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Full Length Research Paper

Organizational process alignment, culture and innovation

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This study explores the relationships between organizational process alignment, culture and innovation. Based on previous studies, this study proposed a conceptual model and hypothesized that three kinds of process alignments (structural, information technology (IT) and strategic alignments) positively affect adaptability culture, which in turn facilitate process and product innovations. Using structural equations modeling with data collected from 175 surveys from high-tech firms in Taiwan, the result indicated that there is a positive effect of structural and strategic alignments on adaptability culture, but information technology (IT) alignment exerted no such effect. This study further found that adaptability culture has a direct impact on process innovation, and an indirect impact on product innovation through process innovation.

Key words: Structural alignment, information technology (IT) alignment, strategic alignment, adaptability culture, process innovation, product innovation.

INTRODUCTION

Nowadays firms are facing dynamic environment, intense competition and demanding customers. The increasing business competition forces companies to stress the importance of dynamic activity to maintain competitive advantage. In this context, the notion of alignment for effective organizational performance has drawn a great deal of attention (Delery and Doty, 1996) . Alignment can be defined as the extent to which organizational dimensions meet theoretical norms of mutual coherence (Jarvenpaa and Ives, 1993). The importance of alignment is increasingly recognized and empirically found to have positive effect on organizational performance (Delery and Doty, 1996).

Organizational process alignment refers to arranging the various parts of a company so that they can work together harmoniously and head in the same direction; therefore, they can seek common organizational goals, improve performance and sustain competitive advantage (Weiser, 2000). Previous studies demonstrated that organizations must design proper structures, strategy, technology and systems to align the contingencies of the dynamic environment (Lewin, 1999). Organizational process alignment can be defined as the organizational effort required making processes and platform for organizational structure, strategic planning and information technology (Sabherwal et al., 2001). Empirically, a significant and positive relationship between organizational process alignment and organizational performance has been found (Gresov, 1989). Since innovation has been widely viewed as a vital role in creating sustainable competitive advantage and enhancing organizational performance in this increasingly complex and rapidly changing environment, (Subramaniam and Youndt, 2005), this study further extends the relationship between organizational process alignment and organizational innovation.

In addition, culture is regarded as a crucial factor in innovation performance (Feldman, 1988). Numerous anecdotal and empirical studies demonstrated that culture plays a major role in organizational innovation (Feldman, 1988; Branen, 1991; Herbig and Dunphy, 1998). This study thus, expects that the association between organizational process alignment and organizational

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culture would subtly affect organizational innovation.

The purpose of this study is to test empirically, the relationship among organizational process alignment, organizational culture and organizational innovation. This study developed a conceptual model based on previous studies. This study proposed that the three constructs of organizational process alignment (structural, strategic and information technology (IT) alignment) facilitate the development of adaptability culture. This kind of organizational culture in turn contributes to organizational innovation. Three hypotheses are proposed and examined with data collected from managers working for high-tech companies in Taiwan.

This study enriches the current literature in several ways. First of all, to extend the impact of organizational process alignment on other construct, though numerous studies have proved that organizational process alignment has positive impact on performance (Gresov, 1989; Roth et al., 1991), this study further consider process and product innovation as outcome variables. Secondly, this study views adaptability culture as a latent mechanism that links organizational process alignment and organizational innovation. Thirdly, this study examines the proposed model based on empirical data of high-tech companies in a Taiwanese context.

The remainder of this paper is structured as follows. This study begins with introduction of our research background. Then this study reviewed literature on organizational process alignment, organizational culture and organizational innovation, and then proposed three hypotheses. The following section detailed the research design and the development of the research instrument. Subsequent sections presented the structural equation modeling (SEM) of the research framework, followed by the conclusions and implications derived from the study.

LITERATURE REVIEW

Organizational process alignment

Organizational process alignment refers to arranging the various parts of a company that they can work together harmoniously and head in the same direction; therefore, they can seek common organizational goals, improve performance and sustain competitive advantage (Weiser, 2000). Previous studies demonstrated that organizations must design proper structures, strategy, technology and systems to align the contingencies of the dynamic environment (Lewin, 1999). Weiser (2000) indicated that in the process of alignment, organizational structure has to be redesigned to be cross-functional to link all parts of an organization. Hall (2002) proposed that an organization with alignment should constantly value customers' requirements and then adjust strategic direction. Grover et al. (1997) found that information technology (IT) can serve as a transformational subsystem in the transformation of culture. Hence, when a firm aligns with proper organizational structure, strategic planning and IT subsystem, it can enhance organizational performance and maintain competitive advantage. Viewed as the organizational effort adjusted to dynamic environment, organizational process alignment can be addressed through the three conceptual components: structural, strategic and IT alignment (Spector, 1999). Therefore, the construct of organizational process alignment in this study comprised structural, strategic and IT alignment.

