THE IMPACT OF IT MANAGEMENT SOPHISTICATION ON PERCEIVED IT IMPORTANCE IN STRATEGIC ALIGNMENT

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ABSTRACT

Yet with a recent rise in environmental uncertainty, firms are asking how their IT management can be more sophisticated in identifying and responding to changing and dynamic business threats and opportunities. Whether how firms perceive IT importance to the organization helps IT management sophistication and therefore strategic alignment is still not clear. This research investigates how business executive perceives IT importance for strategic alignment may be contingent upon IT management sophistication. IT management sophistication represents the extent to which IT management practices have evolved and formalized in planning, control, organization, and integration of IT activities. We use contingency theory to construct a research model to test causal relationships. Using data from a matched survey of IT and business executives in 109 firms, we show that perceived IT importance predicts IT management sophistication, particularly the control aspect, which is the most important aspect for strategic alignment; we also show that planning aspect can be too formal and thereby offset strategic alignment. We further show that IT management sophistication mediates effective IT/ business relationships; in which it can incentivise the building of a more comprehensive, agile and strategy-oriented system for collecting and analyzing market information. Implications of the findings are discussed.

Keywords: Contingency Theory, Perceived IT Importance, IT Management Sophistication, Strategic Alignment

INTRODUCTION

An extensive literature has examined many information technology (IT) management issues. These issues include the business roles of IT managers [41], the cost-efficient use of IT [37], the business value of IT [11], the agility of systems and IT personnel [40], IT use and organisational agility [109], communication between IT and business counterparts [55], and so forth. They all relate to traditional works that determine whether the outcomes of strategic alignment are satisfied [60, 101]. Strategic alignment is a social and intellectual phenomenon involving the shared commitment between business and IT executives to the congruence of IT and the business mission, goals and plans [100]. Achieving and sustaining it can be difficult, evolutionary and dynamic because the environment is changing rather than static condition [4, 34, 47, 89, 103].

To continually monitor and renew IT strategies and functions to respond to rapidly changing environment, understanding how importantly firms perceive IT resources is more critical and fundamental to effective strategic alignment in today's hyper competitive business world [90]. Unfortunately, although most business executives acknowledge the importance of IT, fewer work to align IT with the overall business strategy [72, 74, 75, 78, 86]. An issue that perceived IT importance might not guarantee strategic alignment is addressed. Influential factors that help or hurt this relationship may exist [21, 23, 110].

Moreover, although researchers have already investigated this perceived importance of IT as a fundamental driver of business activity where strategic alignment is a concern, they did not richly explain the process by which strategic alignment can be successful [90, 109]. This process mainly reflects a firm's formal IT management practices that indicate the role of IT as it has evolved from an operational to an integrated role to support business [44]. We note this evolution of formal IT management practices as IT management sophistication, which is a suitable way to represent the level of a firm's overall IT management practices that help align IT with the rest of the business over time [44, 48, 64]. We aim to examine whether and to what extent business executives understand that their perception of IT importance to achieve strategic alignment can be determined by IT management sophistication.

Despite criticisms in tautology, contingency theory (CT) is more suitable than other theories (e.g., institutional theory, resource-based view, etc.) to examine our objective because it emphasizes firm's environmental adaptation through the use of IT, argues contingent effect of contextual factors (or situations) in a firm's adaptive process toward strategic alignment, and emphasizes fit relationship among contextual factors [62, 109]. The literature also indicates that CT has a strong theoretical and empirical foundation and encourages using contingency perspective to study strategic alignment achieved [21]. With CT, business executives must adapt to environmental dynamics with the use of IT and continually consider contextual factors that enable (or inhibit) strategic alignment, which is considered to be a possible source of profitability [48].

Our contingency model of strategic alignment considers the fit of two contextual factors: "perceived IT importance" and "IT management sophistication". The former is served as antecedent that reflects the level of top management support for IT and the latter is served as mediator that generally depends on how importantly business executives perceive IT resources and progressively formalize IT management due to environmental changes (or business needs) [44, 96, 118]. Both of these factors generate contingent (i.e., indirect and direct) effect on posterior "strategic alignment".

Our research is situated within the growing focus on strategic alignment of IT and management literature [20, 41, 93]. In contrast to traditional IT contingency research that demonstrates overall step-by-step mechanisms of strategic alignment and generally discusses what contextual factors considered in terms of the external environment and internal dynamics [116], our major contribution focuses on mediation effect of process-oriented factor "IT management sophistication" between perceived IT importance and strategic alignment. We also fulfil the extant

literature gap by specifying which area of IT management sophistication is most important for improving a firm's adaptive process toward strategic alignment.

The remainder of the paper proceeds as follows. First, research concept and hypotheses are provided. This is followed by a research methodology and a discussion of the results obtained through our study of 109 matched responses of IT managers and business executives. We provide implications for both practitioners and researchers. Lastly, conclusions and limitations are presented.

RESEARCH CONCEPT AND HYPOTHESES

CT provides internal/external contextual factors (i.e., situations as noted) for identifying alternative courses of action to obtain an optimal model of organisational effectiveness [114]. A satisfied organisational outcome depends upon a 'fit' or match between two or more contextual factors [62]. Such a fit indicates a feasible set of equally effective and internally consistent patterns of factors [33, 114]. CT emphasises the importance of such harmonious situations [114]. IT research models should adopt CT perspectives because, in practice, conclusions are often contingent upon contextual factors [48, 88].

Despite its tautology in the literature, CT contributes to the quality and productivity of IT and of the larger firm by providing feedback (i.e., business adjustments) to manage and improve IT to better meet business needs [9]. This process of seeking fit is often part of the strategic planning process that mainly reflects a firm's appropriate response to its environment through the use of IT, i.e., IT management practices as noted [44]. Several contextual factors (e.g., environmental, technical or organisational) have been included in the analysis of a fit relationship in the process [9, 36, 40, 52, 60, 62, 116]. With contextual factors, IT contingency research on fit examines the problems, benefits, methodologies, and managerial issues of the IT management practices that adapts IT to the dynamic business environment (i.e., strategic alignment) [38, 70, 96, 111, 113].

Overview of the Conceptual Model

Based on our research objective, two situations (or contextual factors) are thought to influence the alignment of IT and business: business executives' view of IT resources in the context of current environmental conditions and the evolution of corresponding IT management practices. Using CT, we were able to identify the fit between these two particular situations. We proposed that how business executives respond to the environmental dynamics gives rise to perception of the importance of IT [62]. This perception might in turn affect how well (or formally) a firm manages IT activities and resources in terms of IT management sophistication and assimilates IT to support business [48, 94].

