A multilevel model of human capital contribution to company performance: effects of HR practices and the emergence of human capital

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Summary

This research draws on the human capital emergence process and is based on a multilevel perspective. Using a sample of 383 employees from 60 business units from KIFs (Knowledge-Intensive Firms), it contributes to better explain the mechanisms mediating the HR practices – company performance relationship in two complementary ways. First, the results show that the relationship between individual and collective human capital is not systematic, but that individual human capital components emerge at the collective level through the moderator effect of collective affective commitment (considered as an emergence enabling state), and contributes to BU performance. Second, they demonstrate the positive impact of two HR practices bundles on human capital: at the individual level, skill-enhancing practices leverage individual human capital components; at the BU level, empowerment-fostering practices positively impact collective affective commitment, which enables the human capital emergence process.

Keywords: Human capital, Emergence, Multilevel, Performance, HR practices.

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A MULTILEVEL MODEL OF HUMAN CAPITAL CONTRIBUTION TO COMPANY PERFORMANCE: EFFECTS OF HR PRACTICES AND THE EMERGENCE OF HUMAN CAPITAL

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This research draws on the human capital emergence process and is based on a multilevel perspective. Using a sample of 383 employees from 60 business units from KIFs (Knowledge-Intensive Firms), it contributes to better explain the mechanisms mediating the HR practices – company performance relationship in two complementary ways. First, the results show that the relationship between individual and collective human capital is not systematic, but that individual human capital components emerge at the collective level through the moderator effect of collective affective commitment (considered as an emergence enabling state), and contributes to BU performance. Second, they demonstrate the positive impact of two HR practices bundles on human capital: at the individual level, skill-enhancing practices leverage individual human capital components; at the BU level, empowerment-fostering practices positively impact collective affective commitment, which enables the human capital emergence process.

Keywords: Human capital; Multilevel; Performance.

1. Introduction
The contribution of human capital to company performance and the explanation of the mechanisms mediating the relationship between HR practices – company performance have been important issues in the literature of strategic management and strategic human resource management (SHRM). With a common desire to bring the human element back
into this relationship (Guest, 2011; Wright & McMahan, 1992, 2011), research has built a large corpus proving the decisive role of human capital and collaborative behaviors in increasing company performance (Jiang et al., 2012a; Nishii, Lepak, & Schneider, 2008; Wright & Nishii, 2007). Two theoretical frameworks have been mobilized to explain the mechanisms operating inside the black box (Becker & Huselid, 2006; Jiang et al., 2012a; Takeuchi, Lepak, Heli, & Takeuchi, 2007). First, a behavioral perspective suggests that HR practices affect organizational outcomes by influencing employees’ cooperative attitudes and productive behaviors; such HR practices foster them to act in ways that are consistent with organizational goals and interests (Kehoe & Wright, 2010; Wright, Gardner, & Moynihan, 2003). Social exchange theory (Blau, 1964), in particular, assumes that employees perceive HR practices as an inducement they feel obliged to reciprocate by increasing their organizational affective commitment, task performance and citizenship behaviors (Gardner, Wright, & Moynihan, 2011; Gong, Chang, & Cheung, 2010; Gong, Law, & Chang, 2009). A second perspective draws upon the resource-based view (RBV) (Barney, 1991) and considers that HR practices contribute to develop employees’ knowledge, skills and abilities (KSAs), all of which constitute the firm’s human capital (Jackson & Schuler, 1995). Accumulated human capital can be viewed as a source of sustained competitive advantage as it represents a potentially valuable, rare, and non-substitutable resource (Ployhart & Moliterno, 2011; Wright, Dunford, & Snell, 2001).

Ployhart and Moliterno’s (2011) recent multilevel model is a major attempt to articulate both perspectives by addressing two nebulous issues: (1) How to explain the creation of a unit-level human capital resource resulting in sustained competitive advantage from the emergence of individuals’ knowledge, skills, and abilities; (2) How to articulate other individual characteristics, in particular cooperative attitudes and behaviors, with individual human capital in order to explain the creation and accumulation of collective human capital. Specifically, this model assumes that behavioral, cognitive and affective emergence-enabling states establish the social environment required to amplify and transform KSAs into a unique, unit-level human capital construct. This model can be considered as the missing piece of the puzzle in as much as it specifies mechanisms that explain the nature of this emergence from individual to organizational levels, and clarifies the contribution of human capital to company performance (Nyberg, Moliterno, Hale, & Lepak, 2012). Despite several recent multilevel investigations of the HR practices – company performance relationship (Gardner et al., 2011; Guest, 1997; Wright & McMahan, 2011), and calls to bridge the gap between macro and micro level conceptualizations of human capital (Coff & Krscynski, 2011; Nyberg et al., 2012; Wright & McMahan, 2011), the human capital emergence model still have little empirical proof.

A first contribution of this study will thus be to provide some empirical evidence of the way that individual human capital components contribute to build a unit-level or collective human capital that leverages unit performance. Following this line, we will also examine the role of collective, unit-level affective commitment, as an emotional
enabling state that binds unit members to their organization (Allen & Meyer, 1990) and facilitates the emergence of collective human capital from individual resources (Ployhart & Moliterno, 2011).

A second contribution will be to analyze the influence of HR practices on the process of the emergence of human capital (Ployhart & Moliterno, 2011). Drawing on prior research, we argue that HR practices may positively influence this emergence process through both individual human capital (Delery & Doty, 1996; Huselid, 1995; Jiang et al., 2012a) and collective affective commitment (Ployhart & Moliterno, 2011). Based on the Ability – Motivation – Opportunity (AMO) model (Appelbaum, Bailey, & Berg, 2000), several scholars theorized and demonstrated that specific targets or HR outcomes are distinctively influenced by different bundles of HR practices (Batt & Colvin, 2011; Gardner et al., 2011; Gong et al., 2009; Jiang, Lepak, Hu, & Baer, 2012b; Lepak, Liao, Chung, & Harden, 2006). Furthermore, the recent meta-analysis of Jiang et al. (2012b) demonstrates that skill-enhancing practices are a distinctive predictor of human capital whereas opportunity-enhancing or empowerment practices are mainly related to motivational variables. Pursuing the exploration of the multiple pathways through which HR practices affect employees’ competencies, attitudes and behaviors and, ultimately, organizational performance, we assume that individual human capital is positively influenced by skill-enhancing practices while collective affective commitment is enhanced by empowerment-fostering practices.