Structural alignment means that organizations move from a vertical structure to a horizontal structure, representing a relatively hierarchical structure to a cross-functional one (Ostroff and Smith, 1996). Rowland and Armistead (1996) noted that horizontal structure requires alignment of management style and systems.

Strategic alignment refers to alignment between firms' strategic objectives and actual market requirements (Hung, 2001) . The increasing competition, accelerating technological development and demanding customers' requirements force firms to stress the improvement of product and process to successfully compete in dynamic environment (Thompson and Strickland, 1999).

Information technology (IT) is a main driver of strategic change and reshaping process (Grover et al., 1993). Viewed as a key factor for process improvement, IT can improve operational efficiency in incremental and radical process improvement (Venkatraman et al., 1993). In other words, information technology is an enabling role in changing business processes (Venkatraman et al., 1993). Information technology (IT) alignment refers to alignment between firms' core processes and choice of IT (Hung, 2001).

Previous studies demonstrated that organizational process alignment has positive impact on performance (Gresov, 1989; Roth et al., 1991). Specifically, Ostroff (1999) stated that the horizontalness of organizational structure would facilitate the effectiveness of organizational performance. Scholars also found that strategic alignment has positive effect on organizational performance (Hinterhuber, 1995; Lee and Dale, 1998). Powell and Dent- Michallef (1997) noted that information technology works its beneficial effects on organizational performance along with other business processes. Based on dynamic capability perspective, organizational process alignment has positive relationship with organizational performance in increasingly complex and rapidly changing environment (Lee and Dale, 1998).

Organizational culture

Organizational culture can be defined as a set of shared values, beliefs, assumptions and symbols that direct the way in which a firm runs its business (Barney, 1986). In other words, organizational culture is viewed as a set of beliefs, values and assumptions shared by members of an organization (Schein, 1985). These underlying values influence the behavior of organizational members and

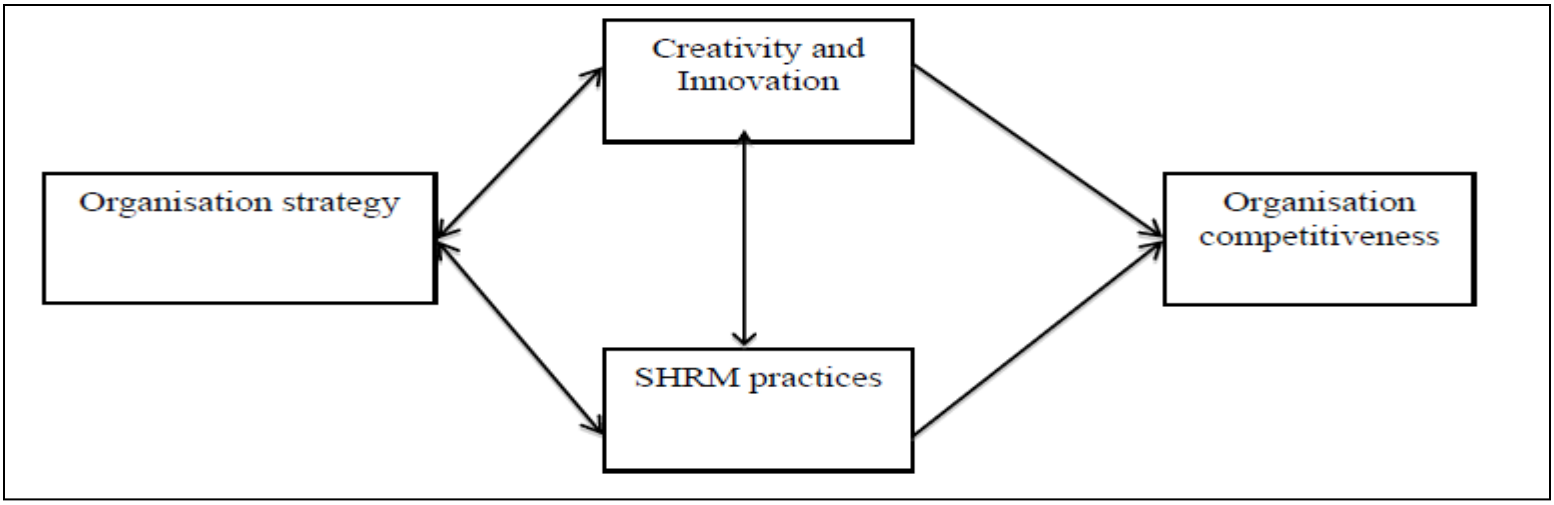

Figure 1. Competing values framework.

guide their behaviors toward organizational goals (Schein, 1985). Previous studies regarded organizational culture as control mechanism in managing staff (Jones, 1983; Wilkins and Ouchi, 1983). In addition, based on resource-based view, some researchers demonstrated that organizational culture can furnish a source of sustained competitive advantage for firms, since it is a firm-level resource which is valuable, rare and difficult to imitate (Barney, 1986).

