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High-performance work systems, joint impact of transformational leadership, an empowerment climate and organizational ambidexterity: Cross level evidence

Yi-Ying Chang

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Yi-Ying Chang
Business Administration Department,
National Taiwan University of Science and Technology, Taipei, Taiwan

Abstract

Purpose – The purpose of this paper is to test a multilevel model, supported by an ambidexterity perspective, to examine the process linking high-performance work systems (HPWS) and organizational ambidexterity using both unit- and firm-level analyses.

Design/methodology/approach – The author collected multisource and multilevel data from 346 employees and 184 managers of 33 electronic engineering firms.

Findings – The results revealed that unit HPWS were positively related to unit organizational ambidexterity. The author considers that the role of firm-level transformational leadership (TFL) is to create a climate of autonomy that can be delegated to promote organizational ambidexterity within units. Furthermore, a firm-level empowerment climate moderates the effect of unit-level HPWS on a unit's organizational ambidexterity. The author contributes to the research on leadership and ambidexterity by revealing the impact of HPWS as experienced in the unit- and of firm-level TFL. The author also identify boundary conditions for pursuing unit organizational ambidexterity.

Originality/value – Responding to the call for more research into the effects of the empowerment climate on employees' behaviors and the behavioral outcomes of employees, this research reveals that not only is the macro perspective of HPWS at the organizational level useful to promote ambidextrous activities at lower levels, but also that the unit experience of HPWS more directly affects employees' behaviors in engaging in the search for new opportunities for new products/services and refining current products simultaneously at the unit level. The broader implication is that the effectiveness of HPWS as an antecedent for organizational ambidexterity (Gibson and Birkinshaw, 2004; Kang and Snell, 2009) depends on the unit experience of HPWS being used to influence autonomous employees to actively undertake ambidextrous activities at the unit level.

Keywords Transformational leadership, Organizational ambidexterity, Cross-level evidence, High-performance work systems

Paper type Research paper

Studies on organizational ambidexterity show that high-performance work systems (HPWS) can promote ambidexterity and that this results in better firm performance (Junni *et al.*, 2013; Patel *et al.*, 2013). Existing research on firm-level human resources management (HRM) and ambidexterity tends to treat both HPWS and ambidexterity as ambient organization-level phenomena. Moreover, prior studies on HPWS mainly focussed on the design or content of the system and rarely explored the issues related to its implementation or how it was viewed by employees (Bowen and Ostroff, 2004). More specifically, research on HPWS has rarely examined the issue of how the

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processes of the system will be integrated and implemented (Bowen and Ostroff, 2004; Liao *et al.*, 2009). Consistent with prior research (e.g. Bowen and Ostroff, 2004; Junni *et al.*, 2013; Liao *et al.*, 2009), this study examines the direct relationship between the experience of HPWS as actual functioning systems and organizational ambidexterity at the unit level. Organizational ambidexterity refers to the capacity of an organization to simultaneously utilize existing market opportunities efficiently and to initiate creative and innovative solutions to anticipate and meet future market demands (Andriopoulos and Lewis, 2009; Gibson and Birkinshaw, 2004; Tushman and O'Reilly, 1996). Moreover, the earlier literature on HPWS studied outcomes at the organizational level, such as organizational performance (Youndt *et al.*, 1996). More recently, studies on HPWS have investigated the mechanisms by means of which firm-level HPWS affect individual-level employee skills, attitudes and behaviors (e.g. Takeuchi *et al.*, 2009). The present study aims to investigate the mechanisms and boundary conditions through which the unit experience of HPWS affects the unit organizational ambidexterity across all levels.

There are several reasons why it is important to identify the mechanisms and boundary conditions through which unit HPWS affect unit organizational ambidexterity. First, HRM studies have investigated the role of HRM practices such as HPWS in the creation of a milieu that is beneficial to ambidexterity (Kang and Snell, 2009; Patel *et al.*, 2013). HPWS literature has consistently argued that the practices themselves do not generate a competitive advantage but rather, that the improved performance stems from the human resources that are developed by the system (Applebaum *et al.*, 2000; Huselid, 1995; Wright *et al.*, 2001). In other words, organizations can achieve ambidexterity by being flexible with time allocation and by focussing the attention of their human resources on exploration and exploitation (Gibson and Birkinshaw, 2004; Patel *et al.*, 2013). By taking into account the dissimilarity in terms of ambidexterity among people in the same organization, rather than viewing the workforce as a single entity, a firm may realize that they need to adopt a set of tried and tested experience of HR practices to promote unit organizational ambidexterity.

Second, it is important to understand why HPWS may be more or less effective in fostering ambidexterity. Previous studies have identified the need to discover the mediating and boundary mechanisms that explain the performance implications of HPWS (Becker and Huselid, 2006). More recently, researchers have called for more studies to investigate how HPWS affect ambidexterity, using various moderators such as the organizational context (Gibson and Birkinshaw, 2004) and cross-multiple levels (Birkinshaw and Gupta, 2013; Junni *et al.*, 2013). While organizational ambidexterity can occur at all hierarchical levels of an organization, it can also occur at all organizational levels. Accordingly, unit ambidexterity (i.e. doing two different things equally well, for example efficiency and flexibility, adaptability and alignment, integration and responsiveness and exploration and exploitation) could contribute to the success of the firm (Birkinshaw and Gupta, 2013).

From the point of view of the leadership, earlier studies on the relationship between the leadership perspective and ambidexterity have mainly focussed on internal structural mechanisms, such as formalization and connectedness, as well as on external environmental conditions at the organizational level (e.g. Jansen *et al.*, 2009). The focus in this study, however, is the examination of the moderating mechanisms between the leadership styles and organizational ambidexterity covering such phenomena as charisma (or idealized influence), inspiration and vision (e.g. Nemanich and Vera, 2009). At the risk of oversimplification, this study suggests that the difference between the

traditional and more recent leadership research is the difference between management and leadership (Zhu *et al.*, 2005, p. 40).