On this basis, this study develops and tests a multilevel model of the emergence of human capital. More precisely, as depicted in Figure 1, this model aims to show that the simultaneous leverage of individual human capital (by skill-enhancing HR practices) and the fostering of collective affective commitment (by empowerment-fostering practices), results in the development of specific collective human capital that has a positive impact on business-unit (BU) performance (Lepak et al., 2006; Lepak & Snell, 1999). We tested this model using a sample of 383 employees from 60 business units from KIFs (Knowledge-Intensive Firms) – an industry where human capital is recognized as a critical source of competitive advantage (Alvesson, 2000).
FIGURE 1.
Multilevel Model of Corporate Stakeholder Responsibility, Mediators, Moderators, and Outcomes
2. Background and theory

2.1. Human Capital as a Key Driver of Organizational Performance

In line with the RBV (Resource-Based View) of the firm, the firm-level of human capital is considered as a firm-specific, valuable, rare, non-substitutable, and inimitable resource, directly impacting the company performance (Barney, Ketchen, & Wright, 2011; Wright et al., 2001). Supporting this notion, Hitt et al. (2001) and Coff (1997), among others, demonstrated that leveraging human capital has a direct effect on company performance. A recent meta-analysis including 66 studies of the human capital – firm performance relationship (Crook, Combs, Todd, Woehr, & Ketchen Jr, 2011) confirmed that human capital relates strongly to performance, especially when the human capital is firm-specific, and when operational performance measures are used at organizational level. Despite their high convergence, the results of these studies leave the issue of the relationship between individual and collective levels of human capital unanswered.

As they conceptualize and measure human capital as a collective or “unit-level” resource, these studies overshadow the mechanisms through which firms or business units create and accumulate valuable human capital. Moreover, this firm-level conceptualization of human capital is at odds with the original conceptualization of human capital as an individual-level asset, consisting of knowledge, skills, abilities and other characteristics (KSAOs) with which individuals are endowed and which are economically valuable (Becker, 1964; Jackson & Schuler, 1995). Recently, scholars attempted to reconcile those micro- and macro-perspectives by exploring the micro-foundations of firm-level human capital (Coff & Kryscynski, 2011). In particular, Nyberg et al. (2012) propose that “insight to the unit-level human capital construct must be derived from understanding both the individual-level human assets it comprises and the organizational processes that affect how those individual-level assets are combined and changed to create the unit-level resource” (2012:12).

2.2. Human Capital as a Multilevel Construct

To date, one of the most important contributions to the understanding of the multilevel processes of human capital creation is the recent human capital emergence model developed by Ployhart and Moliterno (2011). They define human capital as “a unit-level resource that is created from the emergence of individuals’ knowledge, skills, abilities, and other characteristics (KSAOs)” (2011:128). Quoting Kozlowski and Klein (2000), these authors consider “a phenomenon as emergent when it originates in the cognition, affect, behaviors, or other characteristics of individuals – KSAOs – , is amplified by their interactions, and manifests as a higher-level, collective phenomenon” (2000: 55) – i.e. company performance and competitive advantage. Human capital as a whole is thus conceptualized as multi-level concept (Molloy & Ployhart, 2012; Molloy, Ployhart, & Wright, 2011; Wright & McMahan, 2011) and requires studies integrating KSAOs at the individual level, and human capital at the organizational level. Moreover, Ployhart and
Moliterno (2011) argue that “one-level considerations may lead to misattribute the level of theory for a construct, ignoring the effect of a context, and/or assuming that the findings from one level apply to other levels” (2011:129). They stress the fact that “unlike prior micro-level and macro-level research assuming relationships at one level generalize to other levels, their model and definition explicate the nature of these cross-level relationships to explain how human capital resources are created and emerge from lower-level KSAO origins.” (2011: 131).

At the first step of the model, Ployhart and Moliterno (2011) consider the employees’ individual-level KSAOs as the micro-foundations of human capital, presented as individual human capital in the present paper. Human capital resources – i.e. collective human capital – originate in the full range of individuals’ KSAOs within the unit. The authors’ definition of KSAOs encompasses both cognitive (what an employee “can do”) and non-cognitive (what employee “will do”) individual attributes that may be either context-specific and valuable only within the organization or context-generic and also valuable outside the firm (Lepak & Snell, 1999), improving individuals’ employability on the labor market (Shaw, Park, & Kim, 2012). In these terms, employability is by definition associated with individual human capital, as it is obtained through the acquisition of knowledge, skills, abilities, and other characteristics valued by current and prospective employers (De Vos, De Hauw, & Van der Heijden, 2011). As such, individual-level human capital may lead to higher firm-level performance as well as a higher risk of human resources loss, depending on the commitment that binds employees to their organization (Benson, 2006).

The second – and most important – step of the model is the emergence enabling process, defined as “the locus of the intermediary mechanisms that result in an emergent unit-level human capital resource” (Ployhart & Moliterno, 2011:135). This dynamic transformation process resides in a complex relationship between the task environment, defined as the degree to which the unit’s tasks require interdependence and coordination among members, and the emergence enabling states, including unit-members’ interactions, thinking and feelings (behavioral, cognitive and affective enabling states). According to Hackman (1976), emergence enabling states “can be considered as the ‘glue’ that binds unit members together and allows their interactions through the task environment to amplify and transform KSAOs into a unique, unit-level human capital construct” (Ployhart & Moliterno, 2011:137). Among the various emergence enabling states and in line with Kozlowski and Ilgen (2006), the authors consider affective psychological states, that they define as the emotional “bonds” that tie unit members together.

The third and final step occurs at the unit-level. Indeed, Ployhart and Moliterno (2011) consider that because “generic human capital resources emerge as a function of the unit’s unique emergence enabling process, they effectively become unit specific” (2011:142). As a consequence, context-generic individual-level human capital resources may lead to the development of context-specific human capital resources and, as a result, to a sustainable competitive advantage (Lepak & Snell, 1999). Ployhart and Moliterno (2011) point out that individual human capital micro-foundations are thus only partially-
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isomorphic with collective human capital, considering that higher- and lower-level constructs share some common features but remain conceptually and empirically distinct. Therefore, empirical investigations should make a clear distinction between those two levels of construct definition and operationalization, as very little research has yet attempted to do (Nyberg et al., 2012).

Considering this partial-isomorphism argument, and that individual-level assets could be a source of sustainable competitive advantage only if the two are combined to form a collective and unit-specific human capital resource, our first hypothesis states that:

**Hypothesis 1:** Individual human capital positively influences business-unit performance through the mediation of collective human capital.