Figure 1 indicates our contingency model conceptualising that perceived IT importance is a critical antecedent in predicting to what extent IT management sophistication can be appropriately evolved to handle a changing business environment over time. With the "fit" concept, only when both of the two factors are equally and consistently co-evolved based on environmental changes; the posterior "strategic alignment" (a kind of organizational effectiveness) can be sustained [37]. In this model, IT management sophistication plays a mediating role for the effectiveness of strategic alignment.

Strategic Alignment

Over the past decades, many empirical and conceptual works have examined IT/business alignment [20]. Some studies adopt a strategic perspective where alignment is the fit between IT and business strategies [7, 18, 48, 114], while others argue from the operational (or functional) perspective that IT/business plans and structures (e.g., firm or IT department) should be matched simultaneously [38, 39, 41] and that business needs should fit information system priorities [21].

Based on CT, managers must consider (adapt) all kinds of situations to ensure cohesive goals across administrative and technological domains [91]. In this sense, strategic alignment refers to "applying IT in harmony with business strategies, goals, and needs" [68, p.3]. Henderson and Venkatraman's [45] strategic alignment model is believed to be the most influential research that conceptualise the strategic alignment between IT and business requirements. Their model contains four contingencies of business strategy, IT strategy, organizational infrastructure and processes, and IT infrastructure and processes by showing two fundamental "fit" relationships: strategic fit and functional integration.

We focus on the strategic fit and define strategic alignment as the degree to which IT and business missions, goals and plans are internally matched and externally valid as well as the extent of shared vision and commitment between business executives and IT managers on the congruence of the mission, goals and plans [18, 46, 79, 100]. With this definition, strategic alignment can generally be viewed as the social and intellectual process of strategy formulation that seeks a fit among environmental, organisational and technical situations and depends on those situations [39, 64, 100]. This process involves continuous strategic adaptations that ensure successful alignment implementation results [10, 28, 80, 103, 108, 110]. The literature has argued that the inability to realise better organisational performance in part is due to strategic misalignment [8, 32, 39, 41, 46, 63, 96, 109].

In the alignment, communication plays significant role, shared domain knowledge between IT managers and business executives may be potential to generate successful IT implementation in the long run [100]. Other social and intellectual contingencies such as trust, vision, and culture are also important to strategic alignment as the firm grows over time [19, 64, 95, 98]. Moreover, a CEO's IT competence contributes to the effective use of IT [6]. In support of that, Broadbent and Kitzis [14] emphasizes that collaboration between the CIO with the CEO is crucial to effective strategic alignment.

So, to respond effectively to a dynamic environment, appropriately exploiting IT (based on situations) should be

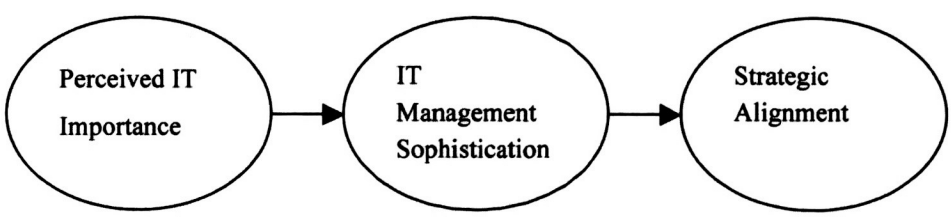

FIGURE 1: The Concept Model

viewed as an important strategic resource [25, 65, 92]. To fulfil this expanded mission, the IT strategy must be in alignment with business strategy and vice versa [65]. However, strategic perspective alignment is an ongoing issue and, in the long term, a difficult task because of the need for a high quality set of inter-related IT and business strategies [46, 77, 100].

IT Management Sophistication

The theoretical basis of IT management sophistication is two-fold. First, Nolan's [84] studies of the stage hypothesis yielded six IT growth stages: initiation, contagion, control, integration, data administration, and maturity. Second, McFarlan and McKenney's [79] technology assimilation model is an extension of the stage hypothesis model that attempts to provide a more detailed contingent view of the overall IT diffusion process and the evolution of IT management [71].

Accordingly, IT Management Sophistication is defined as the progression toward increasingly formalized IT management practices [58]. It is used to examine the extent of formalization (effectiveness) to which management practices of IT activities (e.g., IT strategy formulation, IT expenditures, IT use experience, IT functionality, etc.) can be pursued to support business goals over time [27, 44]. We treat IT management sophistication as process oriented factor, since it relates to the adaptive (alignment) process of IT management that evolve toward formalization [44].

Variations of IT management sophistication are often reflected in the evolution of the roles of IT (from traditional and strategic to integrated) [44, 54]. Based on CT, this involves the adaptation of evolutionary situations to support business goals in the context of IT planning approaches (e.g., techniques for identifying and deciding on appropriate IT investments) and implementation (e.g., measuring IT success) [59, 61, 104, 117]. The evolutionary situations are considered in terms of four dimensions: planning, control, organization, and the integration of a firm's IT-based activities [58].

A greater IT management sophistication represents a significant formalization of planning [35], control [35], organization [87], and integration [113], indicating that the IT management in a firm evolves from computer data processing into a strategic IT orientation [44], and then is more closely integrated into the firm's business strategy [71]. Kim [64] argues that such an IT management evolution process could be viewed as a kind of adaptation toward strategic alignment. So, when IT management sophistication increases, strategic alignment is likely to improve and thus maintain or improve firm performance [48].

Specifically, business executives' participation in IT planning activities is critical in securing other participants (e.g., CFO, COO, and other senior executives) [69]. These individuals will agree to participate when they are knowledgeable about the functions of IT [36]. In this regard, business executives are willing to take advantage of IT opportunities [56], believe that IT is a critical resource [12], consider IT as a strategic investment [50, 99], regularly communicate with IT managers [66, 69], and formally involve themselves in IT managerial activities that produce the IT strategy for business goals and vice versa [48, 51, 73]. Therefore, the hypothesis is formulated as:

Hypothesis 1a (H1a): When IT management in planning activities become more formal and sophisticated, the extent of strategic alignment will increase.