In particular, we expect that the relationship between unit HPWS and unit organizational ambidexterity would be moderated by the empowerment climate at the firm-level. Empowerment climate refers to the sharing of information, the creation of autonomy within a larger structure and the formation of a hierarchy within the organization. This is vital for the establishment of an empowerment climate in an organization (Randolph, 1995). HPWS can both promote and impede the efficiency of individual employees when high quality and skilled competitive human resources act in ways that are needed to implement and achieve organizational outcomes at both the firm and unit levels (Barney, 1991; Wright *et al.*, 1994), in other words, introducing organizational ambidexterity (Kang and Snell, 2009). It could be argued therefore that HPWS have a tendency to focus more on the exploitation of the formal, the induced and the known, but less on the exploration of the informal, the uncertain and the unknown. Hence, we argue that the effect of unit HPWS needs to be further enhanced by the creation of an empowerment climate in order to foster a context that promotes or impedes both exploration and exploitation at the unit level concurrently. In other words, the effectiveness of HPWS may depend on the boundary conditions of a firm-level empowerment climate that can be used to facilitate a unit's organizational ambidexterity. Empirical findings have revealed that an empowerment climate is conducive to knowledge combination and innovation (Si and Wei, 2012) and ambidexterity (e.g. Gibson and Birkinshaw, 2004). Taking this further, we argue that the effectiveness of unit HPWS depends on a firm-level empowerment climate that would provide the variety and safety needed to induce employees to engage in ambidextrous learning.

Although the two streams (i.e. HPWS and leadership) of research on organizational ambidexterity have grown up together, little or no research has been done to explore how the two organizational phenomena may be related to each other (e.g. Boselie *et al.*, 2005). Both HPWS and transformational leadership (TFL) have a positive effect on organizational ambidexterity, but the nature of the relationship remains murky. It may even be they are independent phenomena. Much of the TFL literature on organizational outcomes (e.g. ambidexterity) stresses the structural and top management team characteristics (e.g. Cao *et al.*, 2010) and also stresses the differences between TFL and management and impersonal administrative systems (Zhu *et al.*, 2005). Thus, it can be supposed that the main impact of TFL may lie outside the formal administrative systems such as HRM systems. As such, TFL and HPWS would be two separate concepts, inasmuch as a unit's HRM is an integral part of the organization's formal administrative system. However, the current research proposes the somewhat less intuitive proposition that HPWS at the unit level and TFL may work together to promote unit organizational ambidexterity. In particular, we propose that the moderating effect of a firm-level empowerment climate on the unit HPWS and the unit organizational ambidexterity is further moderated by firm-level TFL.

Finally, while much research has been undertaken on single-level outcomes, only limited research has been done into the effect of unit HPWS on unit-level ambidexterity at multiple levels (Raisch and Birkinshaw, 2008). Therefore, some scholars (e.g. Birkinshaw and Gupta, 2013; Junni *et al.*, 2013) have suggested that cross-level analysis of ambidexterity would be a promising direction for future research. In this study, we examine the relationship between unit HPWS and unit organizational ambidexterity across both firm and unit levels (cf. Gibson and Birkinshaw, 2004;

O'Reilly and Tushman, 2004; Tushman and O'Reilly, 1996). No previous research has examined the following crucial question: how do unit HPWS affect unit level organizational ambidexterity across multiple levels, through the firm-level empowerment climate and firm-level TFL?

We endeavor to make several theoretical contributions to the literature. First, we go beyond the focus on a single level of analysis of ambidexterity by investigating the roles of unit HPWS and firm-level TFL in promoting organizational ambidexterity across unit and firm levels. In this way previous calls for an understanding of organizational ambidexterity across multiple levels (Birkinshaw and Gupta, 2013; Junni *et al.*, 2013; Turner *et al.*, 2013). This research is one of the first attempts to integrate the two separate streams of research into organizational ambidexterity. Second, this study examines whether the relationship between unit HPWS and organizational ambidexterity at the unit level would be similar to the relationship found at the firm-level by Patel *et al.* (2013) (i.e. homology; Morgeson and Hofmann, 1999). Third, our focus on the firm-level empowerment climate adds a missing piece to the research on strategic HRM and organizational ambidexterity. We not only test the idea that the firm-level empowerment climate moderates the effects of HPWS on unit organizational ambidexterity, but also extend it by showing that the effect may depend on the firm-level TFL as a boundary condition to promote the unit organizational ambidexterity. Overall, we contribute to the broader literature on ambidexterity and HRM, which identifies that an important issue is to identify "the conditions an individual needs to have […] to excel at both exploration and exploitation" (Gupta *et al.*, 2006, p. 696). We identify organizational systems, i.e., HPWS and boundary conditions (firm-level TFL and firm empowerment climate), that facilitate the development of unit organizational ambidexterity. More specifically, we contribute to the understanding of how HR practices can have an impact on lower level units of a firm rather than focussing on macro-level outcomes.

Theory and hypothesis

Theoretical background

The strategic view of HPWS suggests that HPWS can be used to upgrade both the ability and the motivation of employees so as to achieve the organizational goals (Becker and Gerhart, 1996; Huselid, 1995). All HPWS have the goal of attracting, retaining and motivating human resources, so as to achieve the organizational objectives by producing a fit between the knowledge, skills and abilities of the person and the duties and responsibilities required by the job (Patel *et al.*, 2013). More explicitly, unit organizational ambidexterity can be created by being flexible with time allocation and focussing attention on human resources (Gibson and Birkinshaw, 2004; Lepak *et al.*, 2003).

Likewise, scholars have stated that versatile individuals have the motivation and ability to pursue a range of apparently conflicting opportunities, deal with conflict and engage in paradoxical thinking (Gibson and Birkinshaw, 2004; Smith and Tushman, 2005). Moreover, individual employees with valuable knowledge, skills and experience are able to perform multiple functions and tasks, and can act more like generalists than specialists (Gibson and Birkinshaw, 2004). Most importantly, Gibson and Birkinshaw (2004) state that ambidexterity is created by "encouraging individuals to make their own judgments as to how best divide their time between the conflicting demands for alignment and adaptability" (p. 211). Although previous researchers have examined the relationship between the use of HPWS and ambidexterity, the focus has been on

contextual ambidexterity, knowledge combination and exchange or adaptive capability (Patel *et al.*, 2013; Wei and Lau, 2010). While this line of research is valuable in revealing the potential impact of HPWS on organizational ambidexterity, it offers only an incomplete insight into the use of unit HPWS as actual functioning systems that promote organizational ambidexterity at the lower levels of firms. Furthermore, it has been assumed that HPWS itself represents a channel for the development of unit organizational ambidexterity. However, the actual mechanisms that link HPWS and unit organizational ambidexterity in multilevel analysis have seldom been examined directly.