2.3. Collective Affective Commitment as an Enabling State

Of the three emergence-enabling states presented in Ployhart and Moliterno’s (2011) model (behavioral, cognitive, affective), this study focuses on the affective state, using the concept of affective commitment defined by Meyer and Allen (1990) as employees’ emotional attachment to, identification with, and involvement in the organization. In SHRM, the role of affective commitment has been recognized as decisive in companies’ success, most of the time as a mediating variable between high involvement work practices and organizational performance (Gardner et al., 2011; Whitener, 2001). In line with the conceptualization of emergence enabling states as shared attitudes, behaviors and perceptions between BU members (Ployhart & Moliterno, 2011), we consider affective commitment at the BU level. Barsade’s (2002) work on emotional contagion in groups has suggested that affects are shared within groups and impact group behaviors and outcomes. Gardner et al.’s (2011) also considered affective commitment at the BU level and defined it as “a shared mind-set and a shared psychological state among a delimited collective of individuals regarding their employer typified by feelings of loyalty and a desire to invest mental and physical energy in helping organizations achieve its goals” (2011:318). Finally, social and situational theories hold that high levels of interaction within work units, attractive-selection-retention dynamics, and similar experiences of organizational structures and events, lead to relatively homogeneous feelings, values and attitudes towards the organization (Klein, Conn, Smith, & Sorra, 2001; Seibert, Silver, & Randolph, 2004). These arguments support our conceptualization of collective affective commitment.

In line with Ployhart and Moliterno’s (2011) model, we consider collective affective commitment as social link that binds unit members together and fosters human capital emergence at this BU level. Effective units are more likely to adopt proactive problem-solving strategies when dealing with adversity (Kozlowski & Ilgen, 2006), and are likely more generally to chart their own idiosyncratic courses by self-regulation (Hackman, 2002; Millward, Banks, & Riga, 2010). These strategies may include specific KSAOs development and sharing, at both individual- and BU-levels. In the same way, because
collective affective commitment can be considered as a positive emotional state in the unit, it fosters the sharing of knowledge and information, supports skills development, and increases individuals’ willingness to remain with the team (Nahapiet & Ghoshal, 1998; Ployhart & Moliterno, 2011). Collective affective commitment consequently strengthens the relationship between individual human capital and collective human capital. Until now, no study has tested whether collective affective commitment moderates the cross-level relationship between individual human capital and collective human capital. In line with the propositions for human capital emergence models (Ployhart & Moliterno, 2011), and considering this moderated relation as the heart of the model, we propose that:

**Hypothesis 2:** Collective affective commitment (BU level) will moderate the relationship between individual human capital and collective human capital, such that this relationship will be stronger when collective affective commitment is high.

### 2.4. The Role of HR practices in Fostering Human Capital and Collective Affective Commitment

Since the early 1990s, many seminal studies have tested the direct relationship between HR practices and company organizational or financial performance (Arthur, 1994; Batt, 2002; Huselid, 1995; Wright, Gardner, Moynihan, & Allen, 2005). Combs and colleagues (2006) large meta-analysis – covering 92 studies – seize the general effect of high performance work practices on organizational performance. Research further investigating the nature of this relationship, has since then evolved in two directions. First, exploring the underlying mechanisms linking HR practices and company performance called for a return to the main target of HR practices – i.e. people – and the consideration of a lower level of analysis than the business unit level – i.e. the individual level (Lepak et al., 2006). Attempts to open the black box of the relationship have recently multiplied, investigating the mediating role of single individuals’ attitudes or behaviors: organizational citizenship behavior (Lam, Chen, & Takeuchi, 2009), perceived organizational support or leader-member exchange (Liao, Toya, Lepak, & Hong, 2009), employee-organization relation (Kuvaas, 2008; Liao et al., 2009), job satisfaction (Takeuchi, Chen, & Lepak, 2009), or human capital (Youndt & Snell, 2004). As an example, Liao et al. (2009) found that employees’ perspective of HR practices is positively related to individual service performance through the mediation of employee human capital and psychological empowerment.

A recent meta-analysis (Jiang et al., 2012b) suggests considering two theoretical approaches to explain the link between HR practices and organizational performance. Firstly, adopting a behavioral perspective of HRM (Jackson, Schuler, & Rivero, 1989), productive and collaborative behaviors from employees as well as motivation-related variables are viewed as the main bridge between HRM and organizational outcomes (Kehoe & Wright, 2010). Secondly, in line with the human capital theory and the RBV of
the firm, the knowledge, skills and abilities that employees possess may form valuable human capital providing the firm with a competitive advantage. Jiang et al. (2012b) meta-analytic results corroborate that motivation-related variables and human capital are indeed the two missing links between HR practices and organizational performance. In this study, we propose to refine this approach by investigating how collective affective commitment, as a motivational variable, and human capital, on both individual and collective levels, are articulated with each other in the black box linking HR practices and BU performance.

The second path to advancing our understanding of the HR practices – performance relationship is to consider that the components of HR systems are compounded of different sets of practices that influence distinct HR outcomes or targets through specific and various pathways (Batt & Colvin, 2011; Gardner et al., 2011; Jiang et al., 2012b). Today, the most fruitful classification of these different pathways is the Appelbaum and colleagues’ (2000) Ability – Motivation – Opportunity (AMO) model that distinguishes three bundles of HR practices depending on whether they are intended to enhance skills and competencies, motivation, and empowerment, i.e. opportunities to participate in the company’s activity (Appelbaum et al., 2000; Lepak et al., 2006; Minbaeva, 2012). Subramony’s (2009) meta-analysis revealed that these three HRM bundles are significantly related to business outcomes. Regarding the mediating mechanism of these relationships, skills-enhancing practices have been shown to affect outcomes mainly through the mediation of human capital, whereas empowerment practices are more efficient in enhancing employee motivation (Jiang et al., 2012b). Motivation-enhancing practices are similarly - i.e. with the same size effects - related to human capital and motivation as mediators. Taking this pattern of the HR bundles’ differential effects into account, we argue that individual human capital may be positively influenced by skill-enhancing practices, while collective affective commitment may be enhanced by empowerment-fostering practices.

2.5. The Impact of Skills Enhancing Practices on Individual Human Capital

In the precise context of this research, we thus consider that companies invest to acquire and develop high quality individual human capital through the implementation of a set of skill-enhancing practices (Crook et al., 2011; Gardner et al., 2011; Ployhart & Moliterno, 2011). Skill-enhancing practices combine HR practices primarily related to recruitment, selection and training that focus on increasing the overall level of employees’ knowledge, ability and skills (Subramony, 2009). Specifically, the implementation of skill-enhancing practices leads the company to firstly select adequate profiles for specific jobs, and therefore secondly to optimally invest in the development and training of these profiles, thus improving individual human capital value (Gardner et al., 2011; Lincoln & Kalleberg, 1996; Tannenbaum, Mathieu, Salas, & Cannon-Bowers, 1991). It is worth noting that, as such, investing in individual skills may increase the risk of losing this individual human capital which is valuable both inside and outside the company (De
Cuyper, Mauno, Kinnunen, & Mäkikangas, 2011). Some scholars have therefore argued that this human capital loss risk must be offset by the implementation of other groups of HR practices influencing affective commitment positively, such as empowerment–fostering practices, as hypothesized in our model (Gardner et al., 2011; Jiang et al., 2012b). Empirically, some studies have shown that the use of comprehensive selection and training practices enhanced collective human capital among employees (Cabello-Medina, López-Cabrales, & Valle-Cabrera, 2011). This research aims at going one step further by testing the following hypothesis:

**Hypothesis 3:** Skill-enhancing practices (individual level) will influence collective human capital, via individual human capital.

