

The Need For IT Alignment Studies in Construction Companies in Malaysia : A Theoretical Framework

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Abstract

Researchers in the past have found that information technology has contributed to many organizations worldwide. However, organizational issues still inhibit the implementation and strategic use of information technologies in the construction industry. Construction companies are still slow in adapting to ever changing trends in IT applications. One significant problem is a lack of understanding on how to actually implement IT in construction companies so that the benefits of IT can be realized at a strategic level. The importance of implementing a formal and well documented IT Strategy has been realized in many organizations in other industries. However, the existence of an IT strategy in construction companies is still in question. A good IT strategy should be comprehensive, aligned with company business strategy, and forward looking. This paper tries to highlight the importance of IT alignment study in construction companies in Malaysia. It attempts to understand the concept of IT Strategy, Business Strategy and IT Alignment within the context of the construction industry environment focusing on construction companies. It also tries to identify the existing methods of alignment studies through various studies that can be applied to construction companies in Malaysia.

Keywords

Information Technology Strategy, Business Strategy, I.T. Alignment

1. Introduction

This aim of this paper is to understand the concept of IT strategy, business strategy and IT alignment through previous literatures. The various methods of measuring IT alignment are also highlighted.

The first part of the research paper discusses and outlines fundamental literature review on key terms relating to IT strategy, IT Implementation in organization, IT Strategy development frameworks and how these are linked with Business Strategy and Business Performance. The purpose is to provide an overview of the meaning of IT strategy terms and concept within the context of business strategy and organizational performance.

The next stage of the paper then tries to identify the available methods for IT Alignment measures from various literatures. Issues are also discussed to bring the reader into the current scenario with regards to ICT uptake among construction organizations which hinder the strategic use of IT in general.

2. IT Strategy

The application of IT is playing an increasingly important role in today's business world. The idea of achieving a competitive advantage through application of IT is now well recognized. The roles of IT whether as an efficiency enhancing tool or as a strategic decision support systems, are penetrating mainstream organizations. Therefore a carefully charted IT strategy can help open up new opportunities for firms to achieve higher productivity and improve overall business performance.

2.1 The Definition

The definition of IT Strategy can be obtained from various literatures dating back to the 1980s. The general meaning of IT strategy is as follow. IT strategy is an expression of the firm's basic belief about its use of IT. IT Strategy would be translated to IT plans and operations. IT Strategy is a collection of fundamental principles that guide future decision making. Earl (1989) described IT Strategy in connection with technology policies, addressing questions related to computers, communication, data and application architecture. IT Strategy is a managerial responsibility of aligning the relationship between the ICT infrastructure and the business domain in order to take advantage of ICT capabilities and opportunities.

2.2 Types of IS/IT Strategy in practice

In their studies Mocker & Teubner (2006) have identified five (5) types of IT strategy concepts in practiced. These are IT strategy as a binding guideline (1) IT strategy as a departmental plan, (2) IT strategy as a change agenda, (3) IT strategy as the market strategy of the IT department, (4) IT strategy as the set of overarching IT issues

**Table 1: Types of Information (IT/IS) Strategy Concepts
(Source : Mocker & Teubner 2006)**

	Information strategy concepts : information strategy is understood as a ..				
Characteristics of concepts	1:Binding guideline	2. Departmental plan	3: Change agenda	4: Market strategy of the IT department	5: Set of overarching IT issues
Purpose	Ensure that IT services can be provided in a sustainable way. Mitigating the risk of locking the company into a wrong direction. Making fundamental directional decisions regarding IT in an uncertain and complex environment.	Ensure that department contributes its part to fulfilling company's targets	Change the way of how IT is currently conducted fundamentally. Make the CIOs work interesting.	Define the IT department's fields of actions, customers, products and how to deliver products.	Coordinate and regulate decisions of single business units for the best of the whole group. Balancing standardization and differentiation.

