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A CRITICAL REVIEW OF LUFTMAN'S INSTRUMENT FOR BUSINESS-IT ALIGNMENT

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Abstract

Business and Information Technology alignment remains one of the most important issues among IT managers. To assess it, many proposals have been put forward over the years. As one of the most cited in Google Scholar, the Luftman's survey instrument emerges as a promising one to assess business-IT alignment.

This work presents a critical review of the Luftman's proposal for assessing business-IT alignment by comparing it with six other relevant proposals in the literature. Each one of the selected proposals was studied in terms of the coverage of the dimensions of the Luftman's instrument: communications, competency/value measurements, governance, partnership, technology scope and skills. Governance was the dimension better covered followed by the technology scope but the remaining dimensions were not so well covered with the skills dimension being the worst one. In fact, none of the selected proposals showed up as complete as the Luftman's proposal.

Some research has already been carried out to validate and test the Luftman's instrument as a useful tool for practitioners and managers. The result, a more parsimonious instrument than the original one, seems a promising tool calling for further attention and use in research to get to an acceptable and recognized valid instrument to assess business-IT alignment.

Keywords: business and IT alignment, alignment approaches, alignment dimensions, instrument validity.

1 INTRODUCTION

Over the past years, IT managers have been concerned with Business and IT alignment (BIA) under the expectation that achieving alignment could positively influence business performance (Bergeron, Raymond and Rivard, 2004, Chan, Huff, Barclay and Copeland, 1997, Chan, Sabherwal and Thatcher, 2006, Cragg, King and Hussin, 2002, Kearns and Lederer, 2003, Sabherwal and Chan, 2001). A regular annual survey of U.S. -based organizations has ranked BIA in the top 10 concerns for many years in a row, moving it from the third in 2010 back to the first top concern in 2011 (Luftman and Ben-Zvi, 2011).

Terms such as "strategic alignment" (Chan et al., 2006, Henderson and Venkatraman, 1993), "strategic fit" or "functional integration" (Henderson and Venkatraman, 1999) and "information systems alignment" (Benbya and McKelvey, 2006) or "IT alignment" (Chan and Reich, 2007, Henderson and Venkatraman, 1993) have been used regarding BIA. Reich and Benbasat (1996) have seen it as a measure of how much "the mission, objectives and plans of IT support and are supported by the mission, objectives and business plans". However, rather than a bivariate conceptualization of alignment between business and IT, looking into just one alignment type, the complex and interrelated nature of the relationships between constructs requires a holistic approach (Bergeron et al., 2004, Chan et al., 1997).

The Luftman's (2003) approach to measure alignment is one of the most cited (more than 400 citations at Google Scholar) taking into account diverse alignment criteria or maturity categories: Communications, Competency/Value Measurements, Governance, Partnership, Technology Scope and Skills. Using a survey instrument to determine a category score for each of the six criteria by evaluating 38 alignment practices from level 1 to 5, an overall alignment score is then determined, what can be used as a benchmarking tool.

This work intends to do a critical review of Luftman's instrument by comparing it with other relevant proposals in the literature for assessing business-IT alignment.

2 RESEARCH APPROACH

In order to identify relevant instruments for BIA in the literature, first, an initial set of keywords to search references related to the subject were identified: "business", "information", "technology" and "alignment". Second, under the rule that those keywords should be part of the reference title, a search was performed using the Google Scholar engine. Third, the results from the previous search were checked against the survey instruments already identified in two repositories, the Calgary Surveys Query System (CSQS) and the "Survey Instruments in IS" (Newsted, Munro and Schwarz, 2012). Forth, to confront with Luftman's instrument, six other instruments were selected from the most cited references in Google Scholar as presented in Table 1.

In the selected references, the most used research approach was the survey. Alignment instruments usually capture the perceptions of a single key informant in each organization. It is argued that the way managers perceive their environment is more significant than other measures, like archival data (Kearns and Lederer, 2003, Segars and Grover, 1999). Yet, sometimes, when there are specific constructs, it may be valuable to use more than one key informant at each organization (Chan et al., 1997).

The majority of alignment instruments assess the alignment at a strategic level. At the tactical level, we selected Reich and Benbasat (2000)'s instrument. For the alignment at the operational level, studies show a much lower level of citation than the selected references and were not included in this work (Cragg, Tagliavini and Mills, 2007).