When these IT planning activities become more formal and sophisticated, control methods for IT are also more likely to be sophisticated and used based on both formal quantitative (tangible) and qualitative (intangible) criteria that best fit into overall business goals and technical standards, balancing existing and future implications of IT applications [31, 44, 57]. Wang and Tai [117] also evidence that formalization in IT control (e.g., centralization) enables organizational co-alignment. Therefore, the hypothesis is formulated as:

Hypothesis 1b (H1b): When IT management in control activities become more formal and sophisticated, *the extent of strategic alignment will increase.*

Moreover, the proper fit between organizational and IT structures (i.e., the IT department) is critical for achieving flexibility and efficiency in competitive and turbulent environments [68]. IT is not simply a tool to handle transactions and process data as a firm moves to higher levels of IT management sophistication, where IT management issues move from technical/business to competitive/organizational in nature [67]. With this organizational concern in mind, an IT strategy is more likely to be aligned with the business strategy and vice versa [44]. Therefore, the hypothesis is formulated as:

Hypothesis 1c (H1c): When IT management in organizational activities become more formal and sophisticated, *the extent of strategic alignment will increase.*

Furthermore, as a firm moves toward higher IT management sophistication, it is possible that frontline managers' IT knowledge and responsibilities will become reinforced through well-integrated top-down IT management infrastructure to increase the rate at which IT investment decision authority can be decentralised to business units or lead to a re-centralisation of decision authority [15]. With this increased systems integration, a business executive is more likely to identify and exploit IT opportunities and display a more proactive orientation toward IT for better strategic alignment [7, 82]. Therefore, the hypothesis is formulated as:

Hypothesis d (H1d): When IT management in integration activities become more formal and sophisticated, the extent of strategic alignment will increase.

Perceived IT Importance

In the face of environmental uncertainty, business executives often hesitate to endorse substantial IT investment because of their responsibility for organizational outcomes [48]. IT managers should educate and persuade business executives to improve their IT knowledge and confidence. Perceived IT importance can be the result of social impact of both IT managers and those outside of the boundaries of the firm on how important business executives perceive IT [94].

How important business executives perceive IT affects the successful linkage between IT and business goals when firms adapt to environmental conditions [91]. In support of that, Parsons [89, p.4] argues, "for IT to become a viable competitive weapon, senior management must understand how IT may impact the competitive environment and strategy of the business." Porter and Millar [92, p.159] conclude, "General managers must be involved to ensure that cross-functional linkages (made possible by IT) are exploited." Jarvenpaa and Ives [50] attribute the ability

to marshal IT resources in direct support of business goals as a factor important for success. More recently, senior management has viewed the strategic role of IT as an essential consideration for gaining a competitive advantage [13].

Moreover, this perceived importance of IT increases with shared understanding between business executives and IT managers regarding the IT strategic planning process and implementation where IT resources are treated as important strategic assets as noted [60]. This reflects business executives' commitment to support IT strategy and functionality [41]. And perceived IT importance must be considered during the strategic planning process to achieve a fit with other internal characteristics as it is a key determinant of the type of IT investment a firm makes [30] and affects the strategic deployment of IT resources within that firm [117].

This relation in turn increases business executives' support for the IT functionality and thus affects IT assimilation, resulting in the effective application of IT in supporting, shaping, and enabling business goals [1, 2, 60]. Hence, the role of IT can progressively move from a traditional supportive role to an integrated one as a firm grows over time [44, 54, 96, 118].

As a result, business executives who perceive the use of IT as a critical success factor are more likely to involve in IT activities, be more willing to communicate with IT managers, and recognize the strategic potential of IT, leading to more sophisticated (or formalized) IT management practices [27, 44, 58, 97]. To show this co-evolved fit relationship as noted, the hypothesis is formulated as:

Hypothesis 2 (H2): Higher perceived IT importance tends to create higher IT management sophistication.

The above two hypotheses (H1 and H2) generally reflect the fact that, in Taiwan, as business executives become more familiar with strategic IT planning processes and gain confidence in IT management [73], the strategic importance of IT increases and influences the level of IT management sophistication. According to the contingency of fit, this strategic alignment is contingent upon the extent to which the evolution of IT management practices supports business goals as a firm adapts to a changing environment over time [5, 17, 26, 102]. Therefore, the hypothesis is further formulated as:

Hypothesis 3 (H3): IT management sophistication significantly mediates the relationship between perceived IT importance and strategic alignment.

RESEARCH METHODOLOGY

In Table 1, three variables — perceived IT importance (PIM), IT management sophistication (IMS), and strategic alignment (STA) — were assessed to test the research hypotheses. Ten items obtained from the literature were used to measure PIM. The operationalization of IMS was based on Gupta et al.'s [44] 20-item instrument containing planning (PLN), control (CTR), organization (OGN), and integration (ITR). Two dimensions of STA were constructed: IT-business strategy alignment (ITBS) (five items) and business-IT strategy (BSIT) (five items), which were selected for their interpretability and empirical support in a previous study [48, 63]. Figure 2 shows the research model.

A stratified sample of 1,074 firms was selected based on ROCSIC (Republic of China Standard Industrial Code) codes. To avoid respondent's interpolation and ensure better discrimination of points, a match-paired survey questionnaire with seven-point Likert-type scales was used. We recognized that research findings would be strengthened by triangulation, using responses from more than one person in the same firm. However, two different respondents may generate the effect of a common source variance [43]. To decrease this effect, match-paired surveys were administered; i.e., certain data were collected to survey business executive attitudes toward IT and validate certain measures. So, IT managers were selected as the primary respondents for IMS and STA questionnaire. Business executives were selected as the secondary respondents for their attitude toward PIM and validating STA. The two respondents' questionnaires were coded with control numbers for matching the returned questionnaires in a firm. However, it should be noted that IT manager might have selected non-executive (or non-senior) level managers to complete the survey on behalf of business executive, thus, generating systematic bias.

178 IT managers returned useable questionnaires. An overall primary response rate of 16.6% (178 of 1,074 surveys) corresponded with findings (12-16%) from previous studies [105, 117]. The number of good matched-pair surveys totalled 109, a paired response rate of 10.1% (109 of 1,074 surveys), approximating the range between 10.2% and 37% from previous studies [107]. The type of secondary respondents targeted may account for this low paired response rate [55]. Previous studies using a matched-pair design that have obtained a higher paired response rate have usually included an IT manager and a user who may not have been a business executive [42]. However, this study included business executives. Jones, Taylor, and Spencer [56] caution that questionnaires targeted at business executives would yield low response rate. Because IT managers are directly

