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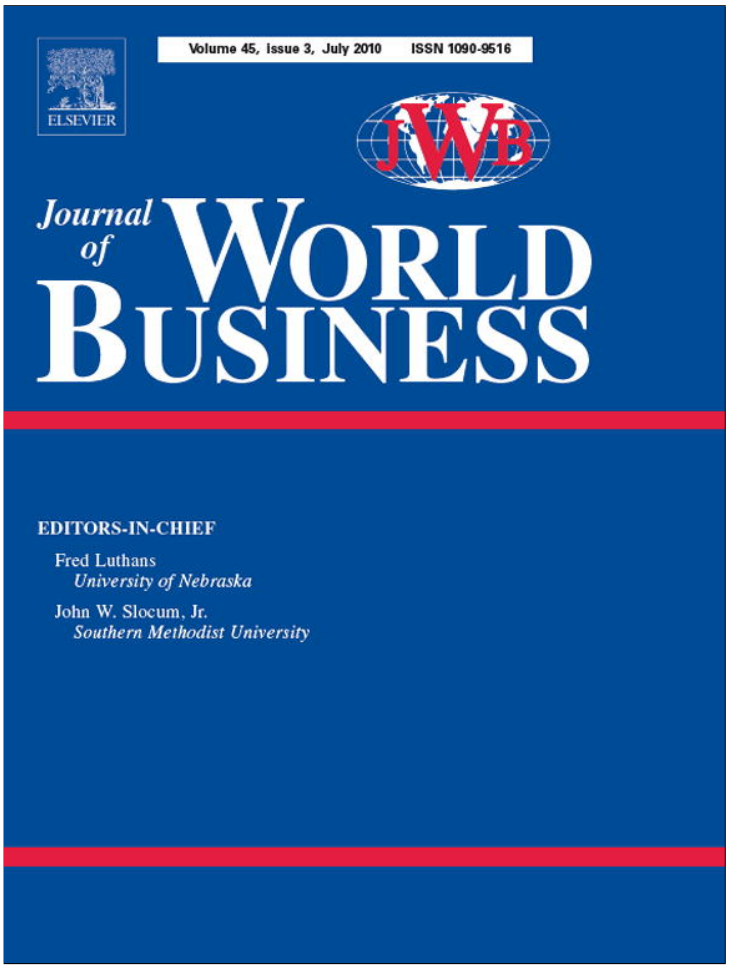

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Dynamic capability: Impact of process alignment and organizational learning culture on performance

Richard Yu Yuan Hung [a,1], Baiyin Yang [b,2], Bella Ya-Hui Lien [c,*], Gary N. McLean [d,3], Yu-Ming Kuo [e,4]

[a] San Kuei Investment Pty Ltd., 5F, No. 73-1, Jhongshan Rd., Chia-Yi City 600, Taiwan, ROC
[b] Department of Human Resources and Organizational Behavior, Tsinghua University, 327G, Shunde Building, Beijing, PR China
[c] Department of Business Administration, National Chung Cheng University, 168 University Rd., Min-Hsiung Chia-Yi County, Taiwan, ROC
[d] Department of Educational Administration and Human Resource Development, 511 Harrington Tower, 4226 TAMU, Texas A&M University, College Station, TX 77843, USA
[e] National Chung Cheng University, 168 University Rd., Min-Hsiung Chia-Yi County, Taiwan, ROC

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ABSTRACT

Although there is much emphasis on the importance of process alignment, organizational learning culture, and dynamic capability, little attention has been paid to their interactions and joint effects on performance. While the concept of dynamic capability has received increasing attention and numerous conceptual frameworks and propositions have been suggested, few empirical studies have been conducted to examine its antecedents and outcomes. Some maintain that dynamic capability is created via organizational learning. Others contend that dynamic capability is resident in organizational processes.

This empirical study utilizes a survey data from a Taiwan high-tech industry to test an integrative model of dynamic capability. The results of this study demonstrated that although organizational learning culture significantly affected performance, its influence was mediated by dynamic capability. Furthermore, this study provides supporting evidence for the hypothesis that process alignment influences performance directly and indirectly through dynamic capabilities.

1. Introduction

The intensity of business competition has significantly increased, forcing business organizations to adopt non-traditional management techniques and tools. Maintaining competitive advantage is a dynamic and infinite activity. Scholars have proposed that to maintain competitive advantage, organizations should develop capabilities for improving business core processes and continuous learning (Argyris & Schon, 1978; Hammer, 2001; Jashapara, 1993; Senge, 1990; Zott, 2003). A primary interest in management research is to identify relationships between organizational variables. Dynamic capability, as an emerging concept, needs to be examined in an integrated framework incorporating its antecedents and consequences (Wang & Ahmed, 2007). According to the resource-based view (RBV) of the firm, firms in the same industry perform differently because they possess different resources and capabilities (Barney, 1986, 1991; Peretaf, 1993). This perspective holds that dynamic capabilities are a set of specific and identifiable processes and abilities to improve business core processes involves the integration of business core operational processes and organizational strategic goals (Eisenhardt & Martin, 2000). Although some strategic management scholars are skeptical regarding the value of the concept of "dynamic capabilities" (see, for example, Winter, 2003), others advocate this concept and provide supporting evidences (Teece, Pisano, & Shuen, 1997; Zott, 2003). Teece et al. (1997) define dynamic capability as the firm's ability to integrate, build, and reconfigure internal and external competencies to address rapid environmental change. The theory of dynamic capabilities suggests that knowledge is a fundamental resource for organizations to build sustainable competitive advantages.