Numerous studies discussed the relationship between organizational culture and firm performance (Saffold, 1988) in several ways. First of all, previous research demonstrated that organizational culture can positively influence organizational performance by guiding staff, motivating employees and shaping employees' behaviors toward specified goals (Daft, 2007). Secondly, viewed as a valuable, unique and inimitable resource based on the resource-based view, organizational culture is a typical sustained competitive advantage of a firm that positively impact performance (Barney, 1986; Chan, Shaffer and Snape, 2004). Thirdly, organizational culture enables a firm to constantly adapt to the changing market conditions and quickly react to dynamic environment, and this enhances organizational performance (Daft, 2007). Finally, more empirical studies should be focused on the manner in which specific organizational culture impacts organizational effectiveness. Previous research has examined the relationships between specific culture domains and specific organizational performance (Denison and Mishra, 1995; Denison, 1990).

According to the competing values framework, Quinn (1988) proposed a classification of organizational culture. The competing values model has four distinct quadrants determined by a horizontal and a vertical axis (Quinn and Rohrbaugh, 1983). The horizontal axis reflects the extent to which an organization focuses on internal or external view, whereas the vertical view reflects the extent to which an organization stresses control or flexibility.

As seen in Figure 1, each quadrant has its distinct philosophy and strategic emphasis. The lower left quadrant, called hierarchy culture, emphasizes internal maintenance with a need for stability and control. The long-term concerns of the hierarchy culture are stability, predictability and efficiency (Quinn, 1988). The lower right quadrant is market culture characterized as a results-oriented organization. This type of organization focuses on external maintenance with a need for stability and control (Quinn, 1988). The upper left quadrant, called clan culture, stresses internal maintenance with flexibility. This kind of organization focuses on the long-term benefit of human resources development with high cohesion and morale, and values teamwork, participation and consensus (Quinn, 1988). The upper right quadrant called adhocracy culture, contrasts with the hierarchy culture. This type of organization stresses external positioning with a high degree of flexibility. The adhocracy culture encourages creativity and innovation (Quinn, 1988) . This kind of organizational culture has positive effect on innovation performance (Lau and Ngo, 2004). Similar to adhocracy culture, Daft (2007) proposed a kind of adaptability culture that is characterized by strategic concentration on the external environment via flexibility and change. Through flexibility and responsiveness, this type of organizations can quickly react to external environment requires (Daft, 2007).

Organizational innovation

Innovation has been widely viewed as an important role in the turbulent environment (Subramaniam and Youndt, 2005).Those organizations with innovative capacity can respond to environmental change quicker and perform better than those non-innovative organizations in an

increasingly complex and highly dynamic environment (Miles and Snow, 1984; Brown and Eisenhard, 1995). Based on resource-based view, when firms have bundles of resources that are valuable, rare, inimitable and non-substitutable, they can implement value creating strategies not easily duplicated by competing firms (Barney, 1991; Conner and Prahalad, 1996). Innovation can be a new product, a new technology, a new operation procedure, or a service. Most innovations originated from conceptual accumulation and technological improvement (Tushman and Nadler, 1986).

Innovation can be classified in various ways, depending on the perspective from which it has been studied (Damanpour and Gopalakrishnan, 1998). Innovation can be divided into incremental and radical innovation according to radicalness. Radical innovation refers to fundamental changes in the activities of the organization from existing practices, whereas incremental innovation refers to lesser degree of changes (Knight, 1967; Normann, 1971; Damanpour and Gopalakrishnan, 1998; Hage, 1999). Incremental innovations are market-pull innovations coming from firms that are good at gathering, disseminating and responding to intelligence from the marketplace (Kohli and Jaworksi, 1990). In contrast, radical innovations are technology- push oriented (Dosi, 1988; Workman, 1993; Green et al., 1995). Radical innovations tend to be risky and often require different management practices (O'Connor, 1998; Rice et al., 1998). However, radical innovations may change existing market structures and create new opportunities (Veryzer, 1988). Moreover, Damanpour (1991) distinguishes technical innovation from administrative innovation on the basis of the dual-core model. Technical innovation includes new technologies, product and services, and administrative innovation comprises new procedures, policies and organizational structures (Normann, 1971; Dewar and Dutton, 1986; Tushman and Nadler, 1986). Various studies explore innovation that can be divided into technological and human perspectives (Vrakking, 1990; Brown and Karagozoglu, 1993; Tang, 1998).