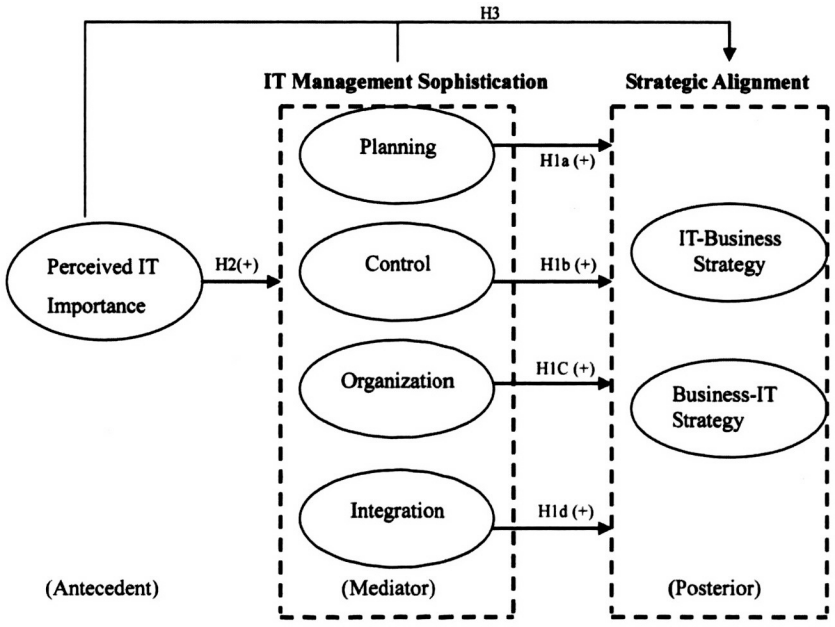

FIGURE 2: The Research Model

involved in IT-related activities, business executives may lack interest in this kind of study and might not allocate time to complete questionnaires.

Internal consistency was calculated for PIM, each of the four dimensions underlying IMS, and each of the two dimensions underlying STA. Except for PIM and ITR, these calculations generated acceptable Cronbach's alpha values of 0.839-0.922 (> 0.5) [86], with no significant difference from the comments received during the questionnaire's refinement (Table 2). The PIM and ITR constructs exhibited less than the recommended reliability (i.e., lower limits of 0.50-0.60) but were retained due to practical interests and acceptable squared multiple correlations (SMC > 0.5; [3]).

Table 3 presents the sample firms' profiles and the characteristics of individual IT manager and business executive respondents. A comparison of the responses and non-responses for each category of sales revenue did not find a statistically significant difference among the firms (Pearson $\chi 2 = 2.33$ [6 df, $p = 0.802$]). Similarly, a chi-squared analysis of the responses and non-responses according to firm size did not yield a statistically

TABLE 1: Construct Measures

Variable	Dimension (Construct)	Items on Questionnaire	Sources
Antecedent-Perceived IT Importance (PIM)		Broadened view of IT (PIM1) Believing IT critical to the company's success (PIM2) Agreement of IT applications having important intangible benefits (PIM3) Endorsement of IT investment sometimes not meet traditional criteria (PIM4) Recognition of strategic potential of IT (PIM5) Commitment to IS function (PIM6) Knowledge about IT assets (PIM7) Knowledge about IT opportunities (PIM8) View of IT spending as a strategic investment (PIM9) Progressive Use of IT (PIM10)	Jarvenpaa & Ives [50]; Nath [83]; Teo [112]; Vitale, Ives & Beath [115]
Mediator-IT Management Sophistication (IMS)	Planning (PLN)	IT project supports business goal (PLN1) Provision of innovative IT opportunities for competitive advantage (PLN2) Being adequately informed of the current use of IT by competing forces (PLN3) Being adequately informed of the potential use of IT by competing forces (PLN 4) Having adequate picture of the coverage and quality of IT applications (PLN5) Being content with how IT projects are set (PLN6)	Gupta et al [44]
	Control (CTR)	Clear responsibility and authority for IT direction and development (CTR1) Clear responsibilities and authorities for IT operations (CTR2) Confidence of IT projects appraised properly (CTR3) Constant monitoring of performance of IT functions (CTR4) Clear goals and responsibilities of IT functions (CTR5) Clear performance criteria of IT functions (CTR6)	Gupta et al [44]
	Organization (OGN)	User ideas given due attention in IT planning and implementation of applications (OGN1) IT specialists understanding business and the organization (OGN2) Structure of IT function fits the organization (OGN3) Constructive IT specialist-user relations (OGN4)	Gupta et al [44]
	Integration (ITR)	Top management's perception of future exploitation of IT as a strategic importance (ITR1) Top-down planning process for linking IT strategy to business needs (ITR2) Some IT development resource positioned within the business unit (ITR3) Introduction and experimentation with new technologies taking place at business unit level under business unit's control (ITR4)	Gupta et al [44]
Posterior-Strategic Alignment (STA)	IT-Business Strategy Alignment (ITBS)	Reflecting business plan mission (ITBS1) Reflecting business plan goals (ITBS2) Supporting business strategies (ITBS3) Recognizing external business environmental forces (ITBS4) Reflecting business resource constrains (ITBS5)	Huang [48]; Kearns & Lederer [63]
	Business-IT Strategy Alignment (BSIT)	Reflecting IS plan (BSIT1) Referring to IT applications (BSIT2) Referring to IS Plan (BSIT3) Utilizing strategic capability of IT (BSIT4) Expecting IT reasonably (BSIT5)	Huang [48]; Kearns & Lederer [63]

TABLE 2
Summary of Cronbach's Alpha for Each Construct

Construct	Number of Item	α
PIM	10	0.421
PLN	6	0.857
CTR	6	0.920
OGN	4	0.876
ITR	4	-0.313
ITBS	5	0.839
BSIT	5	0.922

significant difference at the.05 level of confidence (Pearson $\chi 2 = 5.31$ [4 df, $p = 0.143$]). In sum, the differences between the respondent and non-respondent firms were likely attributable to chance.

With respect to STA, comparing IT manager responses with business executive responses, it is possible to ascertain the reliability of primary respondent perceptions and to reduce the possibility of response bias [61]. This was evidenced by a significantly correlation between STA1 (IT manager) and STA2 (business executive) ($\gamma = 0.173$, $p < 0.05$). A one-sample t-test was further used to ensure the absence of response bias based upon the dates of returning questionnaires. Means were compared between