The RBV theory stresses that firm growth and competitive advantage are functions of the unique bundle of resources possessed and deployed by individual firms (Barney, 1986, 1991). More recently, this perspective has been extended to consider a dynamic capability which is defined as the unique ability of firms "to integrate, build and reconfigure internal and external competencies to address rapidly changing environments" (Teece et al., 1997: 516). From an economic perspective, Carpenter,

* Corresponding author. Tel.: +886 5 2720411x34315; fax: +886 5 2720564.
E-mail addresses: ryyhung@yahoo.com.tw (R.Y.Y. Hung), YinYang@umn.edu (B. Yang), bmayhl@ccu.edu.tw (B.-H. Lien), mclea002@umn.edu (G.N. McLean), tzustu@gmail.com (Y.-M. Kuo).
[1] Tel.: +886 5 2719987; fax: +886 5 2719986.
[2] Tel.: +86 10 62796314; fax: +86 10 62772021.
[3] Tel.: +1 979 845 2716; fax: +1 979 862 4347.
[4] Tel.: +886 5 2720411x34315; fax: +886 5 2720564.

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Sanders, and Gregersen (2001) noted that the RBV stresses rents rising from scarcity (Ricardian rents) and the capabilities perspective emphasizes rents resulting from market discontinuities (Schumpeterian rents).

While the concept of dynamic capability has received increasing attention in the literature (Danneels, 2002; Eisenhardt & Martin, 2000; Winter, 2003; Zollo & Winter, 2002; Zott, 2003), only recently have some attempts been made to look deeper into the process that links its antecedents and to firm performance. There is a paucity of theoretical frameworks and empirical studies on the mechanisms through which firms develop their dynamic capabilities and subsequently enhance the performance. Augier and Teece (2007) argued that dynamic capabilities are resident in a firm's processes and routines. Zollo and Winter (2002) have advanced our understanding by proposing a conceptual framework that posits an organization with continually learning culture namely organizational learning is a key foundation for building dynamic capability. The increasing attention to organizational learning represents a knowledge-based view (KBV) of the firm which emphasizes that knowledge provides the sustainable competitive advantage. According to Zollo and Winter (2002): "A dynamic capability is a learned and stable pattern of collective activity through which the organization systematically generates and modifies its operating routines in pursuit of improved effectiveness" (p. 340). However, there is relatively little close empirical study exploring the relationship between dynamic capability and organizational learning culture. Zahra, Sapienza, and Davidsson (2006) contended that there are considerable ambiguities in the literature about the concept of dynamic capability and such ambiguities can only be resolved by examining its relation to antecedents and outcomes. Unfortunately, there is a dearth of empirical evidence on the relationship between dynamic capabilities and its key antecedent variables such as organizational learning culture and organizational process alignment. Therefore, there remain unresolved questions: (1) how does organizational learning culture influence dynamic capability? and (2) does dynamic capability meditate the impacts of organizational learning culture on performance?

Although extensive studies have been conducted on the outcomes of organizational learning culture (Egan, Yang, & Bartlett, 2004; Ellinger, Ellinger, Yang, & Howton, 2002; Wang, Yang, & McLean, 2007) and organizational process alignment (Gresov, 1989; Lee & Dale, 1998; Powell & Dent-Micallef, 1997), most management literature stresses the benefits of organizational learning culture and organizational process alignment separately. Few studies have been conducted to investigate the relationship between organizational learning culture and process alignment and their joint effects on organizational performance. This study focuses on examining an organization adept at managing core processes in the area of organizational learning culture and process alignment and, particularly, their potential to generate superior performance through the dynamic capability approach. It is reasoned that enhanced organizational performance results primarily from the effective handling, sharing, application and management of knowledge. Thus, distinctive methods of doing business that produce a competitive edge are heavily dependent on integrating the results of process alignment and organizational learning culture with dynamic capability.

The purpose of this study is to examine the inter-relationship between organizational learning culture and process alignment and their joint influence on organizational performance. This study aims to develop and empirically test a model for examining the relationship among organizational process alignment, organizational learning culture and organizational performance from a dynamic capability perspective. This study has implications for both management theory and practice. Based on the dynamic capability perspective, this research significantly contributes to the current knowledge on organizational process alignment, organizational learning culture and organizational performance. This study benefits management practice by demonstrating how organizations can adopt better methods of improving their performance and profitability via organizational process alignment and organizational learning culture based on the dynamic capability approach. In sum, this study attempts to explicate the nature of dynamic capability by clarifying its dimensions, measures, antecedents and impact on organizational performance.

2. The theoretical framework and hypotheses

Based on an extensive literature review and synthesis, we propose a basic conceptual model shown in Fig. 1 that illustrates the inter-relationship between dynamic capability and its antecedent and outcome variables. This model includes organizational performance as the endogenous variable, two exogenous variables (organizational process alignment and organizational learning culture, representing RBV and KBV respectively), and one mediating variable (dynamic capability). The model proposes several relationships among these constructs which are explicitly stated in the section in the form of hypotheses to be tested. The proposed model posits that organizational process alignment and organizational learning culture are inter-related, and are the antecedents of dynamic capability and organizational performance. It implies that organization dynamic capability partially mediates the influence of organizational process alignment and fully mediates the effect of organizational learning culture on performance. The constructs included in the model and their relationships will be discussed in the following paragraphs.

2.1. Dynamic capability

Teece et al. (1997) emphasized that firm dynamic capabilities reflect how organizations first develop firm-specific capabilities and competencies in a changing business environment. These capabilities and competences are highly related to the firm's business process, market position and expansion path. Managerial and organizational processes refer to firm methods for decision completion. Market position refers to the current specific endowment of an organization in terms of technology, intellectual property, complementary assets, and so on. "Path" provides the strategic alternative available to a firm and the presence or absence of increasing returns and related path dependencies.