Authors	Year	Nr. of Citations at Google Scholar	Research Approach	Nr of Constructs / Dimensions	Nr of Items / Indicators	Scale	Unit of Analysis		
							Strategic - Firm Level	Tactical - Business Level	Operational-IT Projects Level
Chan, Huff, Barclay & Copeland	1997	750	Survey (164 companies)	1	8	5 point scale	X		
Reich & Benbasat	2000	728	Case study (10 BU, 45 informants)	4+2		4 levels		X	
Sabherwal & Chan	2001	578	Survey (164 and 62 companies)	1		5 point scale	X		
Kearns & Lederer	2003	228	Survey (161 CIOs)	4	20	7 point scale	X		
Segars & Grover	1999	177	Survey 253 organizations	1	8	7 point scale	X		
Cragg, King & Hussin	2002	163	Survey (250 firms, 256 managing directors)	1	9	5 point scale	X		

Table 1. Selected business-IT alignment instruments.

This paper is divided into four more sections. Next session describes the alignment dimensions as well as the sub-dimensions used in the Luftman's survey instrument. The following section presents the features of the selected and studied instruments. The following section presents a short review and critique in what concerns instrument validity looking at studies that used Luftman's instrument. Finally, the paper ends with some conclusions, some implications for practice and proposals for future research.

3 DIMENSIONS OF BUSINESS-IT ALIGNMENT

Whether it is called dimension, criterion, category, domain, factor, antecedent, enabler or inhibitor, it is relatively consensual that business and IT alignment has many facets. Some authors theorized about those dimensions, underlining the importance of functional integration of business domain with the IT domain. Others call for the fit of the strategic level of business or IT with their correspondent operational levels (Henderson and Venkatraman, 1999). Several factors which can influence the alignment have been, not only argued theoretically, but also tested (Luftman, Papp and Brier, 1999, Reich and Benbasat, 1996, Reich and Benbasat, 2000). In this section, taking a wider perspective on alignment, considering that it is something complex and multifaceted, we briefly introduce the most important dimensions for BIA under Luftman's lenses.

3.1 Communications

Communication implies the transmission of information. However, in addition to the transmission of information, there still exists a need for a mutual understanding of those who communicate. According to a Luftman's multi-year study, with data obtained from business and information technology executives from over 500 firms representing 15 industries, "good IT/business communication" appears as one of the enablers of alignment and "IT does not communicate well" or "IT/non-IT lack close relationship" as one of its inhibitors (Luftman et al., 1999).

Luftman's (2003) instrument considers six criteria for communications: "understanding of business by IT", "understanding of IT by business", "organizational learning", "style and ease of access", "leveraging intellectual assets" and "IT-business liaison staff". Each criterion has five possible levels of assessment. For example, the criterion described as the "understanding of business by IT" ranges from level 1, which means "IT management lacks understanding", through level 3, which means "limited understanding by IT management", up to level 5, which means "understanding required of all IT staff" (Luftman, 2003). These six criteria deal mainly with knowledge and its management.

3.2 Competency/Value Measurements

The different languages usually used by business and IT complicate their communication and mutual understanding. For this reason, it is important for IT professionals to demonstrate the value of their work and propose projects in a way that business can understand. The agreement on service levels of the IT department to the business is a way to define and measure the desired support and service. Luftman's (2003) instrument considers seven criteria about competency and value measurements: "IT metrics", "business metrics", "link between IT and business metrics", "service level agreements", "benchmarking", "formally assess IT investments" and "continuous improvement practices".

This competency value measurements dimension may be somehow linked to the assessment of the IT plan reflection of business plan and the business plan reflection of IT plan as considered in Kearns and Lederer's (2003) instrument.

3.3 Governance

Many strategic alignment issues in the literature are about governance. Luftman's instrument considered seven criteria for governance: "formal business strategy planning", "formal IT strategy planning", "organizational structure", "reporting relationships", "how IT is budgeted", "rationale for IT spending", "senior-level IT steering committee" and "how projects are prioritized". Each criterion has also five possible levels of assessment. For example, the criterion described as the "formal business strategy planning" ranges from level 1, which means "not done, or done as needed", through level 3, which means "some IT input and cross-functional planning", up to level 5, which means "with IT and partners" (Luftman, 2003).

Other authors also underline the importance of measuring specific governance facets of alignment. For instance, the level of CIO participation in business plan or CEO participation in the IT plan, and consequently, the assessment of how the IT plan reflects the business plan and the business plan reflects the IT plan (Kearns and Lederer, 2003). Also, the profile of the business strategy and its compatibility (or not) with the IT strategy profile seems to represent another important aspect of alignment (Sabherwal and Chan, 2001).

3.4 Partnership

Luftman (2003) found that the relationship that exists between the business and IT organizations is another criterion that ranks high among the enablers and inhibitors of alignment. The opportunity to have an equal role in defining business strategies, trust developed among the participants, or the sharing of risks and rewards are considered significant. Luftman's instrument considered six criteria for partnership: "business perception of IT", "IT's role in strategic business planning", "shared risks and rewards", "managing the IT-business relationship", "relationship/trust style" and "business sponsors/champions".