TABLE 3: Sample Characteristics

A. General Information							
Firm Type							
IT Services	19%	Financial/ Insurance	15%	Health Care	4%	High-Tech	9%
Hotel/Restaurant/ Entertainment	7%	Logistics	9%	Manufacturing	18%		
Real Estate/ Land Developer	4%	Media/Publishing	2%	Wholesales/ Retail	13%		
Firm Size		**Annual Sales (US$)**		**IT Dept. Size**		**IT Dept. History**	
200-800	35%	<=100 MM	53%	<=50	42%	<=10	31%
801-1000	21%	101-500 MM	23%	51-100	26%	11-30	44%
1001-2000	23%	501-1000 MM	10%	Unknown	32%	>30	18%
2001-3000	11%	1001-2000 MM	3%			Unknown	7%
Over 3000	10%	>2001 MM	11%				
B. Business Executives							
Age		**Gender**		**Education**		**Title**	
<=30		Male	76%	Bachelor	52%	CEO, GM	39%
31-40	5%	Female	7%	Master	34%	VP, EVP, SVP	31%
41-50	51%	Unknown	17%	Others	6%	AVP	26%
>50	39%			Unknown	8%	Mgr, S. Mgr	1%
Unknown	5%					Unknown	3%
Firm Experience		**Industry Experience**					
<= 5	27%	<= 10	23%				
6 -10	25%	11 -20	36%				
11- 20	28%	**21- 30**	28%				
> 20	17%	**> 30**	9%				
Unknown	3%	**Unknown**	4%				
C. IT Managers							
Age		**Gender**		**Education**		**Title**	
<=30	2%	Male	91%	Bachelor	49%	CIO	8%
31-40	29%	Female	3%	Master	41%	VP/EVP/SVP	15%
41-50	39%	Unknown	6%	Others	3%	AVP	34%
>50	20%			Unknown	7%	Mgr/S.Mgr	32%
Unknown	10%					Others	1%
						Unknown	10%
Firm Experience		**Industry Experience**		**Reporting Level to CEO**			
<=5	27%	<=10	30%	One down	83%		
6-10	33%	11-20	36%	Two down	14%		
11-20	24%	21-30	19%	Unknown	3%		
>20	12%	>30	11%				
Unknown	4%	Unknown	4%				

TABLE 4: Uni-dimensionality Confirmations

Construct	Factor Emerged	Uni dimensionality	Cumulative % Variance Explained	Correlation Between Two Items	# of Item Drop	# of Item Remain
Antecedent-Perceived IT Importance (PIM) PIM(10)	RCG (6)	Confirmed	74.509		1 (PIM9)	6
	KNW (3)	Confirmed	59.450		0	3
Mediator-IT Management Sophistication (IMS)						
PLN (6)	AWR (2)	Confirmed	74.938	0.856**	0	2
	ISP (4)	Confirmed	55.717		0	4
CTR (6)		Confirmed	79.702		0	6
OGN (4)		Confirmed	73.878		0	4
ITR (4)	TPW (2)	Confirmed	85.319	0.761**	0	2
	BTP (2)	Confirmed	76.174	0.453**	0	2
Posterior-Strategic Alignment (STA)						
ITBS (5)		Confirmed	71.964		0	5
BSIT (5)		Confirmed	52.997		0	5

Note 1: Numbers in parenthesis identify the number of questionnaire item.
Note 2: ** Correlation was significant at the 0.01 level of confidence.

each group mean (five groups by returned date) and the total mean for STA. No statistically significant difference was found. t-values ranged from -2.192 to 1.259 (4 df, p = 0.160 ~ 0.472 > 0.05), a finding that supported the likely absence of response bias.

Scale Purification

Table 4 summarises the results of scale purification. Except for PIM, PLN, and ITR, items with loadings that were greater than 0.5 on each of the other constructs loaded onto a single factor, confirming unidimensionality. Two separate factors were labelled as "strategic use of IT recognised" (RCG; items PIM1-3, PIM5, PIM6, PIM10) and "IT knowledge" (KNW; items PIM4, PIM7, PIM8) and replaced the original factor PIM in subsequent analyses (PIM9 dropped). Two additional separate factors were labelled "awareness" (AWR; items PLN3 and PLN4) and "the IS plan" (ISP; items PLN1, PLN2, PLN5-6) and replaced the original factor of PLN for subsequent analyses. Two further separate factors were labelled as "top-down" (TPW; items ITR1, ITR2) and "bottom-up" (BTP; items ITR3, ITR4) and replaced the original factor ITR for subsequent analyses.

To maximise the percentage of variance explained, the communality of each factor was computed [16]. Although the communalities of RCG and KNW were high (0.745) and captured the aspect of the perceived IT importance, only RCG was used as it explained about 75 percent of the variance. Similarly, although ITBS and BSIT loaded onto strategic alignment with a communality of 0.607, only ITBS was used because it explained about 72 percent of the variance. A better factor structure, including ISP, CTR, OGN and TPW, that loaded onto IT management sophistication (with a cumulative variance percentage explained of 69.40) was used. Table 5 shows the results of bivariate correlations between independent variables, indicating negligible multi-collinearity [53].

TABLE 5: Correlation Matrix

	RCG	KNW	ISP	CTR	OGN	TPW
RCG	1.00					
KNW	0.49	1.00				
ISP	0.16	-0.09	1.00			
CTR	0.07	-0.10	0.67	1.00		
OGN	-0.07	-0.17	0.62	0.67	1.00	
TPW	0.05	-0.04	0.54	0.61	0.44	1.00

Assessment of Goodness of Fit

An estimation of the initial measurement model (MM1) resulted in a significant chi-squared value of 1158.432 ($p < 0.001$). GFI, AGFI, NFI, and CFI were 0.664 (<0.9), 0.602(<0.8), 0.698(<0.9), and 0.806 (<0.9), respectively. Both RMSEA and RMR also exceeded 0.1, indicating an unacceptable fit. Table 6 shows the alternative models. MM4 (the 4th measurement model), the best-fitting model, contained two items per factor. Although the chi-squared for MM4 was significantly small ($p < 0.05$), the CS/DF ratio was 1.557 (< 3.0); the other fit indices exceeded 0.90, and RMR was 0.043, all indicating a close fit between MM4 and the data. To confirm further the unidimensionality of MM4, competing models (CM1 and CM2) were compared. The unidimensionality of MM4 was supported, and MM4 was confirmed as the final model (Table 7). All item reliabilities exceeded 0.50 and composite reliabilities for all of the factors exceeded 0.60 [86]. The internal consistency of the majority of items was demonstrated, and their composite reliabilities were supported. The convergent validity was further evidenced (all AVEs ≥ 0.5) (Table 8). Discriminant validity was also evidenced (all AVEs > squared correlations) (Table 9).