Many empirical studies have demonstrated a positive relationship between dynamic capabilities and organizational performance. For example, Danneels (2002) studied five high-tech firms. It was concluded that product innovation capabilities improve firm competencies and renewal performance. Zott's (2003) study explored how the dynamic capabilities of firms may affect different firm performances within an industry. It was found that even a small initial difference between firms' dynamic capabilities

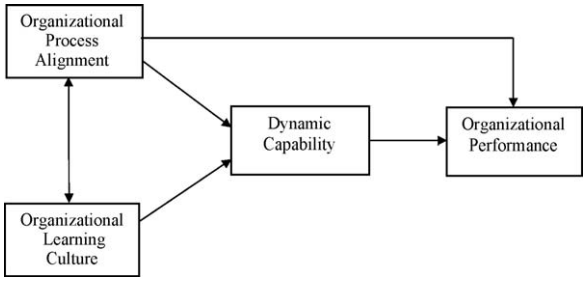

Fig. 1. Conceptual framework.

can generate significant disparity in firm performance. Luo (2000) articulated a dynamic capability perspective on international business. He suggested that with superior dynamic capability exploitation, an international business firm will have a high probability of succeeding in international expansion and firm performance. Therefore, Hypothesis 1 is proposed as the following:

Hypothesis 1. Dynamic capability is positively associated with organizational performance.

2.2. Organizational process alignment

Organizational process alignment refers to the arrangement of various parts in a company so that they work together harmoniously to pursue common organizational goals, to enhance performance and sustain competitive advantage (Weiser, 2000). Organizations must design their structures and systems to align the contingencies of environment, strategy, technology, and so on, for survival and success. Several previous studies have empirically shown that alignment positively affects organizational performance (see Anand & Daft, 2007).

On the other hand, organizational process alignment has multiple implications. Anand and Daft (2007) discussed different organizational structures and designs and how these structures and designs as organizational processes align. Alignment theory indicated that employee behavior was constant with organizational goals through structural change, strategy usage and culture transformation (Semler, 1997). Weiser (2000) stated that to link all areas of an organization and provide an informational lifeline throughout the change and alignment process, organizational structure must be redesigned to be cross-functional. Hall (2002) observed that alignment requires continually focusing on customers and their constantly changing requirements, and should also consider strategic direction. In a knowledge economic era, information technology (IT) is a fundamental dimension and an indispensable element in the current practice of knowledge management (Sher & Lee, 2004). In addition, IT is a primary driver of strategic change and structure reform. IT facilitates the integration of business functions at all levels in an organization by making corporate-wide information more readily accessible (Scott-Morton, 1991). Ostroff (1999) and Hung (2006) advocate that changes in IT systems accompany the transformation to a horizontal management style. IT alignment to support changes in core process is therefore critical to the implementation of organizational process alignment. Grover, Guha, Kettinger, and Teng (1997) noted that IT as a transformational subsystem is imperative in cultural transformation. Therefore, when an organization is appropriately aligned, organizational structure, strategic planning and IT correspond to organizational core processes and objectives, ensuring better performance. Organizational process alignment can be interpreted as the organizational effort required to make processes the platform for organizational structure, strategic planning, and information technology (Hammer, 2001; Sabherwal, Hirschheim, & Goles, 2001; Spector, 1999). Consequently, this study treats organizational process alignment as a three-dimensional construct that includes structural alignment, strategic alignment and IT alignment.

Previous studies have confirmed that organizational process alignment positively influences performance. Specifically, Ostroff (1999) proposed that the effectiveness of organizational performance increases with the degree of horizontalness of organizational structure. Benner and Tushman (2003) suggest that organizational innovation and adaptation depend on appropriate structure alignment between process management and environment. Strategic alignment is also positively related to organizational performance (Hinterhuber, 1995; Lee & Dale, 1998; Zairi, 1997). Further, strategic alignment of internal firm promotes a more dynamic platform and enhances strategic capabilities. Wheeler (2002) also developed a net-enabled business innovation cycle theory that demonstrates how IT can contribute to dynamic capabilities. The proposed theory identifies four sequenced constructs (i.e., choosing new IT, matching economic opportunities with technology, executing business innovation for growth, and assessing customer value) along with the processes that inter-relate them as a cycle. Although IT has an important influence on organizational performance, Powell and Dent-Micallef (1997) observed that IT should be used along with other business processes to enhance organizational performance.

From the dynamic capability perspective, scholars suggested process alignment and organizational performance are positively related, especially in situations of environmental turbulence (Benner & Tushman, 2003; Lee & Dale, 1998; Wheeler, 2002; Zairi, 1997). We propose that dynamic capability partially mediates the effect of process alignment on organizational performance. Both theories and existing empirical evidence support the notion that a firm's dynamic capability can be enhanced by process alignment. In sum, the literature suggests that organizational process alignment, namely structure alignment, strategic alignment, and IT alignment, is an antecedent to organizational performance and dynamic capability. Thus the following hypotheses are proposed:

Hypothesis 2. Organizational process alignment is positively related to organizational performance.

Hypothesis 3. Organizational process alignment is positively associated with dynamic capability.

2.3. Organizational learning culture

The concept of organizational learning culture is derived from organizational learning and learning organization concept, and refers to when an organization recognized learning as absolutely critical for its business success (Wang, Yang, & McLean, 2007). Senge (1990) observed that learning and innovation are crucial for firms in sustaining competitive advantage. Argyris and Schon (1978) also posited that compared to morale, satisfaction and loyalty, learning and competence provide the foundation for organizations to improve their core competencies and further sustain competitive advantage.