Building on the HPWS perspective, the TFL view and the organizational ambidexterity approach, we have identified that unit HPWS do promote the development of organizational ambidexterity at the unit level. Furthermore, across levels, the moderating effect of a firm-level empowerment climate on the unit HPWS and unit organizational ambidexterity is further strengthened by firm-level TFL. This discussion can be presented in an integrative model as presented in Figure 1.

The relationships between the experience of HPWS at the unit level, the firm-level empowerment climate and the unit level organizational ambidexterity

Previous studies have focussed mainly on macro-level HPWS, especially the macro-level impacts of HPWS on organizational ambidexterity (Patel *et al.*, 2013). Scholars have theoretically and empirically suggested that macro-level HR practices are not effective to the same extent (or in the same way) in all employee groups (Lepak *et al.*, 2007; Wright and Boswell, 2002). Following the same lines, it can be argued that experience of HPWS in a unit can have a more direct influence on employees' attitudinal and behavioral reactions in response to the work environment's needs and demands (e.g. Aryee *et al.*, 2012; Liao *et al.*, 2009) such as concurrent exploratory innovation and exploitation innovation at the unit level. Moreover, integrating an empowerment climate perspective (e.g. Lee and Koh, 2001) and an HPWS perspective (Huselid, 1995), we argue that the firm-level empowerment climate has a positive top-down effect on the unit HPWS and unit organizational ambidexterity. By sharing information, firm-level managers can delegate empowerment through established self-oriented units and by conducting training programs on aspects such as problem solving, unit building, and searching for innovation initiatives. Also, if there is only a weak empowerment climate within a firm, its unit members would lack any intrinsic motivation or aspiration to accept greater responsibility and undertake conflicting tasks (Randolph, 1995). The unit members would be passive rather than active in

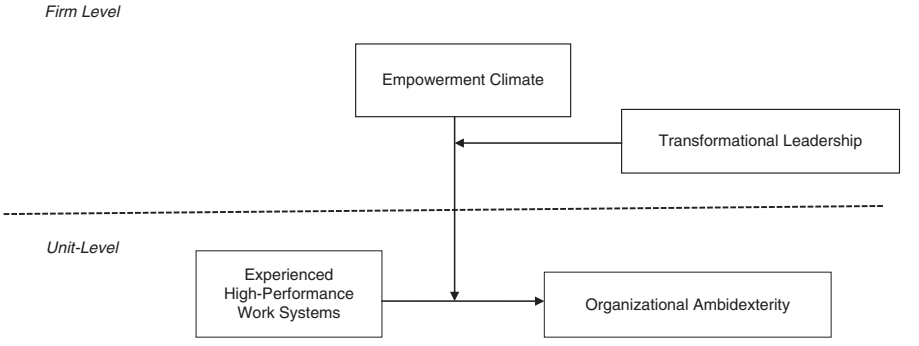

Figure 1.
An integrative multilevel model of high-performance work systems, empowerment climate, transformational leadership, unit level organizational ambidexterity

searching for new ideas and opportunities for existing and new markets, and would be hampered by internal factors, such as a lack of empowerment in carrying out their tasks. Units in firms where there is a low firm-level empowerment climate will be more engaged in simultaneously expanding existing markets/product ranges and identifying opportunities and demand in new markets. By contrast, in units where there is a strong firm-level empowerment climate, there is a much greater degree of trust among unit members, a more frequent flow of information and knowledge, more open unit goals and less managerial control in the workplace. In such units the members experience greater feelings of self-respect, more self-determination, a greater sense of common values and a more harmonious work climate. In turn, this will lead to greater intrinsic motivation and enthusiasm among the members, and therefore a higher level of unit organizational ambidexterity. Prior studies (e.g. Junni *et al.*, 2013) have shown that the firm-level empowerment climate is rarely examined explicitly as a moderator between HPWS and organizational ambidexterity at the unit level. In the context of the electronic engineering industry, individual employees need to learn to deal with conflicting demands and to search for new knowledge and skills in order to refine existing services and products to meet the customers' needs. At the same time, individual employees will have to fulfill various roles and carry out various tasks within a certain period of time (Gibson and Birkinshaw, 2004) as required by their customers. For instance, the experience of HPWS in a unit can develop the electronic engineers' talents at the individual level. It can also influence the hiring and training of engineers for their design-quality, flexibility, information sharing and performance feedback. This, in turn, may enhance the capacity of unit employees to develop organizational ambidexterity at the unit level. Experience of HPWS at the unit level is likely to affect an employee's ability and skills to engage in both developing existing products and seeking new information and opportunities for new markets/products. Also, as noted earlier, we argue that a firm-level empowerment climate may act as a situational enhancer (Howell *et al.*, 1986), and can further strengthen the positive influence of unit HPWS on a unit's organizational ambidexterity:

H1. Unit experienced HPWS is related to unit organizational ambidexterity.

H2. A firm-level empowerment climate moderates the relationship between unit experienced HPWS and unit organizational ambidexterity.

The moderating role of firm-level TFL: unit experience of HPWS, the firm-level empowerment climate and unit level organizational ambidexterity

Integrating the TFL perspective (e.g. Bass, 1985; Judge and Bono, 2000) and the organizational ambidexterity perspective (Raisch and Birkinshaw, 2008), we argue that a firm-level TFL may further have a positive and moderating top-down effect, reflecting the firm-level empowerment climate, on unit organizational ambidexterity. TFL has four dimensions: intellectual stimulation, individualized consideration, idealized influence and inspirational motivation (Avolio *et al.*, 1999). Intellectual stimulation refers to the degree to which leaders stimulate their subordinates to become more innovative and creative. This can take the form of querying assumptions, reframing problems and suggesting new methods for dealing with old situations (Bass *et al.*, 2003). Individualized consideration refers to a leader acting as a coach or mentor to a particular individual to meet his/her need for achievement and growth (Bass, 1985).