### 2.6. The Impact of Empowerment-Fostering Practices on Collective Affective Commitment

Besides the positive influence of traditional skill-enhancing practices on company performance, empowerment practices have also been proved to have a favorable effect on this outcome (Jiang et al., 2012b; Subramony, 2009). Empowerment practices aim to delegate decision-making authority and responsibility down the hierarchy through the use of self-managing or autonomous teams and by facilitating employee participation and voice (Subramony, 2009). Seibert and his colleagues (2011) postulate that “high-performance management practices are thought to improve performance because they increase the amount of information and control employees have over their work; the level of work-related knowledge, skills and abilities possessed by employees, and the level of motivation employees have to achieve the goals of the organization” (2011:983). Based on SDT (self-determination theory) (Deci & Richard, 1985), Gardner et al. (2011) argue that empowerment-enhancing practices satisfy three innate psychological needs – i.e. autonomy, (participation in decisions and personal control over one’s actions), competence (experiencing oneself as capable and able to affect outcomes), and the need for relatedness (feelings of belonging to and participating in a collective) –, which “closely match the percussive psychological processes that arouse affective commitment” (Gardner et al., 2011:320).

Empirical evidence recognizes affective commitment as being positively influenced by HR practices, when these are perceived by employees as proof of the organization’s support in terms of investments in their jobs and careers in the long term (Eisenberger, Huntington, Hutchison, & Sowa, 1986; Whitener, 2001). Specifically, several studies have shown that employees’ affective collective commitment is influenced by HR empowerment-enhancing practices (Gardner et al., 2011), and has a significant influence on the organization’s effectiveness (Klein, Becker, & Meyer, 2009; Whitener, 2001; Wright & Kehoe, 2008). Moreover, Gardner et al. (2011) recently proved the mediating effect of collective affective commitment on the relationship between empowerment-enhancing practices and voluntary turnover, as a social performance indicator, which is
not the case for skills-enhancing practices. On this basis, we propose the following hypothesis:

**Hypothesis 4:** Empowerment-fostering HR practices will influence collective affective commitment as an enabling state of collective human capital.

3. **Methods**
   3.1. **Context, sample and procedure**

This research was conducted in the context of the Knowledge-intensive firms (KIFs) in Luxembourg in 2012. Alvesson (2000) defines KIFs as companies “where most of the work can be said to be of an intellectual nature and where well qualified employees form the major part of the workforce” (2000:1101). Several types of profit-seeking companies are qualified as KIFs: consulting companies, law firms, private banks, engineering or architecture companies, and Research and Technology Organizations (RTOs) (Von Nordenflycht, 2010).

Data collection process was carried out in two waves with a 4-month interval; the process was applied at two levels: the business unit (BU) level and the individual level. 45 companies a priori corresponding to the definition of KIFs were contacted. All the selected companies employ more than 100 individuals, distributed in at least 5 BU. 9 firms accepted to take part in the research. Two types of profiles were invited to answer the survey: BU managers, and their respective subordinates. We consider a BU as a group of individuals, defined as “a collective of individuals interacting through meetings, training, and interdependent work, shared goals, all within a larger setting” (Chan, 1998:235).

A sample of 98 BU managers and 1530 BU members were contacted via e-mail and asked to participate in an online survey on a voluntary basis. At time 1, 69 BU managers and 764 employees completed online surveys, with a 49.9% response rate. BU members responded to survey items regarding their perceptions of HR practices. We contacted participants 4 months later. From the 69 BU managers and 764 BU members who responded at Time 1, 61 BU managers and 457 BU members fully completed the Time 2, yielding a response rate of respectively 87% and 50%. The Time 2 survey captured collective human capital and perception of the BU performance for the BU managers, and affective commitment and individual human capital for the BU members. We only kept data of individuals whose BU managers answered both T1 and T2 surveys resulting in a sample of 387 BU members. In accordance with thresholds generally recognized for measures for multilevel analysis (Bliese, 2000), we excluded 1 BU from the sample due to low agreement among employees’ responses (see Analyses section).

The final sample for this study thus consisted of 383 BU members working in 60 BU including 1 to 17 members, with an average of 6.38 (SD = 4.27). Employee respondents were 75.5% male; 2.6% were under 25 years old, 15.9% were 25 to 29, 23.5% were 30 to
34, 21.7% were 35 to 39, 14.9% were 40 to 44, 11.7% were 45 to 49, 4.0% were 50 to 54, 4.4% were 55 to 59, and 1.3% were over 60 years; the mean of training years was 4.37 years; lastly, 25.6% had under 2 years of tenure, 27% had 2 to 5 years, 18.8% had 5 to 10 years, 17.3% had 10 to 15 years, and 10.4% had over 15 years’ service.

3.2. Attrition bias
To examine possible non-random sampling effects of attrition among participants, we followed the procedure recommended by Goodman and Blum (1996). We performed a logistic regression analysis. The criterion was a dummy-coded variable classifying respondents who were present at Time 1 and 2 as stayers, and those who responded at Time 1 but had left at Time 2 as leavers. The predictors were all Time 1 independent variables and controls. Some non-random sampling was observed: \( \chi^2 (6) = 24.31, p < .01 \). The results revealed that only individuals’ seniority in the company related significantly to staying in or leaving the sample (Exp(B) = 1.07, p < .01): the longer participants had worked in the company, the more they were likely to opt out at Time 2. However, the percentage of respondents in the company for more than 15 years was quite low 10.4%. T-tests and \( \chi^2 \)-tests showed that employees who responded at Times 1 and 2 did not differ from employees who responded only at Time 1 regarding perceptions of HR practices and the majority of control variables. Hence, there was little evidence that loss of observations due to attrition would bias the results.

3.3. Measures
Surveys were online, and participants (managers and employees) had to answer the survey in English. Unless otherwise noted, all answers were collected using a five-point Likert type scale (1 = I don’t agree at all to 6 = I totally agree).

Individual-level measures. Skill-enhancing practices, empowerment-fostering practices, affective commitment, and individual human capital components were measured at the individual level.