Trigger	Business demand cannot be fulfilled anymore (either because IT is in desolate state or business situation changes).	Regular business planning.	IT outdated. Information strategy agenda gets empty.	Regular review of information strategy.	Decisions or requests by business units.
Degree of formalization	High, forms a contract and sets guiding principles.	High, proves that targets can be achieved.	Low, only certain decisions get documented, no coherent "information strategy" document.	High, is the constitution of the IT departments.	Medium to high, sets regulations for business units where needed.
Core themes on the information strategy agenda	IT platform selection due to merger situation or because current platform not sufficient any more. Governance and role of the IT department vis a vis the business units (how do we interact).	Financial plan of the IT department (budget). HR plan of the IT department.	Hiving off the IT department to serve external market. Role of IT department vis a vis the business units (how to gain power).	Mission and Vision of the IT department. Definition of customers and products. Internal organization of the IT department to best deliver services to customers.	Use of standard software vs individual software. IT standards. Corporate wide IT decision rights (governance).

Smith, McKeen, & Singh (2007) analyzed the adaptation of IT strategy in organizations in the past, present and future. Table 2 provides the summary of their findings.

**Table 2: The Adaptation of IT Strategy in the Past, Present and Future
(Source : Smith, McKeen & Singh 2007)**

Past	Present	Future
<ul style="list-style-type: none"> • The job of an IT function was to understand the business strategy and then figure out a plan to support it. • IT's strategic contribution was inhibited by IT managers' limited understanding of business strategy and by business managers' poor understanding of IT's potential. • IT plans were more focused on tactical and tangible line of business needs rather than supporting the business strategies. 	<ul style="list-style-type: none"> • IT is leading to considerable disruption as business models in many industries. • Business strategies are inconceivable without the use of IT. • IT is further influencing business strategies. 	<ul style="list-style-type: none"> • Managers will participate in an organic strategy development process that will continually evolve IT and business plans together. • IT strategy development must therefore become more dynamic. • The focus is more on developing strategic capabilities that will support a variety of changing business objectives.

3. Business Strategy

The literature on Business Strategy was developed way back in early 1980's. Among others Hussin, King & Cragg (2002) summarized several Business strategy items from various literatures. These are namely (1) Pricing Strategy, (2) Quality Product Strategy, (3) Product Differentiation Strategy, (4) Product Diversification Strategy, (5) New Product Strategy, (6) New Market Strategy, (7) Quality Service Strategy, (8) Intensive Marketing Strategy, and (9) Production efficiency Strategy.

Other organizational strategies summarized by Said, Abidin, Shafiei & Wira (2006) are (1) the ability to produce new products (Pan, 2003), (2) deployment of new technology in production (Beckmerhagen, Berg, Karapetrovic, & Willborn, 2003), (3) training programs (Quazi & Jacobs, 2004), (4) application of quality control techniques (Fuentes, Benavent, Moreno, Cruz, & del Val, 2003) and (5) enhancing the relationship with suppliers (Bond III & Fink, 2003)

However, these strategies need to be regularly reviewed and updated according to the changes of variables in the external environment. Thus, the improvement of organizational quality plays a substantial part in forming the main strategy for competition. It is clear that quality is one of the main determinants in making any organization to be more performance-driven and competitive domestically, and internationally.

In developing an IT Strategy for an organization it is very important for managers or owners to consider and try to link IT strategy with Business Strategy so that business objectives can be achieved in the long run through the utilization of strategic IT applications.

4. IT Strategy and Business Performance

Hussin et al. (2002) summarized Business Performance indicators through various literatures to be namely (1) Long Term Profitability, (2) Sales Growth, (3) Financial Resources, (4) Image and (5) Client Loyalty. While Shafei (2002) highlighted especially for construction companies indicators for performance are namely (1) Financial Standing, (2) Completion Period, (3) Quality of Experiences, and (4) Company Workload. All these indicators are very important measures for organization to indicate their growth and success for a period of time.

Various literatures in the past have found that there is a linkage between IT Strategy and Business Performance. However there is little evidence suggesting that research has been conducted on construction companies worldwide. The following research findings indicate that there is a positive relationship between IT Strategy and Business Performance.

Nichols (2001) through a study on the existence of IT Strategy in organizations and its link with business performance has found that business organizations believes that their business plan would not have succeeded without the insertion of IT strategy. Furthermore the findings indicated that Business and IT Strategy integration appear to be positively associated with better financial performance where organizations perform better and more financially successful when IT and business strategies are linked during long-range planning exercise.