Idealized influence refers to the degree to which leaders are admired, respected and trusted. Inspirational motivation refers to the degree to which leaders articulate an appealing vision and perform in ways that motivate those around them by giving meaning and challenge to their subordinates' work (Bass *et al.*, 2003). Therefore, firm-level TFL may promote the development of unit organizational ambidexterity. There are at least two reasons for this declaration. First, firm-level transformational leaders may challenge assumptions, take risks, inspire others and in this way promote incremental change and incremental innovation (Jansen *et al.*, 2009). Also, through idealized influence and intellectual stimulation, they can provide ideological support to explain the links between the individual's identity and the collective identity at the unit level. Firm-level transformational leaders can also provide strong endorsement for unit subordinates to make incremental changes and to innovate through idealized influence and intellectual stimulation. As Damanpour (1991) has revealed, there is a strong correlation between the leaders' attitude to change and incremental innovation. Transformational leaders at the firm-level can serve as a support mechanism at the higher level to influence unit level members to refine their existing capabilities in current fields and to exploit new knowledge. Firm-level transformational leaders can provide support for the creation of social networks that effectively merge and transfer the current knowledge base and sources and share this with the unit members (Jansen *et al.*, 2009). Second, firm-level transformational leaders can support their unit subordinates by offering feed-forward flows of learning accompanied by innovative observations and incremental change to purify the existing knowledge sphere (Jansen *et al.*, 2009). They can also encourage unit subordinates to confront institutionalized learning and use incremental and exploratory thinking processes (Sosik *et al.*, 1997). Research into firm-level TFL and organizational ambidexterity has revealed that transformational leaders can affect the unit subordinates' performance by influencing their self-identity, self-construal, self-efficacy, self-esteem and self-consistency at multiple levels (Nemanich and Vera, 2009; Shamir *et al.*, 1993). Transformational leaders at the firm level can influence the self-concepts and motivation of subordinates at the unit level to engage in social processes by promoting relational and collective identification (Nemanich and Vera, 2009). The behavior of firm-level transformational leaders can provoke unit subordinates to develop self-efficacy to pursue the unit's goals and interests (Van Knippenberg and Hogg, 2003), for example unit organizational ambidexterity (Nemanich and Vera, 2009). Unit subordinates, since they are also firm-level members can work together toward common goals and build up a positive interpersonal relationship with other unit members. This would encourage unit subordinates to be willing to share their current and any new information and knowledge (Dutton and Heaphy, 2003). Scholars have shown that good social relations between the units is vital for both exploration and exploitation.

Furthermore, we argue that when unit employees are embedded in a firm-wide empowerment context, and are supported by a strong firm-level TFL, a unit employee is likely to have access to and become exposed to various new knowledge domains. That will contribute to ambidexterity activities (Vera and Crossan, 2004), because the characteristics of the firm-level TFL resonates with the firm's empowerment climate. As a result, unit employees are more likely to upgrade their knowledge, skills and abilities, as required by the unit's experience of HPWS, and they will also be more ready to participate in an empowerment climate that contributes to the unit's goals and values. This can also be a boost to intra-unit knowledge exchange and creative

thinking, and will create a positive environment for unit organizational ambidexterity. On the other hand, when the TFL at the firm level is weak, individual employees may be less effective, as the moderating effect of the firm-level empowerment climate on the positive relationship between a unit's experience of HPWS and a unit's organizational ambidexterity may give rise to cognitive dissonance among the firm's employees. In such cases, knowledge exchange within a unit may be stifled, and this would negatively affect organizational ambidexterity at the unit level.

However, as noted earlier, a strong firm-level empowerment climate would promote the intra-unit exchange of information and knowledge by creating a constructive autonomy, self-determination and a self-oriented climate within the units. Also, as discussed earlier, firm-level transformational leaders can serve as a supportive mechanism to drive unit organizational ambidexterity. We reason that a firm-level TFL, which facilitates an inter-unit flow of information and knowledge, will promote intra-unit exchange by enhancing the firm-level empowerment climate and in this way will promote unit organizational ambidexterity. Previous studies have pointed out that a firm-level TFL is the key to unit organizational ambidexterity (Vera and Crossan, 2004). For instance, Keller's (1992, 2006) studies on TFL showed that firm-level transformational leaders had a positive effect on the innovative performance of teams engaged in both exploratory and exploitative R&D projects. Inspirational motivation used by firm-level transformational leaders supports utilization's goal of dependability by assisting unit subordinates to link future goals to past and present experience and thus inspire a sense of self-consistency. This is because a perception of stability is vital when dealing with adjustments associated with changes at the unit level. Intellectual stimulation behaviors adopted by firm-level transformational leaders can be instrumental in inspiring unit subordinates to accept the associated institutionalized information and knowledge, such as new standard practices and routines introduced to support the new vision at the unit level (Nemanich and Vera, 2009). Moreover, firm-level TFL is positively related to some of the key processes required to utilize existing knowledge, including knowledge dissemination and information preservation. In addition, if newly acquired knowledge is quickly shared across the unit, it can be more efficiently incorporated into routine activities, and understood and applied in more depth and breadth within the unit in a context of organizational ambidexterity. Thus, from the TFL perspective (Bass, 1985), a higher level of firm-level TFL creates a boundary condition that amplifies the moderating effect of the firm-level empowerment climate on the unit organizational ambidexterity. In combination, the above arguments suggest:

H3. Firm-level transformational leadership moderates the positive relationship between unit experienced HPWS and unit organizational ambidexterity through the moderating effect of the firm-level empowerment climate, such that the effect is stronger when there is a higher level of transformational leadership at the firm-level.

Method

Sample and procedure

We tested our hypotheses in a sample of computer and electronic firms in Taiwan. The computer and electronic sectors are especially suitable for our study, because unit level organizational ambidexterity is vital in assisting computer and electronic firms to service existing products/services and update the products/services or processes in

order to survive in a rapidly changing environment. Organizational ambidexterity is especially important at the unit level of computer and electronic firms, because each firm needs to exploit its valuable human assets in a strong firm-level empowerment climate in order to meet its targets quarterly and annually. In early 2012, we sent surveys to selected participants, together with a supporting letter from the CEO of their firm. The surveys were developed in English and translated into Chinese using the back translation method (Brislin, 1980). Altogether 1,490 managers and 4,000 employees were surveyed across a total of 79 units of 33 electronic engineering firms. After four weeks, with three rounds of reminders, we had received responses from 212 managers, 346 unit employees, 66 senior managers and 102 employees from the headquarters of the firms. To construct the final sample, we excluded those branches that had provided usable responses from fewer than two managers.