TABLE 6: Summarized Result of Evaluation of Measurement Model

Indices	MM1	MM2	MM3	MM4
# of Items	27	22	17	12
# of Cases	109	109	109	109
Item Removed	None	V5 (RG5) V6 (RG6) V17 (CR4) V19 (CR6) V30 (ISBUS1)	V5 (RG5) V6 (RG6) V17 (CR4) V19 (CR6) V30 (ISBUS1) V3 (RG3) V13 (IP4) V18 (CR5) V20 (ON1) V29 (ISBUS4)	V5 (RG5) V6 (RG6) V17 (CR4) V19 (CR6) V30 (ISBUS1) V3 (RG3) V13 (IP4) V18 (CR5) V20 (ON1) V29 (ISBUS4) V1 (RG1) V12 (IP3) V15 (CR2) V23 (ON4) V27 (ISBUS2)
Chi-square	659.946	390.206	174.897	68.652
df	309	194	104	45
P value	< 0.001	<0.001	<0.001	<0.05
CS/DF Ratio	2.135	2.011	1.681	1.557
GFI	0.713	0.782	0.852	0.916
AGFI	0.649	0.715	0.783	0.855
NFI	0.732	0.787	0.869	0.901
CFI	0.834	0.878	0.941	0.962
RMSEA	0.098	0.093	0.076	0.067
RMR	0.074	0.074	0.063	0.063

TABLE 7:
Summarized Result of Competing Model (CM) Analysis

Indices	MM4	CM1	CM2
Chi-square	68.652	721.037	647.360
df	45	78	77
P Value	<0.05	<.001	<.001
CS/DF Ratio	1.525	9.244	8.407
GFI	0.916	0.361	0.446
AGFI	0.855	0.361	0.439
NFI	0.901	0.043	0.063
CFI	0.962	0.000	0.088
RMSEA	0.067	0.264	0.251
RMR	0.063	0.494	0.846

TABLE 8: Results of Construct Reliability and Convergent Validity Tests for MM4

Construct/Item		Standardized Loading	Item Reliability	Composite Reliability	AVE
RCG	RCG2	0.816	0.665	0.825	0.705
	RCG4	0.821	0.674		
ISP	ISP1	0.715	0.511	0.703	0.542
	ISP2	0.704	0.495		
CTR	CTR1	0.880	0.774	0.837	0.738
	CTR3	0.895	0.801		
OGN	OGN2	0.875	0.765	0.875	0.779
	OGN3	0.797	0.635		
TPW	TPW1	0.814	0.662	0.781	0.641
	TPW2	0.886	0.761		
ITBS	ITBS3	0.873	0.762	0.839	0.669
	ITBS5	0.809	0.654		

HYPOTHESIS TESTING AND DISCUSSION

The nomological validity of the model was tested in the structural model (SM). Table 10 illustrates the results of applying the initial structural model SM1 and alternative models SM2, SM3, and SM4. For the initial structural model SM1, the indices of GFI and NFI had values of 0.896 and 0.899, respectively (<0.9), showing that the initial model was inadequate.

The results of SM4 indicated further improvement in the fit indices according to GFI, AGFI, NFI, CFI, and IFI (values of 0.922, 0.871, 0.905, 0.970, and 0.971, respectively). All of the fit indices were regarded as acceptable (> 0.8 for AGFI and > 0.9 for the others). The satisfied values of RMSEA and RMR were 0.058 and 0.071, respectively (< 0.10). The CS/DF ratio of 2.131 was also within the limit of 3.0. A comparison of the chi-squared statistic of SM4 with that of MM4, a difference of 3.152, was less than the critical values of 6.635 (1 df) at the 0.01 level of confidence and 10.828 (1 df) at the 0.001 level of confidence, indicating that the difference between the two models was not significant, indicating that SM4 was an adequate measurement. Table 11 shows the standardised path coefficients for hypothesized relationships (H1

and H2) and depicts that five of the eight standardized coefficients were statistically significant.

A significant path coefficient was found for H2 (RCG→ISP [β = 0.711, p = 0.000 < 0.001], RCG→CTR [β = 0.722, p = 0.000 < 0.001], RCG→OGN [β = 0.507, p = 0.000 < 0.001], RCG→TPW [β = 0.958, p = 0.000 < 0.001]). H2 was strongly supported, indicating that IT management sophistication was positively associated with the business executives' perceived importance of the IT role. This finding was expected and adds credence to CT's fit concept in that the strong antecedent of perceived IT importance often creates a more sophisticated context for IT management practices. Specifically, as a firm grows over time, whether the role of IT evolves from operational toward strategic or toward integrated applications depends upon how strategically important business executives perceive IT to be.

Nevertheless, no significant path coefficient was found for H1a (ISP→ITBS [β = -0.115, p = 0.609 > 0.05]), H1c (OGN→ITBS [β = -0.023, p = 0.881 > 0.05]), or H1d (TPW→ITBS [β = -0.157, p = 0.451 > 0.05]). H1a, H1c, and H1d were not supported, implying that IT management sophistication in planning, organization, and integration of IT activities may not sufficiently fit current business needs despite business executives has emphasised IT. This may be the existence of an IT expectation gap between business executives (who often have responsibility for business operations) and IT managers, which would substantially hamper the appropriate evolution of such three areas and thus strategic alignment [49].

More specifically, 'organization' (H1c: β = -0.023) and 'integration' (H1d: β = -0.157) lower the degree of strategic alignment. This was not expected. A plausible explanation for this may be that IT managers did not report this item questionnaire based on realized perspectives but rather based on intended (and optimistic) perspectives. Thus, some IT managers are likely to neglect the actual levels of 'organization' and 'integration' that are required or realized in the firm's current situation and thus to fail to report the requirement of certain levels of 'organization' and 'integration' appropriately in accordance with the expectations of business executives for the use of IT strategically (i.e., strategic alignment as noted). Another interesting phenomenon is that the sophisticated IT planning mechanism (β = -0.115) may offset strategic alignment because too much sophistication (or formality) may reduce the strategic flexibility of IT (e.g., inadequately timely informed on the potential use of IT by buyers, suppliers, and competitors).

A paramount finding was a strong positive direct relationship between control and strategic alignment (H1b: β = 0.304 [CTR→ITBS], p = 0.044 < 0.05), supporting the notion of the contextual factor of control related to IT management sophistication playing a greater role in influencing the strategic deployment of IT. A plausible explanation for this may be that clear responsibility and authority for IT operations and development are important for ensuring that IT goals address business needs and goals.

TABLE 9: Results of Average Variance Extracted Test

	RCG	ISP	CTR	OGN	TPW	ITBS
AVE	0.705	0.542	0.738	0.779	0.641	0.669
RCG	1.00					
ISP	0.057 (0.003)	1.00				
CTR	0.082 (0.006)	0.524 (0.274)	1.00			
OGN	-0.028 (0.001)	0.739 (0.546)	0.463 (0.214)	1.00		
TPW	0.060 (0.0036)	0.682 (0.465)	0.738 (0.544)	0.432 (0.186)	1.00	
ITBS	-0.181 (0.032)	0.204 (0.042)	0.201 (0.040)	0.197 (0.038)	0.095 (0.009)	1.00

NOTE: The numbers in the parentheses indicate the squared correlations.