Bryan (1999) highlighted two major findings from his research particularly investment in IT does improve business performance and creates a closer fit between business and IT strategies leverages derived benefits. Similarly, Holm (2002) conducted a survey among 220 companies from various industries that indicated linkages between IT Strategies and Business performance were highly significant where highest correlation was evident between Business to Business IT Strategy and Performance variables. Hussin et al., (2002) also found that IT alignment that is linkages between IT Strategy and

Business Strategy has provided a positive relationship with organizational performance. The study was conducted through a survey on 256 small UK SMEs.

5. IT Implementation Issues in Construction Companies

The construction industry is known for its slowness in adapting IT as a major enabler for business operations. Companies are still failing to recognize the importance of IT at strategic level. The extent of usage of IT within construction organizations has been carefully studied throughout the world with IT Barometer survey conducted in various countries namely Nordic Survey 1998, Swedish Survey 2000, Danish Survey 2001 and Singapore Survey 2003. These surveys clearly indicated that IT implementation barriers are still the main issue to be looked at and reviewed from time to time.

ICT implementation issues at company level in construction industry has very much influenced by failing to recognize IT strategy with business strategy or lack of IT strategy within companies itself (Love & Irani, 2004; Whyte, Bouchlaghem, & Thorpe, 2002; Stephenson & Blaza, 2001; Oyediran & Odusami, 2005; Stewart, Mohamed, & Marosszeky, 2004; Hua, n.d.; Futcher & Rowlinson, 1999; Thomas, 1999; Yeo, 1991).

Love & Irani (2004) reported that one of the major barriers to justifying IT investments in companies is due to lack of IT strategy or no strategic vision within organizations.

Whyte et al. (2002) also highlighted in their research that successful uptake of IT requires both strategic decision making by top management and decision making by technical managers.

Stephenson & Blaza (2001) supported the above findings and suggested that one of the important elements for successful IT implementation of IT is IT strategy and assessment of future direction within organizations.

Oyediran & Odusami (2005) found that one of the key findings on his research on poor IT implementation in construction industry is poor IT strategy at various levels in the industry. Futcher & Rowlinson (1999) in his study on 'IT Survey within the Construction Industry of Hong Kong' concluded that one of the major problem is lack of formulation of IT strategy within business strategy. Similar research has been carried for the Republic of Ireland construction sector has found that the majority of construction organizations do not have IT strategy and are unlikely to develop any in near future (Thomas, 1999).

Information technology (IT) is now widely used in the construction sector (Futcher & Rowlinson, 1999; Howard, Kiviniemi, & Samuelson, 1998; Rivard, 2000), however; companies are still failing to gain full advantage from implementing and using emerging IT because of organizational issues (Whyte et al., 2002).

Factors for the low uptake of IT in construction organizations have been summarized (Brewer & Gajendran (2009) through various research findings namely:-

- (1) Failure to deliver promised returns,
- (2) Backing the wrong technology,
- (3) Lack of standard protocols for inter-organizational communication and transfer of data,
- (4) Failure to integrate ICT into the core business processes of the organization,
- (5) Inability of the organization to re-engineer business process,
- (6) Inability to measure the benefits accruing from the use of ICT and
- (7) Difficulty of keeping IT investments up-to-date.

The resistance to change from individual to company level is evident (Hartmann & Fischer, 2009). Other sets of softer issues have been identified as critical success factors (CSFs) by Cooperative Research Centre for Construction Innovation (CRC-CI). These are (1) Organizational commitment, (2) Organizational attitude to communication, (3) Rights and duties of organizations, (4) Investment drive and (5) Risks related to ICT usage

Table 3: IT Implementation Issues in Construction Companies

Item	IT Implementation Issues	Source(s)
1	Lack of IT Strategies, Failing to recognize importance of IT Strategies	(Love & Irani, 2004), (Whyte et al., 2002), (Stephenson & Blaza, 2001), (Oyediran & Odusami, 2005), (Stewart et al., 2004), (Hua, 2004), (Futcher & Rowlinson, 1999), (Thomas, 1999), (Yeo, 1991), <i>IT Strategic Plan for Construction Sector</i> by (Economic Planning Unit, 2004),
2	Low uptake of IT in construction companies	(Brewer & Gajendran, 2009)
3	Resistance to change from individual and companies	(Hartmann & Fischer, 2009)
4	Slow adaptation of IT within companies	IT Barometer Surveys in various countries – Denmark, Finland and Sweden (Howard et al., 1998) The Swedish Survey (Samuelson, 2008) Singapore (Hua, 2004)