Our final sample included 79 units in 33 firms, with responses from a total of 184 unit managers (61.33 percent response rate) and 346 unit employees (72.08 percent response rate). On average, the managers had worked in the firm for 13.3 years, and had been in their current job for 5.24 years. The average age of the managers was 36.7 years. We compared the firms included in our final sample with the firms that had been excluded, and did not find significant differences between them in terms of the number of full-time employees or the number of units. Following Armstrong and Overton (1977), we also compared early (first 10 percent) and late (last 10 percent) responses to check for any non-response bias on each dimension of management innovation. No significant differences emerged across these dimensions. Of the employees in our sample, 48 percent were female. Their average age was 35 years with an average organizational tenure of seven years. Of the managers in our sample, 52 percent were female. Their average age was 32 years with an average organizational tenure of 12 years.

To alleviate the common method bias, we obtained data from multiple sources. First, the 346 unit employees rated their unit's organizational ambidexterity. Second, two senior managers from each firm's headquarters rated the firm-level TFL. Third, three employees of each firm's headquarters rated the firm-level empowerment climate.

We conducted a series of confirmatory factor analyses (CFA) to examine the discriminant validity of these constructs. Like Liao *et al.*'s (2009) one-factor solution of HPWS, we found that the one-factor model of unit experienced HPWS fits the data better ($\chi^2(72) = 735.38$, non-normed fit index (NNFI) = 0.92, comparative fit index (CFI) = 0.92, incremental fit index (IFI) = 0.92 and root mean square error of approximation (RMSEA) = 0.05). In addition, the one higher factor of unit organizational ambidexterity represents the construct well ($\chi^2(65) = 537.91$, NNFI = 0.91, CFI = 0.91, IFI = 0.91 and RMSEA = 0.05). Taken together, these results provide evidence of discriminant validity.

Measures

Unit organizational ambidexterity. Unit organizational ambidexterity was measured using a 12-item scale adapted from one developed by Lubatkin *et al.* (2006). The 12 items showed good reliability ($\alpha = 0.90$). Because of the high agreement between raters within the same unit (mean $r_{wg} = 0.92$, ICC[1] = 0.23, ICC[2] = 0.74), we averaged the responses of the employees within each unit to create an aggregated measure of unit level organizational ambidexterity. We used the 346 unit employees' ratings of unit organizational ambidexterity to conduct a CFA. The CFA results showed that the one-factor model fitted the data well ($\chi^2 = 57.35$, df = 9, $p < 0.01$, RMSEA = 0.04, CFI = 0.92, GFI = 0.92,

TLI = 0.90). The results indicate that the measure was valid and reliable. In this study, unit organizational ambidexterity showed good reliability ($\alpha = 0.81$).

Unit experience of HPWS. We used the 44-item HPWS list that was developed by Liao *et al.* (2009) from extant literature (Delery and Doty, 1996). The HPWS were used a seven-point scale. The HPWS scale identifies eight unique dimensions for HR systems. These eight dimensions were measures taken to enhance employee knowledge, skills, empowerment and information sharing in order to deliver a high quality of service (Liao *et al.*, 2009) and promote knowledge creation and combination (Collins and Smith, 2006). In total, 346 unit employees from 808 units rated the items that were experienced by employees in each unit. Sample responses are "Employees in my job category normally go through training programs every few years to improve our design and development skills for new products," "I have the authority to resolve existing and new products complaints on my own" and "My pay is tied to the quality of design/products/services I deliver to customers." We followed previous research in using the eight dimensions to create an index of HPWS (Chuang and Liao, 2010; Sun *et al.*, 2007) ($\alpha = 0.92$). The results showed that employees from the same unit had a high level of agreement regarding unit experience of HPWS (mean $r_{wg} = 0.90$, ICC[1] = 0.24, ICC[2] = 0.72).

Firm-level empowerment climate. The items on firm empowerment were adapted from those in previous studies (Blanchard *et al.*, 1995; Randolph, 1995; Seibert *et al.*, 2004). The firm-level empowerment climate was rated by 102 employees at the headquarters. The results showed good reliability ($\alpha = 0.85$). The senior managers from each headquarters revealed a high level of agreement regarding the firm-level empowerment climate (mean $r_{wg} = 0.91$, ICC[1] = 0.22, ICC[2] = 0.71). We therefore averaged the responses of the employees within each firm's headquarters to create aggregated measures of the firm-level empowerment climate.

Firm-level TFL. Firm-level TFL was assessed by 66 senior managers at the headquarters level using the items of MLQ-5X (Bass and Avolio, 2000). The respondents rated the TFL behaviors of their respective CEOs using a seven-point scale. As in previous studies, we created a single index of firm-level TFL by averaging the scores of all the items ($\alpha = 0.89$). The results showed that senior managers from the same firm had a high level of agreement regarding the firm-level TFL (mean $r_{wg} = 0.90$, ICC[1] = 0.23, ICC[2] = 0.73).

Control variables. First, we controlled for each manager's age and tenure within the firm, which are expected to be positively related to organizational ambidexterity (Tushman and O'Reilly, 1996, p. 27). Second, we controlled for a manager's tenure in his or her current function, which is related to an increasing level of specialization and therefore is expected to negatively relate to unit organizational ambidexterity (cf. Gibson and Birkinshaw, 2004, p. 49). We also controlled for the level of education, because higher levels of education are linked with a higher cognitive ability to process information and to learn (Papadakis *et al.*, 1998). This may be positively related to organizational ambidexterity (Adler *et al.*, 1999, p. 51). The educational effects included two dummy variables: one reflecting managers with a master's degree or higher, and another reflecting managers with a bachelor's degree. Managers with degrees below the bachelor's level were the reference group (Mom *et al.*, 2009). Third, we controlled for the size effect (number of subordinates under a manager) based on the literature (Lewin *et al.*, 1999). We used the log transformation of size in hypotheses testing. Fourth, we controlled for unit environmental uncertainty, because this is linked to a unit's motivation to adjust to changing resource conditions (Lubatkin *et al.*, 2006).