Although the terms 'organizational learning' and 'learning organization' are used somewhat interchangeably in the literature, they are different concepts. Preskill and Torres (1999) noted that the term 'learning organization' focuses on the systems, principles, and characteristics of an organization that learns as a collective entity, while 'organizational learning' focuses on the actual process of how an organizational learning occurs. Learning organization generally describes specific characteristics of an ideal organization, while organizational learning describes processes or activities related to organizational change. Various approaches can be used to assess such definitions of a learning organization—some employing a systems perspective (Senge, 1990); some based on a learning perspective (Elkjaer, 1999; Finger & Brand, 1999; Watkins & Marsick, 1993); and some derived from a strategic perspective (Garvin, 1993; Goh, 1998).

However, Argyris and Schon (1978) believe that organizations learn through individuals acting as agents, and defined organizational learning culture as error detection and correction. To avoid possible conceptual confusion, we use the term of organizational learning culture to represent "one in which learning is recognized as absolutely critical for business success; in such an organization,

learning has become a habitual and integrated part of all organizational functions'' (Marquardt, 2002: 27). From the strategic perspective (Garvin, 1993; Goh, 1998; Watkins & Marsick, 2003), the development of organizational learning culture starts from the individual through the complete organization, and is embedded in the organization's structure. Organizational learning depends on clear organizational goals, a culture of sharing and a connection among organizational subsystems, structure and culture to achieve learning results.

Building on Teece et al.'s (1997) dynamic capability perspective, we suggest that organizational learning culture has a positive effect on performance. Many studies suggest that organizational learning culture can improve individual, team, and organizational learning and thus enhance organizational performance (Egan et al., 2004; Ellinger et al., 2002; Yang, Watkins, & Marsick, 2004). Based on the perspective of RBV, Wilkens, Menzel, & Pawlowsky (2004) maintain that, organizational learning culture is both a resource and a dynamic capability for a firm. Their empirical study proposes a model that socio-technical processes of knowledge management and organizational learning culture can generate organizational dynamic capabilities and core competencies. Wheeler's (2002) business innovation cycle theory also suggests that organizational learning is an embedded process by which organizations create customer value. Based on a knowledge-based view of acquisitions and data analysis results from a sample of over 200 acquisitions in the U.S. banking industry, Zollo and Singh (2004) demonstrate that deliberate organizational learning strongly and positively influences acquisition performance. Consequently, we suggest that organizational learning culture and alignment enhance each other and that their impact on performance is mediated by dynamic capability.

Previous literature on organizational learning culture has emphasized that its effect on performance is mediated by other organizational variables. Although organizational learning involves individuals, teams, and organization-wide learning, Huber (1991) posited that organizational learning is an individual activity and ways of connecting to organizations may vary, and may not be successful in all organizations. Organizational learning theory posits that organizational capacity must be built on learning (Cohen & Levinthal, 1990; Zahra & George, 2002; Zahra et al., 2006; Zollo & Winter, 2002). To summarize, organizational learning culture is not merely the sum of individual learning, but also involves the exchange of knowledge among organizations, teams, individuals and the environment (Argyris & Schon, 1978).

Organizational learning culture does not directly influence organizational performance; rather, it exerts its influence through enhancing dynamic capability with accumulated knowledge and innovation. There tends to be a consensus that dynamic capability is determined by organizational learning. Ciborra and Andreu (2001) contended that a firm's core capabilities are intertwined with organizational learning process. Zollo and Winter (2002) maintain that dynamic capability is influenced by organizational learning mechanisms including knowledge accumulation, articulation, and codification as well as learning culture. Nevertheless, the effect of organizational learning on performance seems to be more complex. After a comprehensive review of the literature, Zahra et al. (2006) proposed a comprehensive model of dynamic capability that mediates the effect of organizational learning on performance. Following this theoretical framework, we reasoned that under organizational learning culture a firm subsequently translates its knowledge and learning into outcomes. In examining the effects of a firm's resources on competitive advantage, Ray, Barney and Muhanna (2003) argue that "While these resources may retain the potential for generating competitive advantage for some period of time, that potential can be realized only if used in business processes, for it is through business processes that a firm's resources and capabilities get exposed to the market, where their value can be recognized" (p. 26). Similarly, the value of a firm's knowledge and learning can only be realized by effectively integrating that knowledge into business process. In the literature on the relationship between organizational learning culture and performance, earlier studies investigated the direct performance effects of organizational culture (e.g., Denison, 1984), scholars now tend to hold an indirect effect view of organizational culture on performance (e.g., Siehl & Martin, 1990; Wilderom, Glunk, & Maslowski, 2000). As Gold, Malhotra, and Segars (2001) suggest that the influence of organizational culture on organizational effectiveness was mediated by knowledge management capability. Accordingly, we propose the following hypothesis:

Hypothesis 4. The effect of organizational learning culture on performance is indirect and fully mediated by dynamic capability.

3. Methods

This study uses a survey research method to examine the hypothesized relationships among organizational process alignment, organizational learning culture, dynamic capability, and organizational performance. A self-administered survey was employed to sample Taiwanese high-tech industry companies.

3.1. Sample and procedure

The sampling frame consisted of top 1139 Taiwanese companies in high-tech industry, provided by a database compiled by the China Credit Information Service (CCIS) (CCIS, 2004), according to their market capitalization. Samples for the study were collected from Taiwanese high-tech companies (1139 firms) selected from '2004 Taiwanese Top 5000 Companies' published by the CCIS. Since the top administrators are widely believed to provide reliable information regarding the basic environmental and organizational characteristics of their organizations (Mintzberg & Waters, 1985), senior managers or firm presidents represent the most appropriate informants for this study. A questionnaire plus cover letter were mailed to the managing director or chief executive officer of each company. Various efforts, for example follow-up telephone calls, faxes and personal connections, were employed to encourage respondents to complete and return the questionnaires. A total of 364 responses were obtained during the six-week period following the distribution of the questionnaires. Nine (9) of the responses were not useable because of incomplete data. The responses are analyzed in the following section. Discounting the number of unusable mails yielded 355 surveys that were used for the final analysis in this study, representing a response rate of 31.2%.

