IMPACT OF ENABLING TECHNOLOGY(ET) ON BUSINESS-IT ALIGNMENT

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Abstract
The purpose of this research is to understand and quantify the impact of Enablingtechnology on Business-IT Alignment and strength of interaction among them. A theoretical framework is proposed regarding the constructs of, Enablingtechnology (ET) and Business-IT Alignment (BIA) and the construct validity was established. The sample data from 65 firms were obtained through structured questionnaires. Structural equation modeling (SEM) was used to perform confirmatory factor analysis. Regression model was used to model the relationships between the constructs. The results showed that impact of Enablingtechnology is strong on Business-IT alignment.

Key words: *Business-IT alignment, Enabling tools, Processes*

1.Introduction
Business IT alignment is defined as the *extent to which the IT strategy supports, and is supported by, the Business Strategy.* (Venkatraman, et al., 1993), stated that during the last two decades, Information Technology (IT) has become very critical in providing support, sustaining the competitive position and enabling the growth of business. However the alignment of IT with business strategy has been consistently ranked as the single most important issue facing business and IT executives, not only in North America but also in Europe.

(Kaur & Sengupta, 2011)conducted a research to understand the reasons for the failure of software. Their findings indicate that majority of the projects fail to meet their objectives due to poorly defined applications, miscommunication between business and IT, poor requirements gathering, analysis, lack of relationship between business and IT, and management costing U.S. businesses about $30 billion every year.

2.Method
The following picture describes the method followed to achieve the purpose of this research paper.
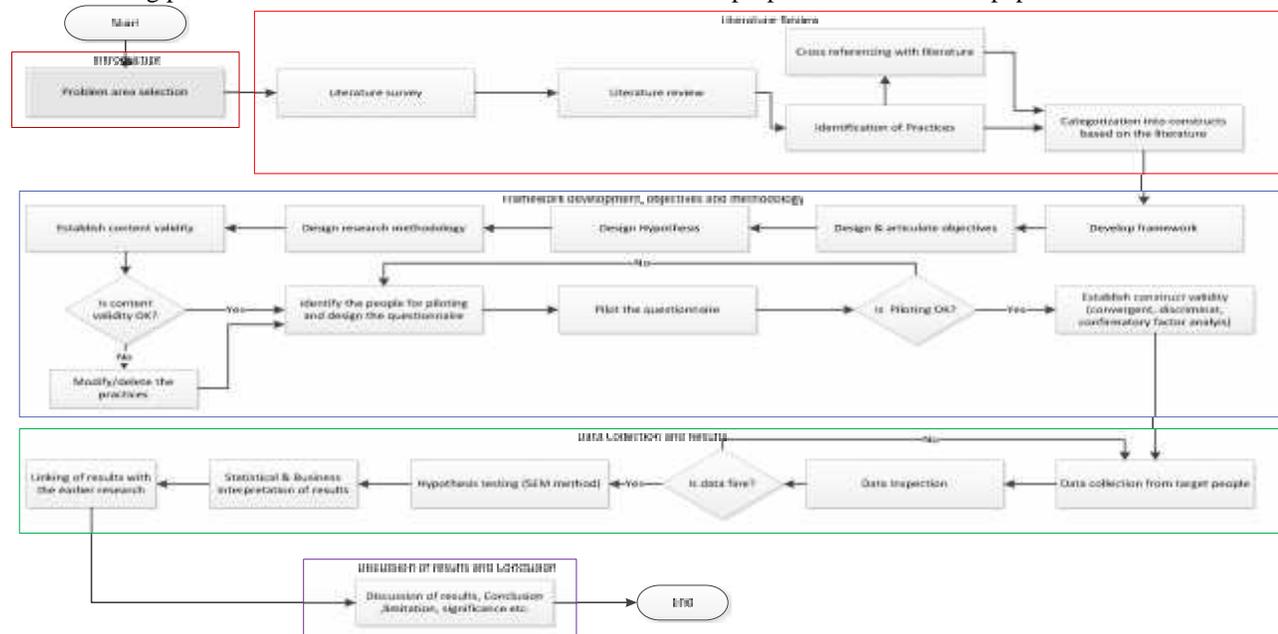
3.Literature Review
Gregor and Hart (2007) studied the relationship between social aspects and business- IT alignment in a public sector organization in Australia called AustralianBureau of Statistics (ABS). Their research shows that the organization uses several communication channels to disseminate business documents, share knowledge and understanding between business and IT

across the ABS organization to developrightenterprise architecture that conforms to *business process architecture leading* to Business- IT Alignment.