6. IT Alignment

For the past two decades IT alignment has remained a top priority in information management and IT literature. Luftman & Ben-Zvi (2010) reported that IT and Business strategy alignment is one of the top ten concerns in IT management issues and still appears to be persistent in the last decades. The definition of IT Alignment can be found in various literatures. Sauer & Yetton (1997) described that the basic principle of alignment is that IT should be managed in a way that mirrors management of the business. In another literature Reich & Benbasat (1996) define alignment as the degree to which the mission, objectives and plans contained in the business strategy are shared and supported by the IT strategy. Henderson & Venkatraman (1993) state the alignment is the degree of fit and integration among business strategy, IT strategy, business infrastructure and IT infrastructure. McKeen & H. Smith (2003) argue that strategic alignment of IT exists when an organization's goals and activities and the information systems that support them remain in harmony. Luftman & Brier (1999) state that good alignment means that the organization is applying appropriate IT in given situations in a timely way, and that these actions stay

congruent with the business strategy, goals and needs. Campbell, Kay, & Avison (2005) defines alignment as the business and IT working together to reach a common goal.

6.1 Strategic IT Alignment Model

Henderson & Venkatraman (1992) introduced Strategic Alignment Model (SAM) which was developed based on Massachusetts Institute of Technology (MIT) model which argues on the basis that change involving IT investment can bring about rewards as long as the key elements of this model which are strategy, technology, structure, management processes and individuals and roles are kept in alignment. The SAM model is based on four (4) related key domains of strategic choice, namely (1) business strategy, (2) business/organizational infrastructure and processes, (3) IT strategy and (4) IT/IS infrastructure and processes (See Figure 2).

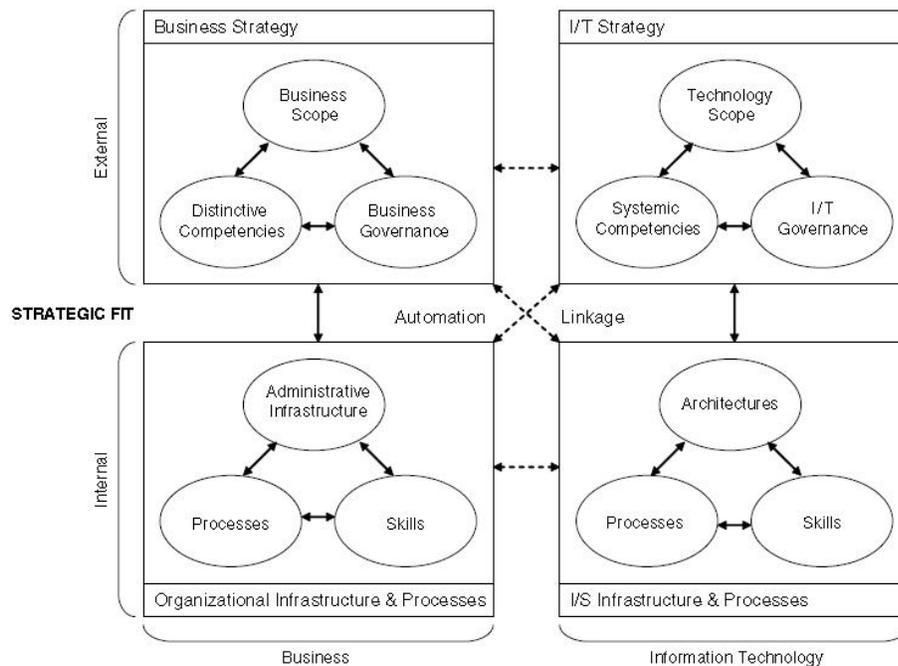


Figure 1: Strategic Alignment Model by Henderson and Venkatraman (1992)

6.2 The Baets Model

Baets (1992) developed a model of alignment which is called The Baet Model. Similar to the SAM model, it depicts the interaction of business strategy, organizational infrastructure and processes, IS infrastructure and processes, and IT strategy (see Figure 3). Baets's model also recognizes that alignment takes place in a broader context and incorporates factors such as competition, organizational change, human resource issues, the global IT platform, and IS implementation processes.