3.5 Technology Scope

According to Luftman, technology scope criteria measure the degree to which IT is able to go beyond the back office and the front office, to provide a flexible and transparent infrastructure for all, to

evaluate and apply emerging technologies successfully, to enable or drive business processes and strategies and to provide solutions customizable to client needs.

Technology scope includes four criteria: "primary systems", "standards", "architectural integration" and "how IT infrastructure is perceived".

3.6 Skills

Luftman's proposal for the skills dimension of alignment includes seven criteria: "innovative, entrepreneurial environment", "key IT HR decisions", "change readiness", "career crossover opportunities", "cross-functional training and job rotation", "social interaction" and "attract and retain top talent". According to Luftman, this dimension "encompasses all IT human resource considerations, such as how to hire and fire, motivate, train and educate, and culture".

4 ASSESSMENT APPROACHES FOR BUSINESS- IT ALIGNMENT

Luftman's research on business-IT alignment is well recognized among academics and practitioners (Luftman, 2000, 2003, Luftman and Kempaiah, 2007, Luftman et al., 1999). As mentioned before, Luftman's instrument, comprised of six dimensions and 38 items, takes into account a considerable number of facets. However, it is hardly difficult, if not impossible, to capture all the facets for complex constructs. Nevertheless, Luftman's instrument seems to provide a strong coverage of important dimensions except for the technology scope. Although reasonably well covered, the technology scope dimension does not address, for example, how IT projects serve specific organizational objectives as it happens in the Sabherwal and Chan's (2001) instrument.

Table 2 summarizes the analysis of selected instruments on each dimension of Luftman's instrument.

Instrument	Year	Dimensions					
		Communications	Competency/Value Measurements	Governance	Partnership	Technology Scope	Skills
Luftman	2003	5	5	5	5	4	5
Chan, Huff, Barclay & Copeland	1997	1	1	4	1	4	1
Reich & Benbasat	2000	4	2	3	2	1	1
Sabherwal & Chan	2001	1	1	4	1	4	1
Kearns & Lederer	2003	3	1	4	3	2	1
Segars & Grover	1999	2	2	4	2	1	1
Cragg, King & Hussin	2002	1	1	4	1	4	1

Table 2. Degree of coverage of Luftman's dimensions by alignment instruments

For each instrument, the degree of coverage of the six dimensions was measured using a five point scale: 1 as "not covered"; 2 as "weakly covered"; 3 as "moderately covered"; 4 as "well covered" and 5 as "strongly covered".

4.1 Chan, Huff, Barclay and Copeland (1997)

This is one of the most cited references for BIA in the literature. This work evaluated the use of two approaches to measure alignment; a holistic, 'systems' approach and a dimension-specific, "bivariate" approach. First, four constructs were developed: realized business strategy, realized IT strategy, IS effectiveness and business performance. The first two of these four constructs were directly linked to the alignment construct. Each of the two constructs (realized business and IT strategies) had eight dimensions, evaluating parallel aspects of the strategies. For instance, for the "strategic orientation of business" construct, the dimension "company aggressiveness" addressed the "push to dominate (i.e. increase the market share)". On the other hand, for the "strategic orientation of the existing portfolio of IS applications or realized IT strategy" construct, the dimension "IT support for aggressiveness" addressed the "IS deployments used by the business unit when pursuing aggressive marketplace action" (Chan et al., 1997). The holistic, 'systems' approach assessed alignment based on specific dimensions of strategic alignment (eight strategies dimensions). The dimension-specific, bivariate approach assessed alignment based on a single (and aggregate) dimension of both strategies (business and IT). A moderation approach, understood as a weighted overall conceptualization of alignment, revealed better assessment of IT alignment and has been recommended under a systems perspective.

Chan, Huff, Barclay and Copeland's (1997) instrument covers well the criteria considered in the governance dimension of the Luftman's instrument. It provides also a good coverage of technology scope criteria. When strategic orientation of the existing portfolio of IS applications has been done, it is necessary to make particular evaluations of business unit's usage of IS developments to support a particular business strategy as it is the case of IS deployments used "to facilitate creativity and exploration". The other dimensions; communications, competency/value measurements, partnership and skills are not covered by this instrument.

4.2 Reich and Benbasat (2000)

Reich and Benbasat (1996) have used the term "linkage" before adopting the term "alignment" (Reich and Benbasat, 2000). In the early study, while looking into short-term and long-term linkage, they have identified two dimensions for the linkage, i.e., alignment between business and information technology objectives: the intellectual dimension, concerned with the internal consistency and external validity of the content of the information technology and business plans, and the social dimension, concerned with the mutual understanding of objectives and plans by business and IT executives. In the later study, although acknowledging that both dimensions are important to achieve high levels of alignment, they have focused their investigation on the factors that influence the social dimension of alignment between business and information technology objectives, something also pursued in other studies (Hartung, Reich and Benbasat, 2000).

