and behaviors. Furthermore, we encourage future studies to replicate (confirm) our factor analyses results, as well as examine, explicate, and illustrate the linkages between our five HR flexibility dimensions and identify their antecedents and consequences.

Moreover, managers and management scholars may need to consider the potential influence that internal firm factors may have on the relationship between HR flexibility and firm performance. For instance, prior empirical research highlights the negative influence of contingent labor use (e.g., Davis-Blake, Broschak, & George, 2003) and the effects of alternative contingent labor strategies (see Way et al., 2010) on standard employee withdrawal behaviors such as turnover and absenteeism. Thus, we encourage future research to investigate the influence that contingent labor use and strategies have on the relationship between coordination flexibility in contingent worker skills and behaviors and firm performance, as well as the relationships between resource and coordination flexibility in employee skills and behaviors and firm performance.

Finally, HR flexibility and firm financial performance are expected to be positively related in dynamic (turbulent) environments. However, HR flexibility may have a negative influence on the financial performance of firms that compete in a stable environment because in stable environments, HR flexibility is a slack resource, which is likely to be rarely of use or needed, and thus, the expenditures required to achieve HR flexibility are not likely to be recoverable (cf. Dyer & Shafer, 1999; Wright & Snell, 1998). To date, published empirical studies that have investigated the HR flexibility–firm financial performance relationship (e.g., Bhattacharya et al., 2005; Ketkar & Sett, 2009, 2010) have not tested the proposition that the nature of the HR flexibility–firm financial performance relationship is contingent on environmental dynamism.[7]

In this current study we contend that irrespective of whether firms compete in a dynamic or stable environment, HR flexibility is a key determinant of the capacity of firms to be adaptive and be responsive to changes in market demands. Moreover, we contend that among firms operating in dynamic (turbulent) industry sectors, HR flexibility is positively related to firm financial performance. Consistent with these contentions, this study's results indicate that HR flexibility can positively influence firm market and financial performance. However, we encourage future research to empirically test the proposition that environmental dynamism moderates the HR flexibility–firm financial performance relationship.

Summary and Conclusion

The importance of the HR flexibility construct to understanding the role of human resource management in developing the capacity of firms to be adaptive and successful in dynamic environments necessitates the need for developing valid measures of the HR flexibility construct. This study provides clarity regarding the HR flexibility construct and presents strong evidence for the construct validity of our proposed HR flexibility measure. The development of the focal measure has generated a more complete and comprehensive operationalization of the HR flexibility construct and provides a useful measure that can be employed in future substantive research that is aimed at creating a more comprehensive understanding of the human resource management–firm performance relationship. We encourage future studies to extend upon this study's findings and integrate HR flexibility into new human resource management theories and strategic frameworks. We hope that our HR flexibility measure provides a means for facilitating research in this domain.

Appendix

The 21 HR Flexibility Items and Five HR Flexibility Scales[a]

Response options for each item presented in appendix ranged from 1 (*strongly disagree*) to 5 (*strongly agree*).

Resource Flexibility in HR Practices (RFHRP): Five Items

Your firm's current compensation structure enables your firm to reward employees who perform different work activities and produce different outcomes (RFHRP1); Your firm's current work structure enables employees to develop the behaviors necessary to perform new/different work activities (RFHRP2); Your firm's current performance management process would enable your firm to motivate its employees to perform different work activities (RFHRP3); Your firm's current staffing procedures enable your firm to select employees who possess the skills necessary to be effective in performing many different work activities (RFHRP4); Your firm's current training process enables employees to learn new/different work activities (RFHRP5)

Resource Flexibility in Employee Skills and Behaviors (RFE): Four Items

Almost all of your firm's employees have the ability to quickly acquire skills that are necessary for them to be assigned to different work roles (RFE1); Almost all of your firm's employees have the ability to quickly acquire skills that are necessary for them to adopt different technologies in their work activities (RFE2); Almost all of your firm's employees can perform work activities that require different behaviors (RFE3); Almost all of your firm's employees would be willing to accept a different job within your firm (RFE4)

Coordination Flexibility in HR Practices (CFHRP): Four Items

Your firm can quickly and effectively implement different staffing procedures (CFHRP1); Your firm can quickly and effectively implement different compensation structures (CFHRP2); Your firm can quickly and effectively implement different work structures (CFHRP3); Your firm can quickly and effectively implement different empowerment processes (CFHRP4)

Coordination Flexibility in Contingent Worker Skills and Behaviors (CFCW): Four Items

Your firm can quickly reassign work activities to contingent workers who possess the skills necessary to successfully perform these activities (CFCW1); Your firm can quickly dismiss contingent workers whose skills are no longer required by your firm (CFCW2); Your firm can quickly assign new contingent workers to where their skills are most needed within your firm (CFCW3); Your firm can assign new work activities to contingent workers who can successfully perform these activities (CFCW4)

Coordination Flexibility in Employee Skills and Behaviors (CFE): Four Items

Your firm can quickly assign new work activities to employees who possess the skills necessary to perform these activities (CFE1); Your firm cannot quickly reassign employees to a different job that requires different (e.g., greater) skills (CFE2); Your firm can effectively assign different work activities to employees who perform below the required level (CFE3); Your firm cannot effectively reassign employees to different jobs within your firm (CFE4). In Samples 2 to 4, CFE2 and CFE4 were reverse-scored (negatively-worded) items, whereas, in Samples 5 and 7 these items were positively worded; namely, *cannot* was replaced with *can*.