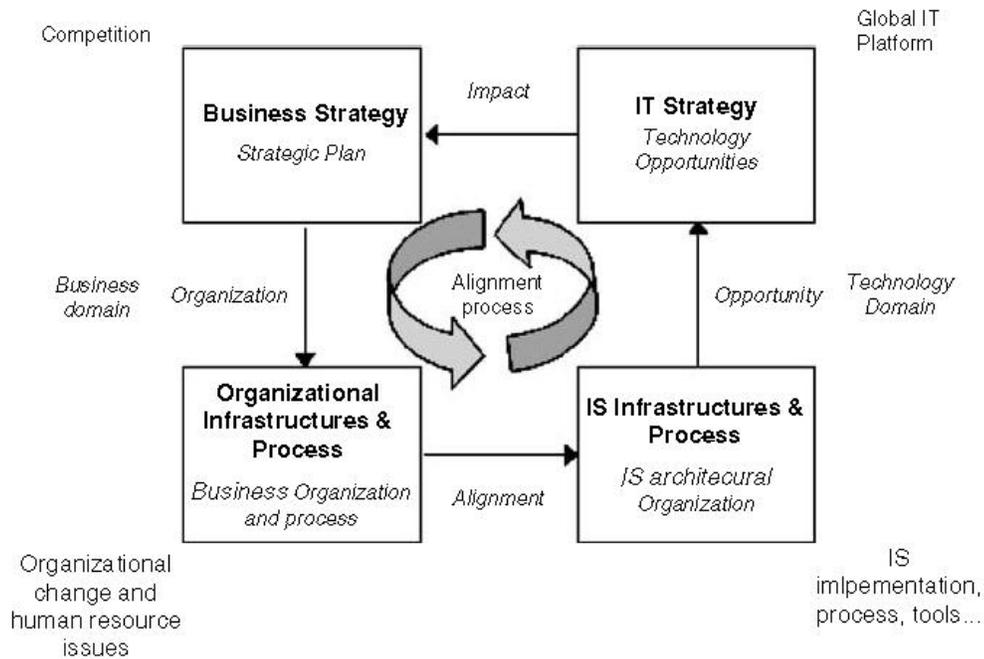


Figure 2: The Baets Model (1992) – Aligning Information Systems with Business

7. The Malaysian Construction Industry Scenario

The construction industry constitutes an important element of the Malaysian economy. It accounted for 2.5% of the gross domestic product (GDP) in 2007. The industry is critical to national wealth creation as it acts as a catalyst for and has multiplier effects on the economy and other industries (Construction Industry Development Board (CIDB), 2007)

Currently, the total number of contracting firms registered with CIDB is 64,593 firms. The registration of contractors are divided by category, starting from G1 for contractors qualified to tender for works not exceeding RM100,000 (US\$26,317) to G7 where there is no limit to the value of work that the contractors under this category are eligible to tender. For the purpose of the study, we are only focusing on the G7 contractors, with 4,533 companies. While under Contractor Service Centre (PKK) the total contracting firm registered is 41,710 firms which are divided by category, starting from Class A to Class F. The total number of Class A contractors registered to date is 2,217 firms.

Table 4: The Registration of Contractors in Malaysia under Pusat Khidmat Kontraktor
(Source : Pusat Khidmat Kontraktor, 2011)