The technology perspective viewed technology and research and development (R and D) as the main drivers of innovation. Technology, the designs of products and operational systems of the firms, functions as creating new processes, changing the essences of industry structure and developing new opportunities (Tushman and Anderson, 1986). Most of the research on innovation tends to highlight technological innovation (Abernathy and Clark, 1985), though researchers demonstrated that innovation may not be completely technologically based (Claver et al., 1998). Research and Development activities representing investment in organizations are demonstrated to have positive effect on innovation (Capon et al., 1992). Research and Development can also be served as an offensive strategy to create new markets (Murphy, 1981). Capon et al. (1992) indicated that spending money on Research and Development activities would facilitate innovation.

The other perspective human factors noted that people and culture play crucial roles in organizational innovation. In terms of people, since innovation originates from converting ideas into something profitable, organizations have to develop an environment that supports idea generation (Daniel and Pervaiz, 2006). Therefore, it is imperative to create an internal environment that encourages people to be willing to innovate (Woodman et al., 1993). In addition, leadership management is also a key element. Previous studies view top management support and commitment as crucial factors for successful innovation (Baker et al., 1986; Cooper, 1988). Innovation tends to be risky; it requires the power of top management to overcome organizational inertia (Szakonyi, 1985; Niehoff and Enz, 1990). In terms of organizational culture, it is regarded as a crucial factor in innovation performance (Feldman, 1988) . Organizational culture is defined as a complex set of values, beliefs, assumptions and symbols in organizations that differ from others (Barney, 1986). Organizations have to cultivate an environment that encourages and supports idea generation to facilitate innovation (Tufan and Cemil, 2007).

Hypotheses development

Daft (2007) proposed a kind of adaptability culture that is characterized by strategic concentration on the external environment via flexibility and change. Through flexibility and responsiveness, this type of organizations can quickly react to external environment requires (Daft, 2007). On the other hand, organizational process alignment refers to arranging the various parts of a company so that they can work together harmoniously and head in the same direction; therefore, they can seek common organizational goals, improve performance and sustain competitive advantage (Weiser, 2000). Previous studies demonstrated that organizations must design proper structures, strategy, technology and systems to align the contingencies of the dynamic environment (Lewin, 1999).

This study argues that adaptability culture is most related to organizational process alignment, since they have similar underlying strategic focus (responsiveness and adaptation to dynamic environment). By combining both organizational process alignment and adaptability culture concurrently, an organization can reach an internal fit. Thus, it is hypothesized that:

H_1: Organizational process alignment is positively related to adaptability culture.

Previous studies indicated that organizations should design their structures to align the contingencies of the environment, strategy and so to survive in the increasingly complex and rapidly changing environment (Lewin, 1999). Additionally, alignment theory noted that

employee behaviors adapt to organizational goals via structural change and strategy usage (Semler, 1997). Since organizational culture manifests itself in the behaviours of organizational members, adaptability culture should be more influenced by structural and strategic alignment. Information technology (IT) alignment seems to have little connection with adaptability culture as compared with structural and strategic alignment. Following the above arguments, this study hypothesized that:

H_2: Among the three sub-dimensions of organizational process, structural and strategic alignment has stronger relationships with adaptability culture as compared with IT alignment.

Organizational culture is defined as a complex set of values, beliefs, assumptions and symbols in organizations that differ from others (Barney, 1986). It is regarded as a crucial factor in innovation performance (Feldman, 1988). Numerous anecdotal and empirical studies demonstrated that culture plays a major role in organizational innovation (Feldman, 1988; Branen, 1991; Herbig and Dunphy, 1998). Organizations have to cultivate an internal environment that encourages and supports idea generation to facilitate innovation (Tufan and Cemil, 2007).

Among the various organizational cultures, the relationship between adaptability culture and innovation has been explored (Lau and Ngo, 2004). Lau and Ngo (2004) indicated that those organizational cultures with flexibility and adaptation had a positive effect on organizational innovation. Daft (2007) proposed that adaptability culture is characterized by active responsiveness to dynamic environment through flexibility and change. Through flexibility and responsiveness, this type of organizations can quickly react to external environment requires (Daft, 2007) . This type of culture enables organizations to actively respond to external environment and consequently contribute to organizational innovation (Daft, 2007). In view of the above, it is plausible to expect a positive relationship between adaptability culture and innovation performance. Thus, it is hypothesized that:

H_3: Adaptability culture is positively related to both process and product innovation.