In their study of a public sector organization in Australia, Gregor and Hart (2007) observed that Enterprise Architecture leads to Business-IT Alignment due to the linkages between the business processes and corporate IS/IT components as described in the enterprise architecture.

Sharma, Merlin and Ekinci (2009) presented the results of a qualitative study of Information Technology (IT) Project Management and Governance. Interviews were carried out with10 senior managers in different organisations who had been involved in major ITprojects. It follows on from a study carried out by Stone, Ekinci and Foss concerning the customer relationship management (CRM) system implementationsuccess and failures. The results supported the idea that project governance and projectmanagement are closely related but different from each other. A company may have good projectmanagement, but may not have good project governance. Governance of IT projects is facilitated by experienced, well-trained senior project management, and by the organization that has an established methodology for managing projects. The paperidentifies that project governance in general may be weak even if the project managementis strong. It requires investment and work to ensure senior management commitment, as well as deployment of governance skills and possibly even articulation or re-articulation ofgovernance culture. Governance would also address IT strategy alignment, returnon investment and on time project completion. Thisresearch supports the notion thatfocusing on project governance would lead to increasing the chances of better project delivery. Hence thisseems to be a better strategy than depending on accidental success.

Gad (2006) identifies three major practice areas of IT governance based on his experience in CA, USA for sustaining the competitive edge namely leadership, organization &decision rights, flexible & scalable processes and enabling technology

Weill and Broadbent (1993) focused their research on alignment in the banking industry and were specifically concerned with the financial Return On Investment (ROI). The authors sought to enhance the SAM model (Henderson and Venkatraman, 1991) because of the lack of the granularity and responsiveness of the SAM model in regards to dealing with agility of the business environment in the financial industry. They were concerned with the technology infrastructure investment and the support it provides the core business strategy as the result of such investments. In this model given below see figure 2.1, the authors based their working model on four distinct areas:

     1. A firm-wide strategy formulation processes
     2. Organizational structure and accountabilities
     3. I/S responsibilities and polices

     4. Technology Strategy

The research described above indicates the impact of ET on Business-IT alignment individually. So the literature has been surveyed to get the support from the literature for ET construct and the same is provided in the form of tables below.

Mapping of Practices with Literature
Table 3-1 Mapping between ET Practices and Literature

Practice no	Enabling Technology(ET)	Cross referencing
1	The operating processes for supporting the delivery of IT initiatives are automated (e.g. planning and budgeting, portfolio investment management, project management, risk and change management, IT service management and delivery, etc.).	Farell (2003), Gad (2006),Gregor and Hart (2007) ,Sharma, Merlin and Ekinci (2009),Weill and Broadbent (1993),Luftman& Brier(1999)
2	Tools provide governance to facilitate decision support.	Gregor and Hart (2007),Weill and Broadbent (1993),Luftman& Brier(1999)
3	Tools provide communications to facilitate decision support	Gregor and Hart (2007),Weill and Broadbent (1993)
4	Tools provide info on effectiveness metrics for decision support	Gregor and Hart (2007),Weill and Broadbent (1993)