Results

Table I presents descriptive statistics and correlations.

We tested the hypotheses using hierarchical linear modeling (HLM) analyses. We grand-mean centered the interpretation for the HLM results, which ensures that the Level 1 effects are controlled for during testing of the incremental effects of the Level 2 variables, and reduces multi-collinearity in Level 2 estimations by lessening the correlation between the Level 2 intercept and the slope estimates (Hofmann and Gavin, 1998).

Before conducting HLM analyses, we examined the degree of between-group variance in the firm-level empowerment climate and the unit organizational ambidexterity. The results of null models revealed that 26 percent of the variance in the firm-level empowerment climate and 32 percent of the variance in the unit organizational ambidexterity reside between individuals (the grouping variable), respectively. The χ^2-tests revealed that the between-individual variances were significant; i.e., the intercept terms significantly varied across units.

Table II presents the HLM results, testing the effects of HPWS on unit organizational ambidexterity across levels. *H1* predicts that the unit experience of HPWS is related to the unit organizational ambidexterity; *H2* predicts that the firm-level empowerment climate moderates the relationship between the unit experienced HPWS and the unit organizational ambidexterity. The results in Model 2 reveal that unit experience of HPWS was significantly related to unit organizational ambidexterity ($\gamma = 3.47$, $p < 0.01$). Thus, *H1* was supported. *H2* proposes a positive cross-level interaction between the firm-level empowerment climate and the unit experience of HPWS in predictions of unit organizational ambidexterity. In Model 5, we regressed the slope estimates for unit experience of HPWS obtained from Level 1 on the empowerment climate at Level 2 to test this interaction (Bryk and Raudenbush, 1992). Moreover, as spurious cross-level interactions may be found if between-groups interactions are not controlled for (Hofmann and Gavin, 1998), we included the interactions of firm-level empowerment climate × firm-level TFL at Level 2. The results revealed that the interaction of firm-level empowerment climate × firm-level TFL was not significant, whereas the cross-level interaction was significant ($\gamma = 0.31$, $p < 0.05$, Model 5). These results provide support for *H2* and suggest that a positive firm-level social climate enhances the influence of unit-level employee human capital on unit organizational ambidexterity.

H3 proposes a positive cross-level interaction between the firm-level TFL, the firm-level empowerment climate and the unit experience of HPWS in predictions of unit organizational ambidexterity. In Model 5, we regressed the slope estimates for unit HPWS obtained from Level 1 on the empowerment climate at Level 2 to test this interaction (Bryk and Raudenbush, 1992). Moreover, as spurious cross-level interactions may be found if between-groups interactions are not controlled for (Hofmann and Gavin, 1998), we included the interactions of firm-level empowerment climate × firm-level TFL at Level 2. The results revealed that the interaction of firm-level TFL × firm-level empowerment climate was not significant, whereas the two-ways cross-level interaction was significant ($\gamma = 0.22$, $p < 0.05$, Model 5). These results provide support for *H3* and suggest that a positive firm-level TFL enhances the moderating effect of the firm-level empowerment climate on unit HPWS and on unit organizational ambidexterity.

Additional analyses

To further examine the robustness of the results obtained from the HLM analyses (dependent variables as unit organizational ambidexterity – multiplication of

Table I.
Means, standard deviations, and correlations[a]

	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12
1. Manager age	36.19	5.67	–											
2. Manager tenure in the firm	11.97	2.27	−0.10	–										
3. Manager tenure in the current job	3.45	0.53	0.21***	−0.16*	–									
4. Size (log of manager's subordinates)	1.22	0.15	0.15**	0.13*	0.03	–								
5. Education 1 (master above)	0.30	0.45	0.00	0.00	0.19**	−0.12**	–							
6. Education 2 (bachelor)	1.00	0.00	0.21**	0.01	0.03	0.01	0.00	–						
7. Environmental uncertainty	5.57	1.15	0.23**	0.08	−0.03	0.15***	−0.12**	0.03	–					
8. Unit High-Performance Work Systems (HPWS)	5.34	0.76	−0.03	−0.08	0.00	0.02	0.03	0.03	0.16*	–				
9. Firm-level empowerment climate	4.85	0.86	−0.08	0.00	0.08	0.10	0.09	−0.06	0.32**	0.57**	–*			
10. Firm-level transformational leadership	5.33	0.77	−0.06	−0.09	−0.01	0.02	0.01	0.02	0.01	0.19**	0.49**	–		
11. Unit organizational ambidexterity (multiplication of exploration and exploitation)	27.43	6.33	−0.01	−0.01	0.00	−0.01	0.00	0.01	0.06**	0.03	0.07*	0.28**	–	
12. Unit organizational ambidexterity (absolute difference of exploration and exploitation)	0.64	0.62	0.08	0.10	0.04	0.14*	0.01	0.05	0.04	0.25**	0.17*	0.30**	0.10	–

Notes: *$p < 0.10$; **$p < 0.05$; ***$p < 0.01$

Level and variable	Unit HPWS (Model 1)	OA (Model 2)	OA (Model 3)	OA (Model 4)	OA (Model 5)
Level 1 (n = 346)					
Intercept	5.27	27.44	27.05	26.91	26.42
Manager age	0.00	0.01	−0.04	−0.00	−0.00
Tenure in the firm	0.02	0.04	0.08	0.00	0.00
Tenure in current job	−0.03	0.03	0.00	−0.00	−0.00
Size (log of manager's subordinates)	0.00	0.00	−0.01	−0.00	−0.00
Education 1	0.01	0.09	0.08	0.00	−0.00
Education 2	0.00	0.01	0.06	−0.00	−0.00
Environmental uncertainty	0.09	0.09	0.08	0.10	0.10
Unit High-Performance Work Systems (HPWS)		3.47***		3.50***	3.59***
Level 2 (n = 33)					
Firm age	0.01	0.00	0.00	−0.00	−0.00
Firm size	0.00	0.00	0.00	0.00	0.00
Firm-level empowerment climate	0.90***	0.31**	0.63**	01.21***	1.28
Firm-level transformational leadership		0.76**	4.38***	5.03***	5.59**
Firm-level empowerment climate × firm-level transformational leadership				0.30	0.43
Cross-level					
Unit HPWS × firm-level empowerment climate					0.31**
Unit HPWS × firm-level empowerment climate × firm-level transformational leadership					0.22*