To know whether the effect of non-response bias is significant between those who responded early with those who responded late, we compared the total sales volume, size of organization, age of firms and sub-type of industrial classification in high-tech industry between those who responded early with those who responded late. Chi-square tests and *t*-tests were performed. The null hypothesis of this analysis is that an early respondent has the same characteristics as a late respondent. The observed significant level p for all variables is much higher than 0.05. This result indicates that in this research the extent of non-response bias is insignificant, and the results are generalizable to the sampling frame.

3.2. Measures

3.2.1. Organizational process alignment

This study assessed organizational process alignment using 15 items developed by Hung (2006). The assessment scale measures the integration between business core operational processes and organizational strategic goals. Following Sabherwal et al.'s (2001)

framework of alignment, organizational process alignment was measured in three domains: structure alignment with 5 items, IT alignment with 4 items, and strategic alignment with 6 items to measure. Appendix A describes the measurement items. Respondents were asked to indicate their levels of agreement with the description using a five-point Likert-type scale (1 = strongly disagree to 5 = strongly agree). The reliability coefficients for the three dimensions were .53 (and reaching .63 when the first item was removed from the scale), .85, and .87 respectively. Furthermore, the overall reliability estimate for the scale is .86 in the current investigation. Confirmatory factor analysis (CFA) showed a reasonable fit between the three-dimensional factor structure of process alignment and the current data ($\chi^2(85) = 484.43$, $p < .01$; RMR = .05, GFI = .86, NNFI = 0.92, CFI = 0.94).

3.2.2. Organizational learning culture

This study assessed organizational learning culture using the Dimensions of Learning Organization Questionnaire (DLOQ) designed by Watkins and Marsick (1993, 2003). Same as Wang et al.'s study (2007), organizational learning culture was assessed on a six-point Likert-type scale. Respondents are asked to determine the degree to which each of the questions reflects their organizations' situations in learning culture (1 = strongly disagree to 6 = strongly agree). According to the suggestion of the authors of the instrument, this study assessed perceived organizational learning culture at the individual, team/group, and organizational levels. This study used the sum scores for these measures to indicate the construct of organizational learning culture. The reliability estimates for the measures are .81, .80, and .88 respectively, and the overall scale reliability estimate (Cronbach alpha) reached up to .93. CFA indicated an adequate fit between the suggested model of organizational learning culture for three levels and the current data ($\chi^2(99) = 362.16$, $p < .01$; RMR = .05, GFI = .90, NNFI = 0.97, CFI = 0.97).

3.2.3. Organizational dynamic capability

This study employed 11 items for assessing organizational dynamic capability. These measurement items were adapted from previous studies (Bierly & Chakrabarti, 1996; Danneels, 2002). Four (4) items were employed to assess organizational strategic capability and achieved a reliability estimate of .75, three (3) items were used to measure R&D innovative capability and achieved a reliability estimate of .82, four (4) items were used to access organizational management capability and achieved a reliability of .74, and the overall reliability estimate was .90. CFA results identified a moderate fit between the three-dimensional model of organizational dynamic capability and the current data ($\chi^2(41) = 411.42$, $p < .01$; RMR = .07, GFI = .81, NNFI = 0.90, CFI = 0.93).

3.2.4. Organizational performance

The organizational performance construct was measured using six (6) items adapted from Baker and Sinkula (1999), Lawler, Mohrman, and Ledford (1998) and Powell (1995). The organizational performance construct includes the change in the company (1) competitive advantage, (2) market share, (3) profit, (4) cost, (5) sales revenue, and (6) customer satisfaction, to their largest competitor. Performance was measured at the organizational level. Because companies may specialize in different fields/industries and have different strategic priorities, performance data needed to be adjusted to evaluate each company (Gupta & Govindarajan, 1984). To do so, organizational performance dimension was designed to ask respondents to answer the questions by comparison to their major competitor. While different companies may have different objectives for measuring organizational performance (some may focus on gaining share, other on profit), the measurement of this study does not focus on particular market efforts. Therefore, the scale includes both sales and profit information. It can be interpreted to measure the effectiveness as well as the efficiency dimensions of performance (Walker & Ruekert, 1987). Also, given that all elements of the measure are taken relative to the organization's major competitor, one might also interpret it to reflect a company's relative advantage. The survey items of organizational performance have been used by Delaney and Huselid (1996) and Rhodes, Hung, Lok, and Lien (2008). The Cronbach alpha on their research was .86 and .88, respectively. Each item used a five-point response scale that ranged from 1 (strongly disagree) to 5 (strongly agree). The 6 items were: (1) "During the past three years, the competitive advantage relative to your largest competitor has markedly improved", (2) "During the past three years, change in market share relative to your largest competitor has markedly improved", (3) "During the past three years, change in profit relative to your largest competitor has markedly improved", (4) "During the past three years, change in cost (product or service) relative to your largest competitor has reduced", (5) "During the past three years, change in sales revenue relative to your largest competitor have greatly increased", and (6) "During the past three years, change in customer satisfaction relative to your largest competitor has greatly increased". The coefficient alpha for the scale was .88. CFA results confirmed the unidimensional structure of six measures for organizational performance ($\chi^2(9) = 141.33$, $p < .01$; RMR = .06, GFI = .89, NNFI = 0.89, CFI = 0.94).