Table 3-2 Mapping between BIA Practices and Literature

Practice number	Business – IT Alignment(BIA)	Cross referencing
5	Assessment of the alignment between Business and IT	(Luftman & Brier, 1999),(Callahan & Keyes, 2003)
6	Understanding of Business case (including the value indicators) prepared for the IT Initiatives	(Buckhow & Rey, 2010)(Callahan & Keyes, 2003)
7	Building approach for computing the value indicators (the metrics that quantify the business expectations. For e.g ."billing accuracy" in case of telecom billing products)	(De Haes & Van Grembergen, 2006);(Van Der Zee & De Jong, 1999)(Farrell, 2003)(Callahan & Keyes, 2003)
8	Tracking success of the IT initiatives	(Luftman & Brier, 1999)
9	Updating business case and compares actual benefits with the planned benefits	((Chad, et al., 2005)
10	Assessment of value add to the Business from each portfolio based on the value indicators (for eg dollars saved due to "billing accuracy" incase of Telecom billing products) identified during Business value Planning state.	(Luftman & Brier, 1999)

4.Framework Development, Objectives and Methodology
4.1Rationale For Developing The Research Frame Work
The rationale for the framework is developed by identifying how ET impacts Business-IT alignment and then the framework is designed.

Table 4-1 Rationale for Research Model Design

Paths in Research Design			Evidence from Literature survey
BIA	<---	ET	Weill and Aral (2006)

4.2Research Framework
Based on the above rationale, the research framework is developed and Regression analysis is used to model this in quantitative terms.

Figure Error! No text of specified style in document.**-1 Research Model**

4.3Objective of the study
- To understand the impact of Enabling Technology on Business-IT alignment in the context of Indian IT Industry

4.4Hypothesis Design
Hypothesis (H1) :Enabling technology does not affect the Business-IT alignment.

Research Design
The basic research design selected for this initiative is cross sectional survey conducted in the IT cover IT Industry in Chennai, Hyderabad, Pune and Noida who are in System Integration, through stratified random sampling from Middle and Senior Management executives with 5 plus years of experience. The questionnaire has been derived with factors ofVision for IT and Business-IT alignment using a 5 point scale (1 – Strongly disagree, 2 – Disagree, 3 – Neutral, 4 – Agree, 5 – Strongly agree). The tools used for Construct Validity are Content Validity, Reliability, Discriminant Validity and Confirmatory Factor Analysis. Correlation and Regression have been used to acquire appropriate inferences and testing of hypothesis.

Control variable
Control variable here is "type of organization". The examples for types of organizations could be that it is a System integration business or product development business or Captive IT.In this research, the target population is only System integration business and it is constant throughout the research.

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4.5 Content Validity
A widely used method to measure content validity was developed by (Lawshe, 1975). It is a method for gauging the agreement among the experts regarding the essentiality of a particular item.

It is computed that Mean Content Validity Ratio (CVR) greater than 0.5. For each practice the Content Validity ratio has exceeded the expected target value (which is based on the 15 subject matter experts).Sincecontent validity for each of the practice have exceeded their expected target values, we can conclude that the practices are in line with the expectations of the Subject Matter Experts and having high relevance in the Indian context to assess the relationship betweenET and Business-IT alignment.

4.6Piloting & Construct Validity
4.6.1Reliability
The pilot survey was conducted with 49 respondents and checked for its reliability with Cronbach alpha test(Cronbach & Meehl, 1955) and found to be 0.81**.**Since the pilot survey has shown a significant reliability value, the survey was continued to collect the data. Cronbach reliabilities for the pilot study also had been done for both thefactors (ET and BIA) separately and the outcomesare 0.80 to 0.85.

4.6.2Convergent Validity
(Bagozzi and Phillips 1982) conducted research on convergent validity to understand "if measures of constructs that theoretically *should* be related to each other are, in fact, observed to be related to each other". Convergent validity is "the degree to which two or more attempts to measure the same concept…are in agreement".

Item convergence was assessed through the calculation of the average variance-extracted scores. Commonly, scores greater than 0.50 support a case for convergent validity (Fornell & Larcker, 1981).

According to results obtained, all of the "Average Variances Extracted" for constructs was greater than 0.50. Thus, convergent validity is evident.

According to all the average variances extracted estimates were close to or greater than 0.50 Thus, convergent validity is evident.