Skill-enhancing practices were measured by an 11-item scale, mainly based on that of Takeuchi et al. (2007). The scale was supplemented with items from Lepak and Snell (2002) and Gardner et al. (2011), concerning selection and training evaluation. A sample item was: ‘Training is continuous throughout the career within the company’. The Cronbach’s alpha was .90.

Empowerment-fostering practices were measured by a 14-item scale adapted from the measure of (Gardner et al., 2011), supplemented with items from Lepak and Snell (2002) and Takeuchi et al. (2007). A sample item was: ‘In my business unit, employees are empowered to make decisions’. The Cronbach’s alpha was .88.

Individual human capital was evaluated by BU members at Time 2 through three of the five variables from Vander Heijden and Vander Heijden (2006)’s employability scale: professional expertise, personal flexibility, and continuous training capacity. These
components emerged from an exploratory qualitative study on managers’ perception of the strategic human capital components expected from employees in KIFs, and correspond to studies on profiles in this context (Alvesson, 2004; Von Nordenflycht, 2010). In line with recent recommendations, we avoided using proxies to measure individual human capital components, preferring direct assessment (Wright & McMahan, 2011). Thus, the measures of these components were:

- **Professional expertise** was measured by fourteen items from the scale developed by Van Der Heijden and Van Der Heijden (2006). A sample item was: ‘I think I am competent to engage in specialized discussions in my job competences’. The Cronbach’s alpha was .93.

- **Continuous training capacity** was measured by seven items. A sample item was: ‘I systematically focus on improving my weaknesses’. The Cronbach’s alpha was .78.

- **Personal flexibility** was measured by six items developed by the same authors. A sample item was: ‘I adapt to changes in my workplace very easily’. The Cronbach’s alpha was .87.

**Affective organizational commitment.** Four items from the scale developed by Meyer and Allen (1990) were used to measure affective commitment, such as ‘This company has a great deal of personal meaning for me’. The Cronbach’s alpha was .82.

**Business unit-level measures.** Collective human capital and perceived BU performance were assessed by BU managers at Time 2.

Collective human capital was measured using a five-item scale inspired by Subramaniam and Youndt (2005) and Youndt, Subramaniam and Snell (2004). A sample item was: ‘Our employees working in the business unit develop new ideas and knowledge’. The Cronbach’s alpha was .86.

Perceived business unit performance. We used nine items from the perceived organizational performance measure developed by Delaney and Huselid (1996). Items were adapted to capture the performance of the business unit. A sample item was: ‘Compared to other business units that do similar work, how do you think your business unit performs concerning quality of products and services’. The Cronbach’s alpha was .88.

**Controls.** To minimize omitted-variable bias, we included individual- and BU-level control variables. At the individual level, we controlled for age, gender, tenure and number of training years. At the BU level, we controlled for BU size.

### 3.4. Aggregation Tests

Consistent with prior research (Batt, 2002; Gardner et al., 2011; Lepak & Snell, 2002), the variables of empowerment-fostering practices and collective affective commitment were measured at the individual level using the ‘direct consensus model’ (Chan, 1998), and were introduced at BU levels of analysis. Several indexes were computed to determine whether creating aggregate scores of BU empowerment-fostering practices and
collective affective commitment from individual-level data was empirically justifiable. First, we calculated $r_{WG(J)}$ scores as a measure of agreement within BU (James, Demaree, & Wolf, 1984) and obtained an average value of .92 for BU empowerment-fostering practices and of .70 for collective affective commitment. These values exceed conventional standards ($r_{WG(J)} > .60$) and are supportive of aggregation (Bliese, 2000). In addition, we assessed between-unit variance and unit mean reliability by estimating the ICC(1) and ICC(2) coefficients. The values were ICC(1) = .21, ICC(2) = .63, $F(59, 323) = 1.83$, $p < .001$ for BU empowerment-fostering practices, and ICC(1) = .06, ICC(2) = .30, $F(59, 323) = 1.37$, $p < .05$ for collective affective commitment. Although the values of ICC(1) and ICC(2) were relatively low for collective affective commitment, they were comparable with estimates reported in previous studies (Liu & Batt, 2010; Subramony, Krause, Norton, & Burns, 2008). Taken together, the pattern of results provides sufficient justifications for aggregating these two individual variables to the BU level (LeBreton & Senter, 2008).

3.5. Analytic Strategy
We accounted for the multilevel nature of our data and model and used multilevel structural equation modeling with Mplus 7.0 (Muthén & Muthén, 2012). Conventional methods for testing mediation (Baron & Kenny, 1986) were inappropriate for this study because the individual-level data were nested within BU, resulting in non-independent observations and biased standard errors. Conventional statistical procedures are not adequate to examine multilevel mediation processes, as there is a risk of confounding within-group and between-group effects (Mathieu & Taylor, 2007). To test multilevel mediation ($1 \rightarrow 2 \rightarrow 2$ and $1 \rightarrow 1 \rightarrow 2$ respectively for Hypotheses 1 and 3), we used the procedures recommended by Preacher, Zyphur, and Zhang (2010). Precisely, we used the Monte Carlo method to estimate confidence intervals for the hypothesized multilevel mediated relationships to determine their significance. Finally, to test the moderating effect of collective affective commitment (Hypothesis 2), we used the moderated multiple regression procedure recommended by Aguinis and Gottfredson (2010).

4. Results
4.1. Measurement Model
Given the multilevel nature of our data, we assessed the constructs’ validity using two different procedures. First, we conducted a one-level confirmatory factor analysis (CFA), using Mplus 7.0, that included all the study’s constructs. This conventional CFA was used to establish measurement adequacy baseline and estimate fit statistics. Second, we estimated a two-level measurement model using Mplus 7.0 for BU-level and individual-level constructs simultaneously, following procedures recommended by (Dyer, Hanges, & Hall, 2005). Multilevel CFAs take into account the non-independent nature of nested
data and provide a more comprehensive test of a multilevel data structure than one-level CFAs.

**One-level confirmatory factor analysis.** The model with eight factors (skill-enhancing practices, empowerment-fostering practices, affective commitment, professional expertise, personal flexibility, continuous training capacity, collective human capital, and BU performance) loading separately fits the data well ($\chi^2 [904] = 1281.2, p < .01; \text{CFI} = .96; \text{RMSEA} = .033; \text{SRMR} = .046$). The fit of this model compared favorably with the fits of more parsimonious alternatives: seven-factor model (collapsing for example professional expertise and continuous training capacity: $\Delta \chi^2 [7] = 311.4, p < .01$ or collapsing skill-enhancing and empowerment-fostering practices: $\Delta \chi^2 [7] = 157.1, p < .01$), a six-factor model (collapsing professional expertise, personal flexibility, and continuous training capacity: $\Delta \chi^2 [13] = 779.4, p < .01$), a five-factor model (collapsing collective human capital, professional expertise, personal flexibility, and continuous training capacity: $\Delta \chi^2 [18] = 1200.1, p < .01$), and a one-factor model ($\Delta \chi^2 [28] = 3935.9, p < .01$). These one-level CFAs demonstrate the convergent and discriminant validity of constructs, and provide a satisfactory basis to test the multilevel structure of the data.