4. Data analysis

This study assessed the hypothesized structural equation model (see Fig. 1) using Jöreskog and Sörbom's LISREL 8 program (1996). SEM is the most efficient and lease problematic means of testing mediation (Baron & Kenny, 1986). Following Anderson and Gerbing (1988), data analysis in this study consists of two parts. First, an overall measurement model for the variables was assessed to examine the construct validity of the scales used in the study. Second, the hypothesized structural model was examined. The first step examined a measurement model that allowed the underlying latent constructs to correlate freely and constrained each item to load only the factor for which it was a proposed indicator. We further assessed the discriminant validity of theoretical constructs by comparing the measurement model with a model that constrained the correlations among the constructs to zero and examined the change in chi-square. The second step combined both the measurement model and the theoretical model depicting the hypothesized relationships between constructs. The hypothesized model was tested with a nested-model approach. The first model specified was the theoretical model. This model was compared to a constrained model where the path from exogenous variable "organizational learning culture" to "organizational performance" was fixed to zero.

To assess the overall fit of the data to the model, this study reports chi-square statistics along with several other different types of fit indices. This study chose three incremental fit indices: Tucker–Lewis Index (TLI) (Tucker & Lewis, 1973), Incremental Fit Index (IFI) (Bollen, 1989), and Comparative Fit Index (CFI) (Bentler, 1990). Two other residual types of fit indices were also assessed: the Root Mean Squared Residuals (RMR) of Jöreskog and Sörbom's (1996) and the Root Mean Square Error of Approximation (RMSEA) of Steiger's (1990). All three incremental indices are based on a fit comparison of the hypothesized model to that of the null baseline model. Furthermore, each of the incremental fit indices ranges from 0 to 1.0, with values exceeding .90 indicating an adequate model-data fit. The Tucker–Lewis Index differs from the other two fit indices in that it is rarely influenced by sample size and model complexity. The RMR measures the average of the fitted residuals, and the RMSEA indicates the closeness of the fit between the model and population. These two indices describe the degree to which the

covariance matrix implied by the model matches the observed covariance matrix, and a value of zero indicates an optimal fit. Values of such indices below .08 reflect reasonably well fitting models (Browne & Cudeck, 1993).

This study also reports the parameter estimates based on their associated significance levels for the hypothesized model. This is done to identify adequate measurement items for the study constructs. This study also describes squared multiple correlations for key endogenous variables to identify the predictive power of the hypothesized conceptual model. The squared multiple correlations for a latent variable indicate the percentage variations of that construct which can be explained using the proposed model.

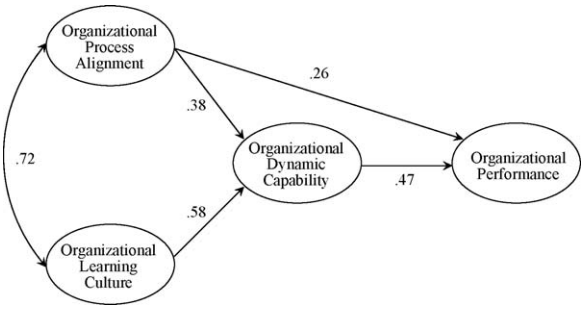

Fig. 2. Structural equation model for organizational performance.

5. Results

Table 1 lists descriptive statistics and correlations among manifest/indicator variables. The pattern of correlations generally supported the proposed hypotheses. All 15 indicators for the constructs included in this study exhibited significant correlations, indicating moderate to high correlations among organizational process alignment, learning culture, dynamic capability, and organizational performance. The confirmatory factor analysis of the four underlying latent constructs produced the following goodness-of-fit measures: $\chi^2(84) = 406.61$, GFI = .87, TLI = .96, IFI = .97, CFI = .97, and RMR = .06. All factor loadings on the specified factor were also significant at the 0.01 level. A model comparison between the unconstrained measurement model and a model that constrained the correlations among the constructs to unity produced a significant difference in chi-square, further suggesting discriminate validity among the constructs ($\Delta\chi^2 = 794.08$, $\Delta df = 6$, $p < 0.001$). Overall, these results suggest that a four-factor structure is a good fit to the data.

SEM results for testing the model shown in Fig. 2 demonstrated that the proposed model fits the sample data reasonably well: $\chi^2(82) = 249.93$, $p < .01$; RMR = .07, RMSEA .07, GFI = .92, TLI = .98, IFI = .98, CFI = .98. All of the path coefficients were significant at .001. Consequently, Hypotheses 1–3 were supported. The constrained model also fitted the data well ($\chi^2(81) = 249.83$, $p < .01$; RMR = .07, RMSEA = .08, GFI = .92, TLI = .98, IFI = .98, CFI = .98). However, the path coefficient of the direct effect of organizational learning culture on organizational performance was negligible (standardized coefficient was .04). Anderson and Gerbing (1988) suggested that when two models are not significantly different (in this case, $\Delta\chi^2 = 249.93–249.83 = 0.10$, df = 161–160 = 1, $p > 0.05$), the one with fewer parameters would be selected. Therefore, the SEM results support the removal of the path from organizational learning culture to performance and Hypothesis 4 was confirmed. The effect of organizational learning culture on performance is mediated by dynamic capability.

In the final structural model, the square of the multiple correlations for the construct of organizational performance was .44, indicating that the proposed model explained 44% of the variations of the construct. Additionally, the results demonstrated that organizational dynamic capability acted as a mediating variable between organizational learning culture and performance. Although organizational learning culture is positively associated with performance (as indicated in Table 1), this relationship diminished when a mediating variable, dynamic capability, was considered.