TABLE 10: Summarized Results of Evaluation of Alternative Structural Models (SM)

	SM1	SM2	SM3	SM4
# of Indicators (Final Model)	12	12	12	12
# of Cases	109	109	109	109
Variables relaxed to covary	None	e10, e22	e10, e22 e2, e4	e10, e22 e2, e4 dISP, dOGN
Chi-square	159.795	146.965	76.787	65.500
df	50	49	48	47
P value	<.001	<.001	<.05	<.05
CS/DF Ratio	3.195	2.999	1.599	1.393
GFI	0.836	0.850	0.910	0.922
AGFI	0.744	0.762	0.853	0.871
NFI	0.769	0.787	0.889	0.905
CFI	0.824	0.843	0.954	0.970
IFI	0.829	0.847	0.955	0.971
RMSEA	0.136	0.130	0.071	0.058
RMR	0.103	0.101	0.078	0.071

TABLE 11: Summarized Results of Predictive Validity

Path	Standardized Path Coefficient	Critical Ratios	*p*-Value	Significance
RCG-->ISP (H2)	0.711	6.329	0.000	<. 001
RCG-->CTR (H2)	0.722	7.787	0.000	<. 001
RCG-->OGN (H2)	0.507	4.853	0.000	<. 001
RCG-->TPW (H2)	0.958	9.402	0.000	<. 001
ISP-->ITBS (H1a)	-0.115	0.511	0.609	Not significant
CTR-->ITBS (H1b)	0.304	1.849	0.044	<. 05
OGN-->ITBS (H1c)	-0.023	-0.150	0.881	Not significant
TPW-->ITBS (H1d)	-0.157	-0.753	0.451	Not significant

Table 12 shows the results of the competing model analysis. Both the direct effective model and the partial mediation model have acceptable chi-squared statistics and relevant fit indices. The partial mediation model explains more variance (i.e., squared multiple correlations) in strategic alignment than does the direct effects model (1.000 vs. 0.030). A significant relationship between perceived IT importance and strategic alignment (RCG→ITBS [β = 0.141, $p < 0.1$]) in the direct effects model became non-significant in the partial mediation model (β = -3.207, $p > 0.1$). A significant relationship between IT management sophistication and strategic alignment (ISP→ITBS [β = 0.511, $p < 0.1$], CTR→ITBS [β = 0.889, $p < 0.05$], OGN→ITBS [β = 0.002, $p < 0.1$], TPW→ITBS [β = 2.146, $p < 0.1$]) was also found in the mediation model. These findings were met by three mediating criteria suggested by Singh, Goolsby, and Rhoads [106]. H3 was supported. This was expected because, based on CT, perceived IT importance *per se* may not directly affect strategic alignment unless there has corresponding sophisticated IT management practices.

IMPLICATIONS

According to our findings (H2), firms that perceive IT to be important are able to predict IT management sophistication. This finding highlights the need to pay close attention to effective communication between IT and business counterparts in the context of uncertain business environments and thus the importance of acquiring top management support (or commitment) during the IT planning process. A practical implication of this finding is that IT managers should maintain an ongoing dialogue with business executives to facilitate a shared and timely IT vision and thereby enhance business executives' confidence in IT and its payoffs during the adaptations that link IT to frontline business needs [61, 93]. However, because of CT's concept that "no single solution fits all" [88], future research should consider diverse communication mechanisms that are important in specific situations (e.g., different strategic organizational contexts [21]). Consideration of this factor might lead to different perceptions of IT importance in those situations and determine the extent to which certain formal IT management practices can evolve.

As compared with planning (H1a), organization (H1c), and integration (H1d) aspects where business executives might expect their IT managers to play a more strategic role in the use of IT and to have substantial business knowledge (or business competence [48]), the findings show that the control aspect (H1b) of IT management sophistication is much more significant for predicting strategic alignment. In this sense, control aspect is seemingly more fundamental than other aspects for firms to focus on changing IT development from informal/technical to more managerial-based as a firm grows [44].

However, in Taiwan, although IT managers had reported the significance of sophisticated IT control, many firms (over 65 % of the sampled participants) actually tend to be more conservative to centralize IT control for cost efficiency (e.g., core single systems application) rather than decentralize IT control for strategic flexibility (e.g., multi-systems application), which often requires tighter and more

TABLE 12: Results of Partial Mediation Effect

	RCG→ITBS (H3) β			SMC	χ^2	*df*	*P*	χ^2 / df (<3)	GFI (>0.9)	AGFI (>0.8)	NFI (>0.9)	CFI (>0.9)	RMSEA (<0.1)	RMR (<0.1)
Direct Effects Model	0.141*			0.030	1.7	2	0.427 (ns)	0.850	0.993	0.965	0.989	0.999	0.0001	0.055
Partial Mediation Model	-3.207(ns)	RCG→ISP β	ISP→ ITBS β	1.000	64.414	46	0.038**	1.400	0.923	0.870	0.907	0.971	0.058	0.071
		0.714***	0.511*											
		RCG→CTR β	CTR→ITBS β											
		0.783***	0.889**											
		RCG→OGN β	OGN→ITBS β											
		0.515***	0.002*											
		RCG→TPW β	TPW→ITBS β											
		0.939***	2.146*											

Note 1: ***Significant at the 0.001 level of confidence; **Significant at the 0.05 level of confidence; *Significant at the 0.10 level of confidence
Note 2: ns=Non-significant, SMC=Squared Multiple Correlations

sophisticated control procedures to support dynamic business needs. Perhaps this is because business executives generally lack IT knowledge (and/or technological competence) and are not confident in endorsing such an expensive IT investment. They might become comfortable if they perceive IT as performing an operational support role and consider costs as the only primary concern for control [29].

As a result, the current sophisticated level of IT control in participating firms may not properly fit real business needs and shows room for improvement. A practical implication is that new control methods should be based on economic benefits, project priorities, technical standards, and business goals rather than just on costs to create an effective IT control environment [41]. In such an environment, firms are confident in managing IT through designing and implementing controls (systems) designed to mitigate identified business risks and to monitor them for continuous effectiveness to pursue the balance between short-term (or existing) acquisitions, configuration/maintenance, service delivery and future strategic IT investment [44]. This balance often requires new IT governance processes that establish mechanisms (e.g., reporting lines, risk management, compliance/regulation, and IT policies, such as procedures regarding responsibilities, authorization, and development direction/criteria/standards) to permit key line managers to exercise control over budgeting, priority setting, and resource planning for the IT function.