**Two-level confirmatory factor analysis.** Multilevel CFA tests individual- and BU-level constructs simultaneously. This makes it possible to estimate constructs’ variance at individual and BU levels after accounting for measurement error at both levels. To provide further clarity regarding the analyses, we note that collective human capital and BU performance are between-unit variables (i.e., values only can vary between business units), whereas skill-enhancing practices, empowerment-fostering practices, and affective commitment variables contain both between-unit and within-unit variance. The fit indexes for the multilevel CFA indicate that the models fit the data well at both the individual and BU levels: $\chi^2 [858] = 1289.06, p < .01; \text{CFI} = .94; \text{RMSEA} = .036; \text{SRMR Between} = .153; \text{SRMR Within} = .057$. Despite the fact that value of the SRMR Between indicates some misfit at the BU level that may be due to the low sample size for multilevel CFA (Muthén & Muthén, 2012), the values of all other fit indexes are satisfactory.

**4.2. Hypotheses testing**

The means, standard deviations, correlations, and reliabilities of all variables are presented in Table 1.
Table 1. Means, Standard Deviations, and Zero-Order Correlations for Individual-Level and Business unit-Level Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>M</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Individual level (N = 383)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Age</td>
<td>37.5</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>2. Gender</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>3. Tenure</td>
<td>7.45</td>
<td>.62**</td>
<td>–</td>
<td>.13*</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>4. Number of years at school</td>
<td>4.37</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>.17**</td>
<td>.02</td>
<td>-.08</td>
<td>–</td>
</tr>
<tr>
<td>5. Skills-enhancing practices</td>
<td>3.63</td>
<td>.93</td>
<td>–</td>
<td>.13*</td>
<td>–</td>
<td>.09</td>
<td>–.10</td>
<td>–.04</td>
<td>–.04</td>
<td>(.90)</td>
</tr>
<tr>
<td>6. Professional expertise</td>
<td>5.03</td>
<td>.61</td>
<td>.16**</td>
<td>–</td>
<td>.04</td>
<td>0.10</td>
<td>.04</td>
<td>.06</td>
<td>.06</td>
<td>(.93)</td>
</tr>
<tr>
<td>7. Continuous training capacity</td>
<td>4.26</td>
<td>.83</td>
<td>–</td>
<td>.16**</td>
<td>–.01</td>
<td>–.16**</td>
<td>.13**</td>
<td>.22**</td>
<td>.44**</td>
<td>(.74)</td>
</tr>
<tr>
<td>8. Personal flexibility</td>
<td>4.61</td>
<td>.74</td>
<td>.07</td>
<td>–</td>
<td>–.10</td>
<td>–.08</td>
<td>–.06</td>
<td>.25**</td>
<td>.43**</td>
<td>.46**</td>
</tr>
<tr>
<td><strong>Business unit level (N = 60)</strong></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. BU size</td>
<td>6.38</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>2. Empowerment fostering practices</td>
<td>3.65</td>
<td>.50</td>
<td>.02</td>
<td>.12</td>
<td>.49**</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>3. Affective commitment</td>
<td>3.67</td>
<td>.54</td>
<td>.12</td>
<td>.49**</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>4. Collective human capital</td>
<td>4.56</td>
<td>.71</td>
<td>–</td>
<td>.10</td>
<td>.22</td>
<td>.29*</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>5. Perceived BU performance</td>
<td>4.40</td>
<td>.73</td>
<td>–</td>
<td>.10</td>
<td>.17</td>
<td>.37**</td>
<td>.58**</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>
In Hypothesis 1 we proposed that individual human capital positively influences BU performance through the mediation of collective human capital. Table 2 presents the results of multilevel structural equation modeling, using the procedure recommended by Preacher et al. (2010) to test multilevel mediation (1 → 2 → 2). The results indicated that at the BU level, collective human capital positively predicted BU performance ($\gamma = .72$, $p = .01$), however, individual human capital variables (professional expertise, personal flexibility, and continuous training capacity) did not significantly predict collective human capital ($\gamma = 5.02$, $p > .10$, $\gamma = .16$, $p > .10$, $\gamma = 1.97$, $p > .10$, for professional expertise, continuous training capacity, and personal flexibility, respectively). We also examined the statistical significance of the mediation effect by using the bootstrap procedure recommended by Preacher et al. (2010) and Selig and Preacher (2008). The indirect effect of individual human capital variables on BU performance, via collective human capital was not significant as all bootstrapped confidence intervals included zero [95% CI = (–38.47, 48.89) for professional expertise, (–7.93, 11.92) for personal flexibility, and (–7.77, 8.64) for continuous training capacity]. Thus, even though collective human capital was significantly related to BU performance, the mediation hypothesis was not supported.
Table 2. Results of Multilevel Structural Equation Models

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Professional expertise</th>
<th>Continuous training capacity</th>
<th>Personal flexibility</th>
<th>Collective affective commitment</th>
<th>Collective human capital</th>
<th>BU performance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Unstandardized coefficients</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Control variables**

*Individual level*

- Gender: -.04, .00, -.02
- Tenure within the BU: .10*, -.02, -.01
- Number of years at school: .05, .11*, -.01

*BU level*

- BU size: -.06, -.08, -.03

**Independent variables and mediators**

*Individual level*

- Skills-enhancing practices: .008, .27**, .32**
- Professional expertise: –, –, –
- Continuous training capacity: –, –, –
- Personal flexibility: –, –, –

*BU level*

- Empowerment fostering practices: .51**, −3.78
- Collective affective commitment: –, 1.33
- Collective human capital: –, –, .72**

| $R^2$ | .028 | .176 | .192 | .239 | .219 | .284 |

Note. N (Level 1) = 383, N (Level 2) = 60; *p < .05; **p < .01, two-tailed tests. Values shown in bold reflect hypothesized results.
Hypothesis 2 predicted that collective affective commitment would interact with individual human capital to influence collective human capital, such that the effect would be stronger when collective affective commitment is high. Results, displayed in Table 3, show the results for moderated regression analyses. They indicated statistically significant interactions between collective affective commitment and professional expertise (b = .43, p < .01), continuous training capacity (b = .27, p < .05), and personal flexibility (b = .39, p < .01) respectively in predicting collective human capital. We plotted the regression lines of collective human capital on professional expertise, personal flexibility, and continuous training capacity respectively at 1 SD below and 1 SD above the mean of collective affective commitment (Aiken & West, 1991). Figure 2 provides the graphic depiction of these interactions. Overall, this yields support for Hypothesis 2.
Table 3. Hierarchical Moderated Regression Results