METHODOLOGY

Sample and procedures

The sampling frame for the study is the Taiwanese top 1000 companies in high-tech industries, published by the China Credit Information Service Incorporation. Since the top managers are supposed to supply reliable information concerning the organizational characteristics (Mintzberg and Waters, 1985), this study regards senior managers as the most appropriate informants. This study used a questionnaire survey method to collect data for testing the validity of the model and research hypotheses. Variables in the questionnaire include background information, organizational process alignment, organizational culture, and organizational innovation. By using random sampling, 300 firms were selected, and a total of 900 questionnaires were mailed to selected respondents, along with a cover letter that explained the objective of this study and asked the questionnaires to be completed by those who are top executives (presidents, vice-presidents or top administrators) and are familiar with the issue of this study. To increase the response rate, this study used follow-up letters, emails and phone calls after three weeks. Of the 186 returned questionnaires from 93 companies, 11 are incomplete and the remaining 175 are valid for analysis, representing a response rate of 19.4%. In addition, this study compared the characteristics of the respondents to those of the original sample to avoid the probability of non-response bias. These comparisons did not indicate any significant differences between the respondent and non-respondent companies, suggesting no response bias in this study.

Measurement of variables

The scales were derived from previous literature. Respondents responded to the items using a six-point Likert-type scale (1 = 'strongly disagree'; 6 = 'strongly agree'), except for organizational innovation. The measures to which respondents responded are as follows. Internal consistency reliability estimates are also furnished in the following text.

Structural alignment

To measure this variable, we used an abbreviated scale based on Hung (2001) that contained four items: (1) Our cross-functional teams have more authority than departmental managers in daily decisions; (2) Horizontal communication is well practiced in our organization; (3) We have a flat organizational structure. The alpha coefficient for this scale was 0.8320.

Information technology (IT) alignment

This study used a shortened three-item scale developed by Hung (2001) to measure information technology (IT) alignment. The items, selected from original scale of Hung (2001) according to the high factor loadings, included three items: (1) Our IT enables our business processes to perform well; (2) Information technology is very important to the improvement of our business processes; (3) Our Information technology systems are well integrated across functional units. The alpha coefficient for the abbreviated scale was recorded at 0.8442.

Strategic alignment

The study used a four-item scale to measure strategic alignment according to previous study (Hung, 2001). The items included: (1) We develop strategies based on customer needs; (2) Our current strategic plan identifies the projects we actually undertake to improve our business processes; (3) Our strategic planning process encourages information sharing and cross-functional cooperation. This scale had an alpha coefficient of 0.8672.

Adaptability culture

Adaptability culture was measured using a scale that comprised three items developed from previous studies (Denison and Mishra, 1995; Lau and Ngo, 2004; Hanh and Raymond, 2008). Respondents were asked to indicate the extent to which each item of the measure characterizes the culture of their firms. The items

included: (1) The culture of this firm could be characterized as flexible; (2) Our firm values adaptability and responsiveness to change; (3) Our firm emphasizes creativity and innovation. The alpha coefficient for this scale was 0.8874.

Process innovation

Review of previous research revealed that organizational innovation has been extensively measured in various ways. According to previous research such as Deshpande et al. (1993), Avlonitis et al. (1994), Miller and Friesen (1982) and Daniel and Pervaiz (2006), this study uses two dimensions of organizational innovation, including process and product innovation.

Process innovation represents changes via innovation developed elsewhere (Zhuang et al., 1999) or new practices developed internally. The process innovation comprises four items: (1) Technological competitiveness; (2) Speed of adopting the latest technology; (3) Novelty of the technology used; (4) Rate of changes in technology. This study used a 5-point Likert-type scale to measure process innovation, ranging from 1 (very bad) to 5 (very good). The alpha reliability for this variable was 0.8840.

Product innovation

Product innovation is connected with generating ideas or creating something new, reflected in the changes of product or service provided by the organization. Product innovation included three items such as: (1) Use of latest technology; (2) Speed of product development; (3) Number of new products. Responses were asked to score on a 5-point Likert-type scale that range from 1 (very bad) to 5 (very good). The alpha coefficient of this variable was 0.8362 with sufficient reliability.