Item	States	Class A	Class B	Class C	Class D	Class E	Class F	TOTAL
1	Johor	100	75	175	363	254	2,227	3,194
2	Kedah	109	67	112	172	82	2,229	2,771
3	Kelantan	109	85	143	251	135	2,224	2,947
4	Melaka	42	24	60	207	135	1,149	1,617
5	Negeri Sembilan	47	32	92	312	186	2,038	2,707
6	Pahang	78	56	148	351	201	2,180	3,014
7	Perak	63	62	127	339	220	2,683	3,494
8	Perlis	17	16	30	64	11	1,031	1,169
9	Pulau Pinang	111	69	81	227	103	1,310	1,901
10	Sabah	222	124	107	436	293	2,463	3,645
11	Sarawak	201	98	88	145	276	962	1,770
12	Selangor	434	251	415	927	348	4,302	6,677
13	Terengganu	129	120	270	360	144	2,327	3,350
14	W. Persekutuan	555	275	405	493	159	1,567	3,454
	TOTAL	2,217	1,354	2,253	4,647	2,547	28,692	41,710

7.1 IT in Construction Companies in Malaysia

In Malaysia the overall scenario has been indicated in the IT Strategy Plan for the Construction Sector (Economic Planning Unit, 2004) which among others reported the following (1) there is no IT Strategy Plan exists for the construction industry and companies will have no Business Plan tailored to such a Strategy Plan – the company may be making mistakes that could be averted if collaboration existed in associations and as companies, sharing under the mandate of the association and (2) there is no compelling reason to feel that companies will change as they are not encouraged to do so by an industry agency or body that could establish an IT Strategy Plan for the construction industry

Further in the report suggested that construction organizations are facing two main problems with regards to IT utilization. (1) Its slow adoption to IT implementation can reduce the potential benefit that can be gained through the fast growing evolvement of modern technology which can assist business operations and therefore enhance the productivity of the industry as a whole. (2) IT implementations are carried out with no proper IT strategy which prevent IT usage to be realized at strategic level.

Gaith & Ismail (2009) conducted a survey recently on construction companies in Malaysia on the parameters which contributed to their IT use. The response rate was 62%. The findings indicated that firm performance was related to the level of investment in information technology. The study provided

empirical evidence that information technology (IT) use has a positive impact on construction firm performance. The findings were relevant to both the construction and IT literature. It also identified and assessed the degree of IT use and investigated the factors that affected the performance of construction firms. However the study only focused on the general use of IT within the companies where no emphasis was made on the strategic issue of IT application within construction companies.

8. The Need For IT Alignment Studies

For two decades, IT alignment has consistently appeared as a top concern for IT practitioners and company executives (Luftman, 2005). For many years, researchers have drawn attention to the importance of alignment between business and IT. In early studies, this often meant linking the business plan and the IT plan. Another perspective involved ensuring the similarity between the business strategy and the IT strategy. Still another has required examining the fit between business needs and information system priorities. These conceptualizations have been enlarged over time and now research recognizes many points of alignment between business and IT. The business and IT performance implications of alignment have been demonstrated empirically and through case studies during the last decade. Simply put, the findings support the hypothesis that those organizations that successfully align their business strategy with their IT strategy will outperform those that do not. Alignment leads to more focused and strategic use of IT which, in turn, leads to increased performance (Chan et.al., 2006)

Clearly IT alignment studies have been conducted in various industries on many organizations be it in IT companies or other types of organizations which utilize IT as part of their business operation. However there is little evidence that similar studies have been made on construction companies.

8.1 Alignment Measures

Various literatures have outlined different methods of measuring alignment which can be adopted to suit the environment of the industry and the organizations. Chan & Reich (2007) summarized the various methods of measuring alignment as tabulated in the table 4 below:

Table 5
Methods of Measuring Alignment

Methods of Measuring Alignment	Source
1 Typologies and taxonomies	Chan (1992), Miles et.al (1978)
2 Fit Models	Bergeron et.al (2001) Venkatraman (1989)
3 Questionnaire	Kearns & Lederer (2003) Bergeron et.al. (2004), Burn (2001)
4 Mathematical calculations and models	Day (1996)
5 Qualitative measures	Reich & Benbasat (1996)
6 Psychological model	Tan & Gallupe (2006)

Among the critical factors to be considered are (1) readily and easily managed, (2) reliable and (3) valid. Therefore it is important that selection of method of measuring alignment must be appropriate to suit the existing condition for the construction companies in Malaysia. Table 5 shows and explains the different characteristics of each method.