Notes

1. An overview of the HR flexibility conceptualization and measures, relationships examined and findings, and construct validation efforts of these five empirical studies (Beltrán-Martín, Roca-Puig, Escrig-Tena, & Bou-Llusar, 2008; Bhattacharya, Gibson, & Doty, 2005; Ketkar & Sett, 2009, 2010; Ngo & Loi, 2008) is available from the first author upon request. Based on this overview, we contend that the HR flexibility measures employed in these five empirical studies have not been subjected to proper, rigorous construct validation efforts that meet commonly accepted standards (see Hinkin, 1998; Schwab, 1980) and do not accurately reflect how HR flexibility has been conceptualized in relevant extant research (see Snell, Shadur, & Wright, 2001; Wright & Snell, 1998).

2. A review of the five empirical HR flexibility studies published to date (Beltrán-Martín et al., 2008; Bhattacharya et al., 2005; Ketkar & Sett, 2009, 2010; Ngo & Loi, 2008) reveals that four of these studies have used (Bhattacharya et al., 2005) or adapted (Ketkar & Sett, 2009, 2010; Ngo & Loi, 2008) Bhattacharya et al.'s (2005) HR practices flexibility, skill flexibility, and behavior flexibility scales.

3. Wright and Snell (1998: 762) defined resource flexibility in HR practices as "the extent to which they can be adapted and applied across a variety of situations." However, Wright and Snell were not clear about how they defined "situations." Since an HR practice is only valuable to the extent that it promotes the skills and behaviors of employees, the resource flexibility of the practice is best understood in terms of the versatility of the skills and behaviors it promotes. Thus, we conceptualize these situations as a variety of employees performing a variety of work activities (tasks, roles, jobs, etc.). More specifically, resource flexibility in HR practices exists when the firm's current HR practices can be effectively applied across a variety of employees in different contexts (settings or jobs) and/or performing different work activities. Thus, in the development of the resource flexibility in HR practices survey items, we focused on the extent to which the practice would (a) enable the firm to manage (acquire, train, motivate, etc.) employees doing different work activities, (b) enable the firm to acquire (attain/retain) employees who possess the skills and/or behavioral scripts necessary to perform alternative (different/new) work activities, (c) enable the firm's employees to acquire (learn/develop) the skills and/or behavioral scripts necessary to perform alternative work activities, or (d) enable the firm to motivate employees to perform alternative work activities (see appendix).

4. Customer Follow Up, Inc. (CFU), in collaboration with the Environment, Behavior and Risk Research Laboratory, University of Arizona (EBRRL), was contracted to administer our senior non-HR manager survey via computer-assisted telephone interviews. EBRRL extracted a calling list of 905 senior non-HR managers from 905 for-profit U.S. firms that operated in 48 different industries and with 100 or more employees from the Dun and Bradstreet Million Dollar Database. From this list, CFU randomly selected 441 senior non-HR managers and asked them to participate in this study. Data were obtained from 217 senior non-HR managers from 217 for-profit U.S. firms, representing a 49% response rate.

5. We derived Chinese versions of the HR flexibility and high-performance work systems measures, as well as a Chinese version of the firm financial performance measure following the back-translation procedure (see Schaffer & Riordan, 2003). More specifically, (1) a bilingual member of this study's research team translated these measures' items from English to Chinese, (2) a second bilingual member of this study's research team then translated the items from Chinese back into English, (3) these two bilingual members of the research team then resolved all disagreements through discussion, and (4) once the most appropriate translation had been agreed upon by these two bilingual members of the research team, the translated item was included in this study's surveys.

6. As Reviewer 2 requested, these controls were included in our structural equation models (see Figure 2).

7. The Bhattacharya et al. (2005) and Ketkar and Sett (2009) studies did not include an environmental dynamism measure. Moreover, the Ketkar and Sett (2010) study did not use a valid (appropriate) environmental dynamism measure nor did the study empirically test the proposition that the nature of the HR flexibility–firm financial performance relationship is contingent on environmental dynamism (see Dyer & Shafer, 1999; Wright & Snell, 1998). Refer to Datta, Guthrie, and Wright (2005) and Dess and Beard (1984) for appropriate descriptions and measures of environmental dynamism.

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