Analytical strategy

This study used structural equation modeling (SEM) to explore the relationships among the variables. SEM enables researchers to definitely test research hypotheses concerning the relationships among research constructs. This study used LISREL 8.51 to assess the fit of the measurement and structural models and calculated the values of incremental fit index (IFI) (Bollen, 1989), comparative fit index (CFI) (Bentler, 1990), normed fit index (NFI) (Bentler and Bonett, 1980) and root mean square error of approximation (RMSEA) (Steiger, 1990). If the values of IFI, CFI and NFI exceed the cut -off value of 0.9 and the value of RMSEA is below the cut-off values 0.08, then the model is said to be acceptable (Hu and Bentler, 1999). In addition to the fit indices, this study uses the parameter estimates in the structural model to test the hypotheses.

RESULTS

Before testing the hypotheses, this study first conducted confirmatory factor analysis to ensure that respondents can explicitly distinguish the variables in this study. By assessing the model fit of a six-factor measurement model (structural a, IT, strategic alignment, adaptability culture, process innovation and product innovation), we found that the measurement model provides a reasonable fit (chi-square value = 326.24, d.f. = 137 ($p < 0.01$), RMSEA = 0.072, CFI = 0.93, IFI = 0.93 and NFI = 0.92), suggesting that the fit indexes of this study were within the acceptable range. Then this study performed the Harman's one-factor test by pooling all six variables to one single factor, indicating a poor model fit (chi-square value = 746.38, d.f. = 152 ($p < 0.01$), RMSEA = 0.17, CFI = 0.82, IFI = 0.82, NFI = 0.80). These results indicated that the variables of the study were proven to be distinct with sufficient discriminate validity. Moreover, this study examined convergent validity by considering the significance of the factor loading and t-values. Table 1 displays the parameter estimates of the constructs and their T- values. As observed, all constructs have T - values greater than 2, revealing good convergent validity.

Table 2 lists the means, standard deviations and correlations among variables. All constructs included in this study exhibited significant correlations. As observed, structural alignment has the higher mean value than IT and strategic alignment. The mean value of adaptability culture was quite high, and the mean value of process innovation was slightly higher than that of product innovation. As suggested, three variables organizational process alignment were positively related to adaptability culture (ranging from r = 0.42 to 0.64), and adaptability culture had a positive correlation with process innovation (r = 0.68) and product innovation (r = 0.42). The correlation between process and product innovation were also high (r = 0.64). Correlations can only represent the degree of relationship between constructs and initially provide support for our hypotheses. Direct and mediating effects among the constructs were tested using the SEM technique, which is discussed below.

Since the study performed an acceptable confirmatory factor analysis, it then tests the hypotheses by estimating the full model. SEM results for testing the model depicted in Figure 2 revealed only a marginal fit between our conceptual model and the data (chi-square value = 276.32, d.f. = 144 ($p < 0.001$), RMSEA = 0.082, CFI = 0.92, IFI = 0.92 and NFI = 0.90). Since RMSEA exceeds the acceptable level of 0.08, the modification index of SEM^2 suggested adding a path from process innovation to product innovation to enhance the overall model fit. By doing so, it was found that the fit statistics of modified model were within the recommended range (chi- square value = 262.32, d.f. = 143 ($p < 0.001$), RMSEA = 0.074; CFI = 0.96; IFI = 0.96; NFI = 0.94), thereby, suggesting that the modified model fits the data better than the original model. Owing to the better modified model than the original one, this study tested the hypotheses according to its parameter estimates.

Hypothesis 1 depicted that organizational process alignment is positively related to adaptability culture. As observed in Figure 3, the coefficient for structural alignment (= 0.48, $p < 0.001$) and strategic alignment (= 0.52, $p < 0.001$) were significant as expected. However, contrary to the prediction, the coefficient for IT alignment was not significant (= 0.32, n.s.), indicating that hypothesis 1 was partially supported. These findings suggested that not all of the three variables of organizational process alignment have the same impact

Table 1. Convergent validity.

Variables	Items	Factor loading	t-value
Structural alignment	3	0.37 – 0.52	6.18 – 8.64
IT alignment	3	0.45 – 0.58	7.70 – 9.23
Strategic alignment	3	0.49 – 0.62	6.87 – 8.72
Adaptability culture	3	0.52 – 0.74	6.94 – 9.16
Process innovation	4	0.46 – 0.64	7.83 – 9.65
Product innovation	3	0.42 – 0.66	6.24 – 9.31

Table 2. Means, standard deviations and correlations among constructs.