Table II. Hierarchical linear modeling results

Notes: OA, unit level organizational ambidexterity (multiplication of exploration and exploitation). Effects of unit high-performance work systems (HPWS), firm-level empowerment climate, firm-level transformational leadership on unit organizational ambidexterity. *$p < 0.10$; **$p < 0.05$; ***$p < 0.01$

exploration and exploitation), this study tested the hypotheses by using the absolute difference of exploration and exploitation to measure unit organizational ambidexterity as suggested by previous studies (e.g. He and Wong, 2004; Lubatkin *et al.*, 2006). The results shown in Table III were consistent with the HLM results in Table II, providing additional support for our statistical suggestions.

Discussion

In this study, we theoretically identified the unit experience and effects of HPWS on unit organizational ambidexterity and boundary mechanisms. We found that a firm-level empowerment climate moderated the relationship between unit HPWS and unit organizational ambidexterity. Furthermore, firm-level TFL exerted a top-down effect on the relationship between the firm-level empowerment climate and the unit level organizational ambidexterity. Ceteris paribus, the results revealed that firm-level TFL plays a vital role in stimulating unit members to simultaneously engage in exploratory innovation and exploitation innovation at the unit level when a firm-level empowerment climate is stronger. Overall, three contributions emerge.

First, we reveal the unit-level effects of HPWS, as actually experienced systems, on organizational ambidexterity at the unit level. Innovation ambidexterity researchers have tended to focus on one level of analysis (Gupta *et al.*, 2007). In particular, extant research that examines the HPWS effects on organizational ambidexterity

Level and variable	Unit HPWS (Model 1)	OA (Model 2)	OA (Model 3)	OA (Model 4)	OA (Model 5)
Level 1 (n = 346)					
Intercept	5.27	0.75	0.74	0.61	0.56
Manager age	0.00	0.01	0.00	0.00	−0.00
Tenure in the firm	0.02	0.02	0.00	0.00	0.00
Tenure in current job	0.00	0.00	0.02	−0.00	−0.00
Size (log of manager's subordinates)	0.00	0.00	−00.00	−00.00	−0.00
Education 1	0.01	0.07	0.02	0.00	−0.00
Education 2	0.00	0.01	0.05	0.00	−0.00
Environmental uncertainty	0.09	0.04	0.04	0.07	0.02
Unit High-Performance Work Systems (HPWS)		0.15*		0.45**	0.17*
Level 2 (n = 33)					
Firm age		0.03	0.00	0.00	0.00
Firm size		0.00	0.00	0.00	0.00
Firm-level empowerment climate	0.90***	0.30**	0.29**	1.89***	2.38***
Firm-level transformational leadership		0.11*	0.15*	1.26**	1.61**
Firm-level empowerment climate × firm-level transformational leadership				0.30	0.39
Cross-level					
Unit HPWS × firm-level empowerment climate					0.83**
Unit HPWS × firm-level empowerment climate × firm-level transformational leadership					0.27**

Notes: OA, unit level organizational ambidexterity (absolute difference of exploration and exploitation). Effects of unit high-performance work systems (HPWS), firm-level empowerment climate, firm-level transformational leadership on unit organizational ambidexterity. *$p < 0.10$; **$p < 0.05$; ***$p < 0.01$

Table III. Hierarchical linear modeling results

(Patel *et al.*, 2013) has focussed on the macro effects of HPWS only as organizational outcomes (Jiang *et al.*, 2012) at an organizational level. Our approach suggests that a single-level HPWS approach (either at the firm or the unit level) is not sufficient to explain ambidextrous behaviors in complex organizations. It should be noted that it is also desirable for ambidextrous activities to occur at lower levels of the organizational hierarchy (Mom *et al.*, 2009) and have an impact on unit level functioning systems such as unit experience of HPWS. To this end, it is important to recognize that unit experience of HPWS can actually affect the occurrence of unit organizational ambidexterity. Our results show that overlooking the unit experience of the effects of HPWS and the associated mechanisms, such as the firm-level empowerment climate and firm-level TFL, will result in an inadequate understanding of unit organizational ambidexterity. Specifically, this approach bridges the experienced view of HPWS (e.g. Liao *et al.*, 2009) and unit level ambidextrous activities. It extends the SHRM research (Wright and Boswell, 2002) by adopting a cross-level approach to examine the role of unit experience of HPWS and the empowerment climate in accounting for the assistance to unit employees engaging in organizational ambidexterity at the unit level. Responding to the call for more research into the effects of the empowerment climate on employees' behaviors and the behavioral outcomes of employees, this research reveals that not only is the macro perspective of HPWS at the organizational level

useful to promote ambidextrous activities at lower levels, but also that the unit experience of HPWS more directly affects employees' behaviors in engaging in the search for new opportunities for new products/services and refining current products simultaneously at the unit level. The broader implication is that the effectiveness of HPWS as an antecedent for organizational ambidexterity (Gibson and Birkinshaw, 2004; Kang and Snell, 2009) depends on the unit experience of HPWS being used to influence autonomous employees to actively undertake ambidextrous activities at the unit level. Identifying such unit-level effects of HPWS and boundary mechanisms at both the unit and the firm levels will deepen our understanding of organizational ambidexterity beyond the impact of a single-level HPWS on the organizational ambidexterity relationship.