<table>
<thead>
<tr>
<th>Variables</th>
<th>Outcome Variable: Collective human capital</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Professional expertise</td>
</tr>
<tr>
<td></td>
<td>Step 1</td>
</tr>
<tr>
<td><strong>Control variables</strong></td>
<td></td>
</tr>
<tr>
<td>BU size</td>
<td>.02</td>
</tr>
<tr>
<td>Average tenure within the BU</td>
<td>-.04</td>
</tr>
<tr>
<td>Average number of years at school</td>
<td>-.17</td>
</tr>
<tr>
<td><strong>Main effects</strong></td>
<td></td>
</tr>
<tr>
<td>Professional expertise</td>
<td>.10</td>
</tr>
<tr>
<td>Continuous training capacity</td>
<td>.09</td>
</tr>
<tr>
<td>Personal flexibility</td>
<td></td>
</tr>
<tr>
<td>Collective affective commitment (CAC)</td>
<td>.40**</td>
</tr>
<tr>
<td><strong>Interaction effects</strong></td>
<td></td>
</tr>
<tr>
<td>Professional expertise x CAC</td>
<td>.43**</td>
</tr>
<tr>
<td>Continuous training capacity x CAC</td>
<td></td>
</tr>
<tr>
<td>Personal flexibility x CAC</td>
<td></td>
</tr>
<tr>
<td><strong>R2</strong></td>
<td></td>
</tr>
<tr>
<td>R2</td>
<td>.049</td>
</tr>
<tr>
<td>∆R2</td>
<td>–</td>
</tr>
</tbody>
</table>

**Note.** N = 60. Unstandardized regression coefficients are reported. Values shown in bold reflect hypothesized results. * p < .05, ** p < .01.

CAC = Collective affective commitment. Average age within the BU was excluded as a control from the analyses as it was highly correlated to average tenure.
Fig. 2. Simple Slopes for Moderating Effect of Collective affective commitment on the Effect of Individual human capital variables on Collective human capital
Hypothesis 3 specified that skill-enhancing practices (individual level) would influence collective human capital, via individual human capital variables. Table 2 shows the results of the multilevel structural equation model used to test multilevel mediation (1 → 1 → 2). In sum, our results showed that the relationships between skill-enhancing practices and personal flexibility and continuous training capacity respectively were positive and significant (γ = .32, p < .01 and γ = .27, p < .01). Professional expertise was not related to skill-enhancing practices (γ = .008, p > .10). Also, as shown in Table 2, individual human capital variables did not significantly predict collective human capital. Moreover, the indirect effect of skill-enhancing practices on collective human capital, via individual human capital variables was not significant, as all bootstrapped confidence intervals included zero. Hence, Hypothesis 3 was not supported.

Finally, Hypothesis 4 predicted that empowerment-fostering HR practices at the BU level would influence collective affective commitment as an enabling state of collective human capital. As shown in Table 2, the relationship between empowerment-fostering HR practices and affective commitment at the BU level was significant and positive (γ = .51, p < .01). Thus, Hypothesis 4 was supported.

5. Discussion and implications

By drawing on the human capital emergence model (Ployhart & Moliterno, 2011), our findings contribute to understand the nature of the relationship HR practices – company performance – i.e. of mechanisms mediating and moderating it – in two complementary ways, as hypothesized in the model. First, the results partially prove that individual human capital components emerge as collective human capital through the moderator effect of collective affective commitment – i.e. the emergence enabling state –, contributing to the BU performance. We thus partially empirically validate Ployhart and Moliterno (2011)’s human capital emergence model, which – as far as we know – has not yet been done. Contrary to most of the classical literature on human capital (Crook et al., 2011; Youndt & Snell, 2004), we show here that individual human capital components do not emerge directly at the collective level, and consequently do not directly impact BU performance: the enabling effect of collective affective commitment is a pre-condition or a boundary condition for the emergence of BU-level human capital. Second, we demonstrate that HR practices positively leverage human capital on a multilevel perspective: at the individual level, skill-enhancing practices leverage individual human capital components; at the BU level, empowerment-fostering practices positively impact collective affective commitment that enables the human capital emergence process. Next, we discuss the implications of these findings from theoretical, empirical and practical viewpoints, and present the limitations of the present study and new perspectives for future research.
5.1. Theoretical implications

Contrary to our first hypothesis, individual human capital components did not directly influence BU performance through the mediator effect of collective human capital. This relationship is only partially confirmed, as collective human capital positively influences BU performance. Nevertheless, this finding sheds light on the nature of the individual human capital – company performance relationship (Jiang et al., 2012a; Way & Johnson, 2005). It does not contradict recent contentions that unit-level human capital does not emerge from individual-level human capital in a linear manner, but is also shaped by organizational processes, as boundary conditions that combine and change individual assets to create a unit-level resource (Nyberg et al., 2012; Ployhart & Moliterno, 2011; Wright & McMahan, 2011).

Our results confirm that the relationship between human capital at both individual and collective levels depends on other conditions required for building up competitive advantage from individual assets. Consequently, individual human capital does not appear to be the main factor enabling companies to build valuable collective human capital. The first main contribution of this research thus resides in the empirical evidence that individual and collective human capital should not be considered as isomorphic constructs (Nyberg et al., 2012). In these terms, this research is one of the rare empirical multi-level investigations of the content of the black box, as recommended by Nishii et al. (2008). In numerous studies, the mechanisms linking HR practices and performance are considered either at group level (Gong et al., 2010), or at individual level (Kuvaas, 2008), but rarely in a multi-level perspective (Liao et al., 2009). Future research should continue to investigate the role of black box components, in particular human capital, as multilevel constructs, and elaborate on how the mechanisms in this black box operate.