Construct	Mean	Standard deviation	1	2	3	4	5
Structural alignment	4.34	0.72					
IT alignment	4.14	0.58	0.52				
Strategic alignment	4.28	0.64	0.58	0.57			
Adaptability culture	4.22	0.79	0.46	0.42	0.64		
Process innovation	3.72	0.68	0.46	0.52	0.48	0.68	
Product innovation	3.56	0.76	0.43	0.44	0.37	0.42	0.64

All correlations are significant at 0.01 level.

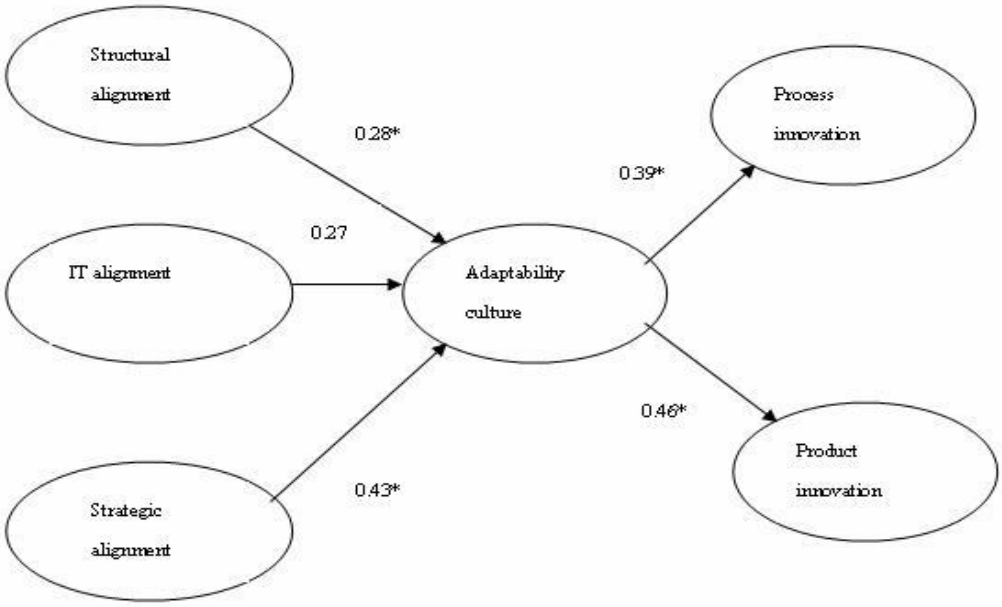

Figure 2. Original conceptual model. Standardized path coefficients are reported; * p < 0.001.

on adaptability culture. Concerning H_2, the study results indicated that structural and strategic alignment has a stronger relationship with adaptability culture than IT alignment, suggesting that hypothesis 2 was supported.

In terms of hypothesis 3, analytical results demonstrate that adaptability culture had a positive effect on process innovation (= 0.57, p < 0.001). However, its effect on product innovation seems to be an indirect effect. As observed in Figure 2, the coefficient of adaptability culture on product innovation was significant (= 0.46, p < 0.001). Nevertheless, when this study added a path from process innovation to product innovation, the original coefficient turned to be insignificant (= 0.06, n.s.). The result proves an indirect effect from adaptability culture on product innovation through process innovation. In Figure 3, it is also interesting to find that process