Second, this research extends previous studies on HPWS and ambidexterity by identifying the firm-level empowerment climate as a moderator in disentangling the effects of unit experience of HPWS on unit organizational ambidexterity. This study suggests that unit organizational ambidexterity involves both unit experience of HPWS and the firm-level empowerment climate. This clarifies that HPWS are vital in fostering a positive firm-level empowerment context for individual employees to ensure unit organizational ambidexterity. More specifically, in line with the SHRM perspective (Wright and McMahan, 1992) and the empowerment perspective (Seibert *et al.*, 2004), the effects of unit experience of HPWS on the behavioral outcomes of employees at the unit level endured even after we accounted for the effect of the firm-level empowerment climate in driving unit employees toward ambidextrous activities through cross-level processes. These add new empirical evidence to the behavioral view of organizational ambidexterity (Gibson and Birkinshaw, 2004; Junni *et al.*, 2013; Turner *et al.*, 2013). More specifically, we theorized and demonstrated that the direct effects of unit experience of HPWS on unit organizational ambidexterity can be strengthened when the firm-level empowerment climate is stronger. Clearly, the use of the unit experience of HPWS alone may not facilitate the appearance of the highest level of unit organizational ambidexterity. Individual employees who engage in exploration and exploitation simultaneously reach the highest level when the boundary condition features a work context where there are high levels of firm-level empowerment.

Third, we theorized and showed the moderating effects of firm-level TFL on the relationship between the firm-level empowerment climate and the unit organizational ambidexterity. Our results revealed that the effect of the firm-level empowerment climate on the unit organizational ambidexterity is magnified in the presence of a stronger firm-level TFL as used by the firm's top leaders. This study extends previous studies linking leadership and SHRM perspectives to exploration innovation and exploitation innovation (e.g. Vera and Crossan, 2004; Jansen *et al.*, 2009). The findings from the present study indicate that transformational leaders encourage their subordinates to search for new opportunities, to contest the institutionalized thinking and explore new ways of performing their tasks. Specifically, this study implies that a firm's top leaders can cultivate a climate in which there is a high level of motivation to engage in social processes through inducing relational and collective identification (Nemanich and Vera, 2009) and to simultaneously engage in refining existing capabilities in current fields and searching for new knowledge for new products/customers (Jansen *et al.*, 2009).

No previous study of HPWS and unit organizational ambidexterity has examined the moderating effect of the firm-level empowerment climate under a strong firm-level TFL. This study has revealed the important role of the firm-level empowerment climate

in promoting the occurrence of unit organizational ambidexterity, and has thus provided a valuable extension to previous research. Theoretically, it extends previous work (e.g. the behavioral perspective of ambidexterity) by revealing the direct effect of unit experience of HPWS through both a stronger firm-level empowerment climate and a firm-level TFL used by the firm's top leaders, both of which may affect unit organizational ambidexterity. The implication is that a more powerful theory of HPWS and organizational ambidexterity must consider the role of TFL adopted by the firm's top leaders. Empirically, this study provides another potential explanation for the findings on the relationship between HPWS and organizational ambidexterity. It may be that some employees have benefited from a more autonomous context within the firm than others, and the moderating effect of the firm-level empowerment climate can be strengthened under the boundary condition of a firm-level TFL used by the firm's top leaders, and that this will result in a higher level of unit organizational ambidexterity.

In arriving at the third contribution, we collected survey data from multiple and multilevel sources. Because we used a sample of electronic firms in Taiwan, this study also extends the empirical literature to cover firms from emerging economies, which have not, hitherto, been extensively studied.

Practical implications

Firms can generate higher levels of performance by both renewing existing products/services and by promoting new initiatives for products/services, processes or markets. To help ensure the effectiveness of unit organizational ambidexterity, it is important that firms encourage their employees to engage in activities that require adaptability and the acquisition of new skills and knowledge at the lower levels of organizational units. Managers must seek ways of using their leadership to stimulate unit employees to search for new knowledge and upgrade existing products/services, including the adoption of a set of HPWS to cultivate a more autonomous context. Moreover, the firm's HR system needs to be flexible enough to align itself with the expectations of the top leaders of the firm. Such systems can be leveraged so as to more systematically select transformational leaders who would encourage unit members to engage in ambidextrous activities. A firm's top leaders can use their idealized influence to magnify the effectiveness of a firm-wide empowerment context. In addition, the firms must think of how they can actively build an empowerment climate that would promote employee behavioral outcomes independent of the behavior of the leadership. In reality, managers can use information sharing to gradually improve the self-determination and capabilities of unit employees' and by adapting the hierarchy of their firms. Also, managers need to communicate effectively with employees, using appropriate HR practices, as these practices will inform employees of what the management anticipates, supports and rewards (Bowen and Ostroff, 2004; Schneider, 1990). Firms can also develop unit organizational ambidexterity by offering training internally or externally. For example, firms can teach leaders through role-playing to show individual employees how to engage in appropriate behaviors, and through goal setting to motivate employees to use such behaviors when developing new products/services and acquiring new knowledge when dealing with their customers.

Limitations and further research directions

This study has several limitations that point to future research directions. First, this study has begun to examine the experience of the effects of HPWS at the unit level and the cross-level boundary mechanisms on unit organizational ambidexterity.

Building on this beginning, future research may explore multilevel studies on the interaction between individuals, firms and industries to understand how organizational ambidexterity occurs across industries (Raisch and Birkinshaw, 2008; Raisch *et al.*, 2009). Second, we did not examine how the fit between unit-level HPWS and firm-level HPWS might promote or hamper organizational ambidexterity across levels (Bowen and Ostroff, 2004). For example, the perception of HPWS and of its actual functioning might be different across levels (Bowen and Ostroff, 2004). Third, we did not examine how other types of leadership behaviors, such as transactional leadership, might moderate the unit-level effects of HPWS on unit organizational ambidexterity. It is possible that unit level transactional leadership and firm-level transactional leadership might have different effects on unit organizational ambidexterity. Moreover, the data of this research mainly focussed on computer and electronic sectors in Taiwan. There is a need to explore whether the relationships found in this study especially the positive relationship between empowerment and organizational ambidexterity are due to the specific features of the computer and electronic sectors and/or cultural values embedded in a relatively high power distance society (e.g. Taiwan) from which this study had drawn the computer and electronic sectors sample. Future research could expand more samples from different industries such as manufacturing and different cultures such as low power distance society (e.g. Australia, UK) and this can increase the generalization of this existing results. Finally, the measurements used in this study dealt with organizational ambidexterity at the unit level. While we took steps to assess the validity and reliability of our measurement method, future research may further assess its psychometric properties using additional samples.

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Corresponding author
Yi-Ying Chang can be contacted at: y.chang@mail.ntust.edu.tw