4.6 .3Discriminant Validity
Discriminant validity is "the degree to which measures of distinct concepts differs" (Bagozzi & Philips, 1982). Measures of different constructs should share little variance. Discriminant validity is important to the discussion of model fit because it establishes that two or more constructs are separate and distinct from one another. If constructs are separate and distinct from one another, then it can be established whether or not a predictive or causal relationship exists between them.

The results support the existence of Discriminant Validity, as the Average Variance Extracted (AVE) for each of the Constructs was greater than the shared variance between the construct and all other constructs.

4.6.4Confirmatory Factor Analysis
Upon satisfactory results, Confirmatory Factor Analysis (CFA) was performed to confirm the findings using SPSS Amos 20.0. The model values found satisfy the literature expectations.

Table Error! No text of specified style in document.**-4 Summary of SEM model Values for constructs**

Name of the construct	CMIN/DF	P	RMR	GFI	RFI	CFI	NFI	RMSEA
ET	0.68	0.41	0.005	0.98	0.99	1	0.99	0
Business-IT Alignment(BIA)	1.15	0.32	0.01	0.98	0.97	0.99	0.98	0.024

Interpretation of CFA
The structural equation modeling approach using Confirmatory Factor Analysis (CFA) compliments traditional methods of evaluating reliability (like Chronbach alpha) and validity. The measurement model examines the relationship of observed indicators to their underlying constructs (latent variables), and provides a confirmatory assessment of convergent validity by evaluating the significance of the estimated indicators coefficients. The loading obtained are strong.

The measures were validated through CFA using single factor model (Albright & Park, 2009). Here maximum likelihood method is used in AMOS 20.0 version. For all the items under each of the construct, the regression loadings are shown in the table listed above.

5.Data Collection and Results
Questionnaires and interviews are a commonly used method of gathering data for research purposes. The major inputs considered for designing the questionnaire are the research objectives, hypothesis and the research framework and target population of research. The questionnaire is divided in to 2 sections with a totalof 10 questions. 269 valid filled questionnaires have been received.

5.1Results
5.1.1Hypothesis Testing
Regression model was used to model the framework and test the hypothesis. In this case the regression coefficient and statistical significance are computed. The results are shown in the following path diagram and table.

Model diagram
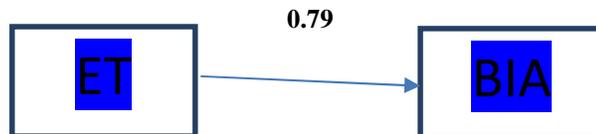
6.Discussion and Conclusion
6.1 Effect Of Enabling Technology (ET) On Business-It Alignment (BIA)
It is observed that Enabling Technology (ET) affects the Business – IT Alignment (BIA) The direct effect of ET on BIA is 0.79 and is statistically significant at 1% level. The regression coefficient 0.79 means that when ET goes up by 1 standard deviation, "BIA" goes up by 0.79 standard deviations. So the effect of ETisstrong and significant statistically. *So the null hypothesis (H1) is rejected and alternate hypothesis is accepted.* This relationship signifies that higher levels of Enabling Technologylead to higher levels of Business-IT alignment. Conclusion

The effect of Enabling TEchnology (ET) on Business-IT alignment indicates that theEnabling Technologyis critical to have effective business value planning

6.2Research Implications
6.2.1Implications for Theory base
The implications of this research towards the theory are to build a structure for the constructEnabling Technology impacting the Business-IT Alignment.The construct structures are designed using the literature survey and tested through confirmatory factor analysis - single factor model using Maximum Likely hood method (ML) through Structured Equation Modeling (SEM). The confirmatory factor analysis showed very good relationships between the constructs and the items under each of the constructs. The model fit values match or exceed the expectations from the literature. The framework developed would add value to the theory base as it describes interaction between the ETand Business-IT alignment.

6.2.2 Implications for IT organizations
The study describes a very good correlation between Enabling Technologyand Business-IT alignment. The ETimproves the business-IT alignment.

6.3Limitation
- The size of the organization could play a role and thus focusing on Small/Medium/Large organizations may result in a different model/Interrelationships.
- In the current study, the maturity of the organization is not considered in the scope and the maturity of the organization could alter the findings.

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