Table 6
Analysis of Methods of Measuring Alignment

Item	Methods of Measuring Alignment	Nature/Characteristics	Methodology	Techniques
1	Typologies and taxonomies <i>Chan (1992), Miles & Snow (1978)</i>	Deductive, Intuitive Groupings, Classifications of phenomena	Empirical Analysis	Weighted Euclidean
2	Fit Models <i>Bergeron et.al (2001), Venkatraman (1989)</i>	Based on six (6) conceptualization Fit Strategy research Moderation Mediation Matching Gestalts Profile Deviation Covariation	Moderation / Synergistic Matching / Mirroring	STROBE (Strategic Orientation of IS)
3	Questionnaire <i>Kearns and Lederer (2003), Bergeron et.al (2004), Burn (1993, 1996)</i>	Scales Measurement (1-5), (1-6)	Quantitative/Statistical	Likert Scale
4	Mathematical Models <i>Day (1996)</i>	Alignment Measurement Alignment Index Effectiveness Acid Test	Quantitative/Statistical Quantitative/Statistical Quantitative/Statistical Using percentage %	Indices Likert Scale (1-100) Direct comparison
5	Quality Measures <i>Reich and Banbasat (1996)</i>	Quality judgment	Qualitative	Document Analysis
6	Psychological Models <i>Tan and Gallupe (2006)</i>	Shared Cognition Analysis	Qualitative/Quantitative	Cognition Maps

9. Objectives of the Paper

The aim of this paper is to propose a theoretical framework for IT Alignment Study on Construction companies in Malaysia. The objectives of this study are:-

1. To identify the concept of Business strategy/objectives adopted by construction organizations
2. To identify the concept of IT Alignment from various literatures
3. To identify various measurement methods available for IT alignment

10. Methodology

Literature review from various sources through articles and papers local and international were selected as the main methodology for the study.

11. Issues and Discussions

Within the context of measuring IT and Business strategy alignment one of the main issue to be addressed are the alignment method adopted and the critical success factors for aligning IT plans with business plans within organizations. Teo & Ang (1999) have outlined several critical success factors for aligning IT and business plans. These are namely (1) Top management commitment to the strategic use of IT, (2) Top management's confidence in the IT department, (3) Top management's knowledge on IT, (4) IT management's knowledge of business, (5) Business goals and objectives that are known to IT management, (6) The corporate business plan being available to IT management, (7) The IT department being able to identify creative ways to use IT strategically, (8) IT staff who are able to keep up with advances in IT, (9) Frequent communication between users and IT departments, (10) Business and IT management partnering to prioritize applications development, (11) The IT department's efficiency and reliability, and (12) An IT department that is responsive to user needs. Chan & Reich (2007) argued that alignment is not always desirable. IT alignment is not possible if the business strategy is unknown.

12. Conclusions

IT strategy alignment is a process, including business strategy, business organization, IT infrastructure, and IT strategy elements. Alignment is a collaborative process between all actors and divisions. Thus, it is not enough to simply understand the factors involved in alignment; one must understand the interrelationships among the factors.

IT Alignment is an ongoing process, which requires specific IT management capabilities, encompasses specific actions and reactions and has discernable patterns over time. IT alignment is also can be considered as an end state, which focuses on the antecedents, measures, and outcomes of alignment. Authors in the past have found that work that links these two perspectives is likely to be the most difficult but the most beneficial for companies.

As stated by Chan & Reich (2007) a more significant measurement change would be involved in going beyond the mathematical models (matching, synergy, and profile deviation) used most frequently in the IS literature. Bergeron et al., (2001) suggest that future research should incorporate multiple performance criteria and adopt a dynamic rather than a static perspective, with a longitudinal rather than a cross-sectional operationalization of fit.

In the context of construction organizations where little evidence of IT alignment studies been conducted, the selection of measurement instruments needs to be addressed so that an appropriate indicator can be established. However variables and items of measurement need to go through careful identification and selection process. IT strategy and business strategy elements are somewhat subjective in nature and therefore difficult to measure.

The IT Alignment concept has been discussed for so many years in IS literature. However the concept is still new in construction industry. This research gap provides an avenue for further research to be conducted in the construction industry environment so that the big question of whether company's mission, objectives and plans contained in the business strategy are shared and supported by the IT can be answered.

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