Second, we proved the moderating role of collective affective commitment on the individual human capital – collective human capital relationship. The relationship between the three individual human capital components – i.e. professional expertise, continuous training capacity, and personal flexibility - and collective human capital is stronger when affective commitment is high. In line with Ployhart and Moliterno’s (2011) model, our results confirm that collective affective commitment – here considered as an emergence enabling state – is a necessary condition for creating a valuable collective human capital from the components of individual human capital. This highlights the need to simultaneously consider the role of human capital and motivational variables to understand the micro-mechanisms fostering organizational performance (Jiang et al., 2012b; Wright & McMahan, 2011). Specifically, ensuring that BU members are highly committed to the organization appears as a precondition for their collaborating, sharing knowledge, skills and abilities for the organization’s benefit. Moreover, considering that a simple and direct relationship between individual human capital and collective human capital does not exist, our results proved that the human capital emergence process must be contextualized, as it depends on the existence of enabling states related to the BU’s specific social environment. Individual and context-generic human capital is not a source of competitive advantage per se but it can form a collective
and valuable context-specific human capital if, and only if, some contextual conditions are present. This study confirms the role of collective affective organizational commitment as an enabling state and encourages further exploration of behavioral and cognitive enabling states suggested by Ployhart and Moliterno (2011).

Thirdly, our findings support the assumption that the different variables in the black box are leveraged through distinct HR practices. In particular, skill-enhancing practices positively influence the three individual human capital components whereas empowerment-fostering practices positively influence collective affective commitment. Given that individual human capital is not systematically related to collective human capital, we failed to prove the mediation hypothesis that individual level skill-enhancing practices influence collective human capital, via individual human capital. Regarding empowerment-fostering practices, as expected, they contribute to enhancing collective affective commitment among BU members, which has been recognized as an emergence enabling state for collective human capital. These results once more support the recent choice to consider HR practices as specific bundles, taking specific attitudinal targets into account, as has been shown in very recent studies (Batt & Colvin, 2011; Gardner et al., 2011; Jiang et al., 2012b). Taking into account the differential pathways through which HR practices bundles affect company performance, encourages researchers to explore the possible positive or negative synergies among these different HR bundles (Chadwick, 2010). As individual components of human capital and collective affective commitment interact to explain the emergence of human capital at BU level, our results suggest that the effects of skill-enhancing and empowerment-fostering practices on organizational performance may be multiplicative, not only additive as shown in previous research (Gardner et al., 2011; Subramony, 2009). Moreover, this evidence of the differentiated impact of several HR bundles partly supports the AMO model (Appelbaum et al., 2000; Lepak et al., 2006), that distinguishes several HR bundles relative to the three main HR domains – i.e. individuals’ ability, motivation and opportunity to participate in company performance. Future research should go one step further by investigating the specific role of motivation-enhancing practices in the emergence of human capital, in addition to the role of skill-enhancing and empowerment-fostering practices studied here. The differentiated effect of the three AMO dimensions on the multiple components of individual human capital may also be explored to explain more and more precisely the black box mechanisms.

5.2. Limitations and Future Research

Despite its theoretical contributions, this study has some limitations. First, HR practices bundles are only considered from the employees’ perspective and do not include BU managers’ or HR managers’ points of view. In future research, confronting HR practices implementation reported by managers and employees’ perception could help to detect the line of sight perceived by employees (Buller & McEvoy, 2012), and the overall strength of the implemented HR system (Bowen & Ostroff, 2004). Second, the measures used to
capture human capital at both levels may be criticized. As Wright and McMahan (2011) recently pointed it, very few validated multi-dimensional and contingent human capital measures exist as yet. In the present study, we used a multi-dimensional measure of employability (Van Der Heijden & Van Der Heijden, 2006) to apprehend individual human capital because this scale focused on three components that were judged relevant during exploratory interviews in the specific context of KIFs. However, in addition this measure is being specific to the particular context of this study, it is also self-reported by employees themselves. A future perspective could be to ask BU managers to assess each employees’ human capital component, as in Liao et al.’s (2009) multilevel study. At the BU-level, we assessed human capital using an existing measure (Takeuchi et al., 2007; Youndt et al., 2004), but this is also a subjective measure by BU managers that is likely to suffer from a common method variance bias with the self-reported measure that we used to assess BU performance. Due to the diversity of BU investigated in this study, we could not access objective performance indicators comparable across BUs.

Finally, the results of this study may not be generalizable to settings outside the specific context of KIFs. Indeed, companies that took part in this study are mostly structured as adhocracies (Mintzberg, 1979), based on teams where informal communication is the major mechanism of coordination. Inherently, in adhocratic organizations, the task environment reinforces the linkages among team members and facilitates the emergence of a unique collective human capital (Ployhart & Moliterno, 2011). Without falling into the universalistic perspective (Delery & Doty, 1996; Wright & McMahan, 2011), future research is needed to examine whether the human capital emergence process also occurs in other contexts.

### 5.3. Practical implications

This study calls HR managers to consider employees’ individual human capital as important resources, but bear in mind that such individual resources have no value unless both emergence enabling states (collective affective commitment) and collective human capital are leveraged –. The main contribution of this study is to highlight that individual human capital is not the only source of BU performance: other more contextual factors take part in the emergence of human capital as a valuable resource. Managing human capital thus implies balancing individual-oriented practices to build a pool of talented employees, and team-oriented practices to develop a collective will to collaborate with organizational goals. Sustainable value can only be achieved by combining both the optimal development of individuals’ skills and the improvement of teams’ social cohesion and organizational affective commitment. First, this study highlights the fact that HR managers should first focus on the selection and development of employees’ KSAOs a priori – i.e. in a pro-active perspective of development and long term career path and before evaluation practices and performance assessment –, and not to focus a posteriori only on the HR outcomes – i.e. retrospectively, only based on rewards and incentives policies. Second, our results underline that managers must also take care to
leverage emergence enabling states, as these are a necessary condition for developing collective human capital. These emergence enabling states are as important as individual KSAOs for developing collective human capital. Concretely, empowerment-fostering practices, such as information sharing and participation programs, should be recommended for improving collective affective commitment.

Finally, our results demonstrate once more that HR practices could be classified into different bundles that affect organizational performance through specific pathways (Gardner et al., 2011; Jiang et al., 2012b; Subramony, 2009). This perspective encourages HR managers to reach organizational objectives by defining precise targets for HR practices, in developing individual or collective human capital and emergence enabling states (Lepak & Snell, 2002). HR managers may make explicit the varied and sequential effects expected from these practices, in terms of individual skills, behaviors and attitudes and, ultimately, in terms of organizational outcomes. The definition of these specific pathways may be operationalized through the implementation of specific HR scorecards, integrating both individual and HR outcomes indicators, and organizational and financial indicators (Becker, Huselid, & Ulrich, 2001). The wider and more systematic view provided by such HR scorecards may contribute to considering positive or negative synergies between HR bundles and developing an integrated and consistent HR policy (Chadwick, 2010). As an example, our results pointed to the importance of supplementing skill-enhancing practices with empowerment-fostering practices to transform individual assets into human capital leveraging unit-level performance.

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