Structural equation models generally use ellipses to represent constructs (latent variables), and a line with one arrow between two constructs indicates the influence of one construct on another. The number near the line is the statistic denoting standardized path coefficients (SPC), and can be considered a standardized regression coefficient for one latent variable in relation to another when the effects of all other variables are partialed out. This study indicates a strong association between organizational learning culture and process alignment (SPC = .72, $p < .01$). Organizational learning culture considerably and positively contributed to organizational dynamic capability (SPC = .58, $p < .01$). Furthermore, organizational process alignment significantly and positively influenced both organizational dynamic capability (SPC = .38, $p < .01$) and organizational performance (SPC = .26, $p < .01$). Finally, organizational dynamic capability significantly contributed to organizational performance (SPC = .47, $p < .01$). To summarize, the results of the structural equation analysis (Fig. 2) indicate a close correlation between organizational learning culture and process alignment, with both of them being strong predictors of organizational

Table 1
Descriptive statistics and correlations among indicator variables.

Variables	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Structural alignment	3.35	.63	–													
2. IT alignment	3.69	.59	.40	–												
3. Strategic alignment	3.79	.59	.40	.39	–											
4. Individual learning	3.71	.63	.39	.39	.45	–										
5. Team/group learning	3.67	.66	.40	.45	.45	.71	–									
6. Organizational learning	3.79	.68	.40	.47	.56	.62	.77	–								
7. Strategic capability	3.68	.66	.35	.46	.59	.58	.63	.73	–							
8. R&D innovative capability	3.69	.68	.34	.41	.61	.50	.53	.67	.73	–						
9. Management capability	3.57	.65	.40	.51	.59	.53	.60	.70	.75	.69	–					
10. Performance (competitive advantage)	3.64	.75	.24	.29	.40	.32	.34	.42	.45	.42	.41	–				
11. Performance (productivity)	3.64	.75	.35	.34	.47	.39	.37	.46	.50	.47	.45	.62	–			
12. Performance (profit)	3.61	.83	.25	.22	.40	.34	.26	.32	.37	.48	.38	.65	.55	–		
13. Performance (cost per product/service)	3.42	.78	.29	.24	.32	.35	.35	.40	.37	.38	.39	.50	.48	.40	–	
14. Performance (total sales)	3.70	.79	.30	.25	.43	.39	.28	.34	.39	.50	.36	.57	.60	.72	.45	–
15. Performance (customers' satisfaction)	3.57	.75	.24	.33	.34	.41	.36	.39	.42	.41	.45	.49	.60	.47	.49	.60

Note: $N = 355$. All correlation coefficients are statistically significant ($p < .01$).

Table 2
Total effects of organizational process alignment and learning culture on dynamic capability and performance.

Endogenous variables	Exogenous variables	
	Process alignment	Learning culture
Dynamic capability	.38	.58
Organizational performance	.44	.27

dynamic capability and overall performance. The results also demonstrate that organizational dynamic capability fulfills a key mediating role in transforming the contributions of process alignment and organizational learning culture to overall performance.

By using SEM, Table 2 lists the total effects of two exogenous variables on two endogenous variables. The SEM indicated that all of effects were significant at a level of $p < .01$. Although organizational learning culture did not directly affect performance, it did exert a significant indirect effect via dynamic capability. The analytical results demonstrated that learning culture impacts dynamic capability (.58) more strongly than process alignment (.38). Thus, a learning culture was more important than aligning organizational process in developing organizational dynamic capability. However, aligning organizational process was more highly related to performance than a learning culture (.44 vs. .27, respectively), though these two management processes are closely related ($r = .72$, $p < .01$). The overall effect of organizational learning culture on organizational performance was .27, indicating that about 27% of the variations of perceived performance could be explained by organizational learning culture. This figure was comparable to some of the research findings (ranged from .25 to .31 in Ellinger et al., 2002) but lower than the other findings (.66 in Yang et al., 2004). This might be explained by the fact that previous studies did not include the variable of process alignment, which shared considerable variance with organizational learning culture. To summarize, the results illustrated that both organizational learning culture and process alignment are significant predictors of organizational dynamic capability and performance.

6. Conclusion and discussion

This study was designed to investigate how firms build dynamic capabilities through process alignment and creating organizational learning culture. This study integrated two key organizational constructs (namely, process alignment and organizational learning culture) that represent two theoretical underpinnings (i.e., RBV and KBV) into a single framework. The result of this investigation demonstrates that the proposed integrative model closely fits the sample data. The hypothesis tested in this study received full empirical support. The results found that the organizational process alignment and organizational learning culture significantly contributed to organizational dynamic capability and ultimately performance. This study provides supporting evidence for the hypothesis that process management needs to be aligned with organizational contextual variables in order to build firms' dynamic capabilities and consequently yield healthy performance (Benner & Tushman, 2003). Overall, the results of this study provide preliminary evidences for both resource-based view (RBV) and knowledge-based view (KBV) of the firm.

The results of this study demonstrated that although organizational learning culture significantly affected performance, its influence was mediated by dynamic capability. Organizational learning culture does not appear to deliver or create value directly. This finding tends to be consistent with some of the current writings on the effects of organizational learning and knowledge management on performance (Ciborra & Andreu, 2001; Gold et al., 2001; Wilderom et al., 2000; Zahra et al., 2006). It can be reasoned that the culture part alone would not generate superior performance. Instead, organizations have to actually use what they have learned in the appropriate way to make them effective. This phenomenon may partially explain why many organizations are reluctant to invest in learning activities. It may also indicate why few empirical studies have examined learning related concepts, such as learning organization, organizational learning, and learning culture, despite such concepts having received considerable attention in the literature (Cohen & Levinthal, 1990; Zahra & George, 2002; Zahra et al., 2006; Zollo & Winter, 2002). Nevertheless, this study demonstrated that organizational learning culture matters since it is strongly associated with process alignment and that both variables influenced organizational dynamic capability and performance. Consequently the role of creating adequate learning culture in aligning organizational process with core business mission and thus boosting organizational capability should not be overlooked. Organizational learning culture tends to be embedded in the process of improving firm alignment and dynamic capabilities. Ultimately, organizational learning culture significantly influences organizational performance. However, for the managerial implication, since organizational learning culture is fully mediated by dynamic capability on organizational performance, this study revels that when manager cultivate organizational learning culture in their organization should also consider to develop their dynamic capability in order to influence their organizational performance effectively.