Another implication is the issue of the IT expectation gap noted. Business executives are often highly demanding in their expectations of IT, whereas IT managers are too optimistic [29]. This gap may hinder the evolution of IT management sophistication (H1c and H1d). Therefore, business executives and IT managers often perceive IT importance differently because they lack a shared understanding of strategic alignment [23, 41, 48]. To ameliorate the gap, IT managers must demonstrate a strong command of business requirements and the ability to communicate the business benefits of IT; reciprocally, business executives must be knowledgeable about information opportunities. To do so, as noted previously, an effective communication mechanism is required to increase business executives' confidence; likewise, IT managers should educate business executives to have reasonable IT expectations to increase the level of IT management sophistication and thus strategic alignment. Future research should consider how business orientation (i.e., conservative or aggressive) may affect the ways in which business executives create expectations for different outcomes from the use of IT and how to determine such a communication mechanism [22, 48].

The findings further show that perceived IT importance *per se* may not predict strategic alignment well (H3). This means that no matter how strongly firms focus on IT resources, there is no assurance of an effective IT/business relationship unless business executives actually and progressively support IT to foster appropriate IT management sophistication according to business goals. Hence, besides IT control, which is the first fundamental step toward possible strategic alignment, according to CT, organization and integration aspects need improvement; despite, they showed a nonsignificantly negative association with strategic alignment possibly due to IT expectation gap as noted.

A practical implication for enhancing the sophisticated level of IT organisation is that business people's ideas and organisational issues (e.g., business culture, product/service delivery and logic systems) must be taken into account during the development of IT applications/IT departments that might impact a firm's structure. As the firm grows over time, such applications might become increasingly interdependent, incompatible, redundant, and, in many situations, incomprehensible [44]. Integration should require a top-down planning process for linking IT strategy to business needs so that technology is transferred to a wider spectrum of IT applications by blending together organisational components, including IT components (e.g., infrastructure, processes, people [skills] and culture). However, future research should consider how a more highly integrated level of IT activities may be difficult to achieve due to the multiple uses of systems given a reliance on flexibility [48]. For example, integrating Enterprise Resource Planning Systems with other Supply Chain Management and Customer Relationship Management systems is difficult [23].

We also suggest that some offsets due to excessively formal or sophisticated IT planning processes can be accommodated to ensure strategic alignment as long as the control, organisation and integration aspects of IT management sophistication can co-evolve to respond quickly to the environment [49]. However, it should be noted that, according to CT, diverse perceived IT importance due to internal dynamics and external uncertainties adds to the difficulty of developing all four aspects of IT management sophistication at the same time. Future research should consider how such contingencies as the IT expectation gap and business orientation might play a role in affecting how firms perceive their IT functions and thus prioritise aspects of IT management sophistication in response to the environment-organisation fit relationship. Each firm might focus on different aspects of IT management sophistication due to various adaptations.

CONCLUSIONS AND LIMITATIONS

The literature has largely studied strategic alignment issues and demonstrates a step-by-step alignment mechanism [20, 76]. However, the literature also provides evidence that "this mechanism is not necessary to fit all firms or industries" [88]. Therefore, challenges for strategic alignment remain. Rather than providing a general alignment mechanism, identifying critical contextual factors for practitioners who adapt themselves to real IT-business management practices seems to be more essential.

In this sense, we have used CT to institutionalise "strategic alignment" in the context of certain situations. "How important IT is perceived to be" and "how IT management practices can evolve IT in a formal and sophisticated manner" were selected in our contingency model of strategic alignment because the former represents business executives' support or commitment to IT and the latter reflects a firm's overall IT management practices in support of its business.

The nomological validity test of the contingency model was satisfied, showing that perceived IT importance and IT management sophistication are influential contextual factors that are considered in a strategic alignment mechanism. This is similar to the findings of Palmer and Markus [88], who demonstrate a fast IT response for better performance, implying that responsive (and appropriate) IT management sophistication depends on top management's support and is required for strategic alignment. The predictive validity of the model further suggests that the control aspect of IT management sophistication is more important and fundamental than other aspects. In other words, this finding generally indicates that high strategic alignment may not necessarily require a strong emphasis on other aspects of IT management sophistication but indeed needs strong support from business executives for IT control.

However in the long run, to sustain strategic alignment, based on CT, business executives should still take other aspects of IT management sophistication into account during the strategic IT planning process. In contrast to the traditional "sequential alignment model", we have viewed the "strategic alignment" concept as an integrative, ongoing and dynamic development of strategies and implementation [21]. This view reveals that full IT management sophistication should be considered as an IT management capability in planning to generate a comprehensive view of contextual factors that may accommodate offsets resulting from excessively formal planning processes and thus substantially improve strategic alignment. As noted, simultaneously developing all of the aspects of IT management sophistication can be difficult because of the contingencies mentioned previously.

Our research also echoes with the central theme of CT that there exists no universal solution, different firms (or industries) may increase their likelihood of success by responding to their particular environments with appropriate actions through the alignment (adaptive) process to reflect (or prioritise) certain required IT management sophistication aspects that support business goals. In other words, firms' benefit by ensuring that emphasis is given to IT management practices with business executives' support. Business executives will benefit from understanding the costs and time associated with such an IT evolution process and further recognize the importance of tracking environmental changes using IT.

Accordingly, we conclude that high perceived IT importance should motivate business executives to support IT progressively and seek a higher level of IT management sophistication, striving toward strategic alignment. However, this alignment may not be guaranteed because IT management sophistication mediates the effectiveness of the IT/business relationship due to the difficulty of achieving an appropriate level. This is because perceived IT importance may differ according to firms' diverse adaptations to environmental uncertainty and is also subject to business executives' IT confidence, which traditionally tends to be limited. For example, business executives assess the characteristics and potential impact of the objective environment (e.g., real customers, suppliers, competitors), and they perceive IT systems as being required to collect information [81]. However, the objective and perceived aspects differ because perceptions are not always accurate [24]. Thus, future research should consider how to reduce the differences between actual competitive outcomes and perceived IT importance to ensure appropriate IT management sophistication.

As in most studies, this study was limited by the measurements used. Although IT management sophistication comprises four aspects related to implementation, our perceptual measurements may not fully assess every IT technical factor, such as breadth, depth, volume, and diversity that is involved in implementation. Moreover, business executives and IT managers may tend to report their intended rather than their emergent or realized IT importance and IT management sophistication. If there is no intention, they may even create one for the benefit of the researcher. This tendency is a common problem in the social sciences [85]. Finally, we did not control for the industry that we chose. The findings of this study may not apply to firms in less information-intensive industries in which IT plays a more supportive role. The statistical significance of these results, however, provides us with a reasonable level of protection against spurious and unreliable findings.

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