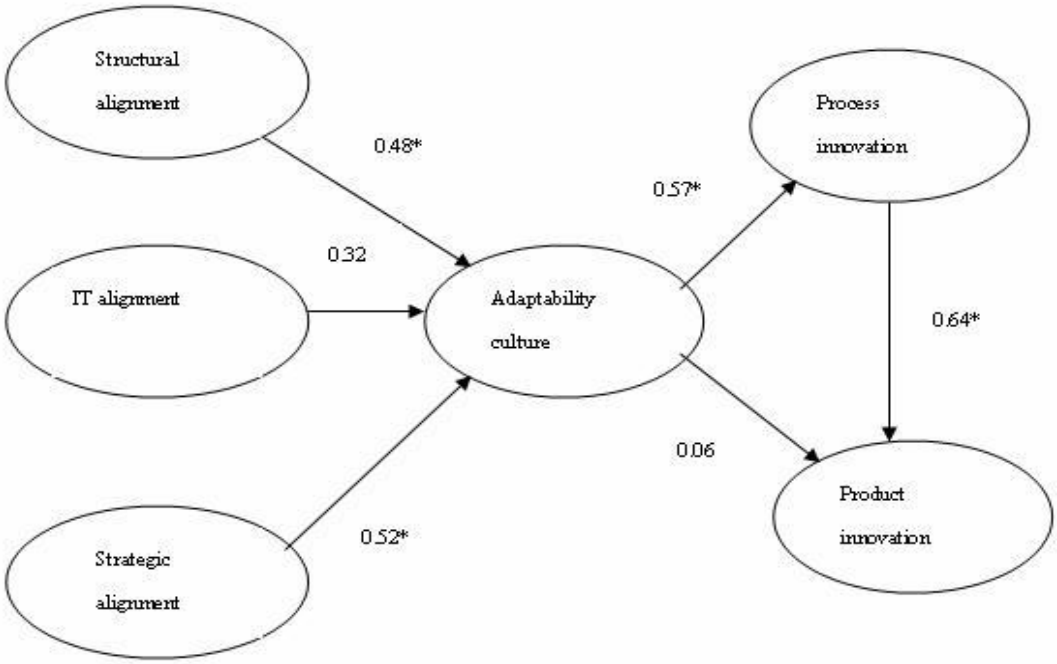

Figure 3. Modified model: Standardized path coefficients are reported; * $p < 0.001$.

innovation had a strong positive effect on product innovation (= 0.64, $p < 0.001$). These results suggested that process innovation mediates the relationship between adaptability culture and product innovation. The above findings demonstrated that hypothesis 3 was supported.

DISCUSSION AND CONCLUSION

The objective of this study was to examine the relationship among organizational process alignment, organizational culture and organizational innovation using data collected from high-tech companies in Taiwan. This study hypothesized that organizational process alignment would be positively associated with adaptability culture that emphasizes responsiveness and flexibility. Moreover, adaptability culture would facilitate organizational innovation. This study has tested a mediating effect of organizational culture between organizational process alignment and organizational innovation. On the whole, the findings largely supported the hypotheses. This study observed that structural and strategic alignment, but not IT alignment, affected adaptability culture positively. Organizational culture appears to be more associated with structural and strategic alignment than IT alignment. Contrary to our hypothesis, this study did not observe that IT alignment had a significant impact on adaptability culture. It is possible that IT alignment does not have direct effect on adaptability culture, but has direct effect on organizational innovation and not through adaptability culture.

Furthermore, this study demonstrated that adaptability culture exerts a complete mediating effect between organizational process alignment and organizational innovation. Hence, when firms aim to promote organizational innovation, they should consider the mediator variable of organizational culture. This study also found that adaptability culture had a direct impact on process innovation and an indirect impact on product innovation through process innovation. The finding reported the mediating effect of process innovation on the relationship between adaptability culture and product innovation. Adaptability culture works its beneficial effects on product innovation through process innovation, highlighting the critical roles of adaptability culture and process innovation in the process of product innovation.

Theoretical and practical implications

Numerous studies have proved that organizational process alignment has positive impact on performance (Gresov, 1989; Roth et al., 1991), this study further extended the relationship of organizational process alignment with organizational innovation. This study contributes to the theoretical development of the relationships among organizational process alignment, organizational culture and organizational innovation. Owing to the importance of innovation, this study establishes the conceptual model and hypotheses to

demonstrate the vital role of adaptability culture in mediating the relationship between organizational process alignment and organizational innovation.

The findings also provide guideline for managers on how to facilitate organizational innovation. To enhance organizational innovation, firms have to foster an organizational culture that stresses flexibility and adaptability. Particularly, as indicated in this study, firms should conduct structural and strategy alignment to facilitate the development of adaptability culture. Managers have to be devoted to the congruence of organizational process alignment and organizational culture that can have a positive joint effect on organizational innovation.

LIMITATIONS AND FUTURE RESEARCH

While this study explored the relationship among organizational process alignment, organizational culture and organizational innovation of high- tech companies in Taiwan, it has some limitations. Since the samples were drawn solely from Taiwanese firms, this may result in potential cultural limitation and future research can avoid this by exploring different cultural contexts. Another limitation is that the use of a cross-sectional research design may make causality difficult to determine. This study has the methodological limitation that causal relationships among variables cannot be concluded. Longitudinal designs are required to examine the causality of the variables. Although, this study proposed that organizational process alignment fosters adaptability culture, it is possible that adaptability culture may influence organizational process alignment of firms. The final limitation is the low return rate of the survey.

In addition to some limitations, this study furnishes some directions for future research. Firstly, it is interesting to duplicate the study in different settings (for example, industries and countries) to test the generalization of the findings. Secondly, this study views adaptability culture as a mediating variable between organizational process alignment and organizational innovation. Maybe other factors can function as mediators or moderators in the relationship. Future research can work on these factors, explore the relationships and identify their effects.

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