6.1. Limitations

While this study assesses the impact of process alignment and organizational learning culture on the dynamic capabilities and organizational performance of high-tech companies in Taiwan, the study itself was not completely free from limitations. As a result of the fact that the study sample was comprised of homogenous, high-tech firms that ruled out extraneous factors associated with different organizations in different industries, care is required in generalizing the results to other business organizations. Another limitation of this study is that it does not objectively measure organizational performance. However, the perceptual and self-reporting data from senior management on organizational performance are becoming more acceptable because of the difficulties in obtaining real financial data from various organizations (Delaney & Huselid, 1996; Powell & Dent-Micallef, 1997; Spanos & Lioukas, 2001). The other limitation of this study is that all of our measures were collected using the same method (self-report) and therefore, relationships among variables might be inflated by common method variance. Although we take several measures to reduce the threat of common method variance, it remains one of the limitations of this study.

6.2. Managerial relevance

Besides the research and theoretical implications, this study provides practical implications for business. It highlights management issues involving operating process alignment, the need to cultivate organizational learning culture, and real understanding of the influence of dynamic capability on organizational performance. This study proposes that senior management simultaneously consider two key internal strategic management processes (namely, organizational process alignment and organizational

learning culture) to improve firm dynamic capabilities and organizational performance.

Although previous research has posited dynamic capabilities as a mediator (Hung, Chung, & Lien, 2007), this study is arguably among the earliest to examine the mediating role of dynamic capabilities in the relationship between organizational learning culture, organizational process alignment and organizational performance. The implication of this study is clear; company should look for synergies between their organizational process alignment, organizational learning culture and dynamic capabilities in order to obtain competitive advantage.

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Appendix A. Major survey items

1. Process alignment
   (1) Horizontal structure alignment
      a. High barriers between departments (R).
      b. Frequent use of process teams.
      c. Cross-functional teams have more authority in making day-to-day decisions than departmental managers.
      d. Customer satisfied with response time.
      e. Managerial tasks to front-line staff delegated.
   (2) IT alignment
      a. Technology enabled business processes to perform well.
      b. State-of-the-art technology.
      c. IT important to improvement of business processes.
      d. Well integrated IT systems across functional units.
   (3) Strategic alignment
      a. Developed strategies based on customer needs.
      b. Core processes important input into strategic plan.
      c. Operational improvements had direct impact on ability to compete.
      d. Sufficient measures permit clear tracking of performance.
      e. Current strategic plan identified actually undertaken.
      f. Strategic planning process actually encourages information sharing and cross-functional cooperation.
2. Organizational learning culture
   (1) Individual level
      a. In my organization, people identify skills they need for future work tasks.
      b. In my organization, people are rewarded for learning.
      c. In my organization, people give open and honest feedback to each other.
      d. In my organization, people listen to others' views before speaking.
      e. In my organization, people spend time building trust with each other.
   (2) Team or group level
      a. In my organization, teams/groups have the freedom to adapt their goals as needed.
      b. In my organization, teams/groups treat members as equals, regardless of rank, culture, or other differences.
      c. In my organization, teams/groups focus both on the group's task and on how well the group is working.
      d. In my organization, teams/groups revise their thinking as a result of group discussions or information collected.
      e. In my organization, teams/groups are rewards for their achievements as a team/group.
   (3) Organizational level
      a. My organization makes its lessons learned available to all employees.
      b. My organization gives people choices in their work assignments.
      c. My organization gives people control over the resources they need to accomplish their work.
      d. My organization encourages people to get answers from across the organization when solving problems.
      e. In my organization, leaders generally support requests for learning opportunities and training.
      f. In my organization, leaders mentor and coach those they lead.
3. Organizational dynamic capability
   (1) Organizational strategic capability
      a. My organization owns future competitive flexibility in industry.
      b. My organization owns ability that can fast aware new business opportunity or threat possibility.
      c. In my organization, leaders have entrepreneurship characteristics.
      d. My organization has the ability to cohesive employees' knowledge by visioning.
   (2) R&D innovative capability
      a. My organization has the ability to evaluate my own organization's strength and weakness.
      b. My organization has the ability to know the direction and timing for R&D.
      c. My organization has the flexibility to development new product or technology.
   (3) Organizational management capability
      a. My organization has the flexibility to understand the specific needs of customers.
      b. My organization has the flexibility to communicate and coordinate effectively among departments.
      c. My organization helps employees to balance the life of work and family.
      d. My organization coordinates with community to fulfill mutual needs.
4. Organizational performance
   (1) During the past three years, change in competitive advantage relative to your largest competitor has markedly improved.
   (2) During the past three years, change in market share relative to your largest competitor has markedly improved.
   (3) During the past three years, change in profit relative to your largest competitor has markedly improved.
   (4) During the past three years, change in cost (product or service) relative to your largest competitor has reduced.
   (5) During the past three years, change in sales revenue relative to your largest competitor has greatly increased.
   (6) During the past three years, change in customer satisfaction relative to your largest competitor has greatly increased.

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