The proposed model included four factors that could influence alignment: shared domain knowledge between business and IT executives, IT implementation success, communication between business and IT executives, and connections between business and IT planning processes. As Although considered factors that could influence alignment, they may be considered these as criteria of alignment itself (Luftman, 2003). Reich and Benbasat's (2000) proposal covers well the criteria for the communications and governance dimensions of the Luftman's instrument. A moderate coverage of competency/value and partnership criteria was provided, especially because of "connections between business and IT planning processes" but misses the criteria for technology scope and skills dimensions.

4.3 Sabherwal and Chan (2001)

Sabherwal and Chan (2001) have used an indirect computation process to assess alignment instead of measuring it through specific alignment indicators. The approach measures BIA through the proximity of the actual business or IT strategy to the expected business or IT strategy. In addition, the expected

business or IT strategy depends on the detected strategy profile, which can be defender, prospector or analyzer (Sabherwal and Chan, 2001). Under this proposal, "IS for efficiency", "IS for flexibility" and "IS covered" are IT strategies that are believed to be better aligned, respectively, with profiles of defender, prospector and analyzer of business strategies.

In terms of dimensions, Sabherwal and Chan's (2001) proposal is similar to Chan, Huff, Barclay and Copeland's (1997). Accordingly, governance and technology scope are well covered dimensions. The governance criteria link to strategy definition, either the business strategy (defensiveness, analysis, risk aversion, proactiveness, futurity, aggressiveness) or the IT strategy (operational support systems, interorganizational systems, market information systems or strategic decision support systems). Technology scope dimension is well covered in this instrument since it forces an assessment of the development consequences in each kind of systems, like the improvement of day-to-day operations efficiency or the enhancement of the ability to negotiate with customers. This instrument does not cover the other dimensions: communications, competency/value measurements, partnership and skills.

4.4 Kearns and Lederer (2003)

Kearns and Lederer's (2003) instrument to measure alignment considered four dimensions: the level of CIO participation in the business plan, the level of CEO participation in the IT plan, the assessment of the IT plan reflection of business plan and the business plan reflection of IT plan (Kearns and Lederer, 2003). Authors stated that the first two dimensions could affect the last two. Among instruments analyzed, this is the only one that models the BIA with four constructs with relations of dependency among each other.

These four constructs make a good coverage of the governance dimension since they provide an evaluation of several aspects of the strategic planning process, specially the final objective of having the IT plan reflecting the business plan and vice-versa. For the CEO participation in IT planning, an item asks for an evaluation of "the CEO regards spending on IS as strategic investments rather than expenses to be controlled". This item links with the Luftman's item of governance described as "how IT is budgeted". The constructs "level of CIO participation in business plan" and the "level of CEO participation in IT plan" provide a moderate coverage of the communication and partnership dimensions. Although these constructs relate to the communication dimension, they do not approach adequately some facets in the Luftman's instrument such as "organizational learning", "style and ease of access", "leveraging intellectual assets" or "IT-business liaison staff". Also, although items like "business perception of IT" and "IT's role in strategic business planning" are considered in this instrument, others like "shared risks and rewards" are ignored. The technology scope dimension is slightly covered, in particular when using "the business plan refers to specific IS applications".

4.5 Segars and Grover (1999)

The research of these authors wanted to detect distinctive organization profiles when planning strategic information systems. It uses particular measures of planning effectiveness, namely the "planning alignment" dimension, with eight items concerning BIA (Segars and Grover, 1999).

The factors proposed by Segars and Grover (1999) covered well the criteria considered in the governance dimension of the Luftman's instrument. The instrument has a low coverage of communications, competency/value and partnership measurements criteria. It completely lacks the criteria about technology scope and skills dimensions. Its strength lies on its simplicity. One weakness consists on its strict orientation on the governance perspective of alignment (3 items). Nevertheless, it also has some items which belong to the dimensions of communications, competency/value measurements and partnership.

4.6 Cragg, King and Hussin (2002)

This study uses an approach similar to Chan et al. (1997) to assess BIA. Alignment is seen as the fit between business strategy and IT strategy. Nine items are used to assess each one of the strategies. Alignment was modelled following two approaches: fit as 'matching' and fit as 'moderation'. Fit as matching was computed based on the difference between each of the two pairs of each of the nine strategies. Fit as moderation was modelled as the interaction between each business strategy and the related IT strategy. For each of the nine strategies, instead of the absolute difference, it was computed the product of the business strategy score and the corresponding IT strategy score (Cragg et al., 2002).

In a similar manner to the approach of Chan et al. (1997), and by the same reasons, this alignment instrument covers well the criterion considered in the governance and technology scope dimensions. The remaining dimensions, communications, competency/value measurements, partnership and skills are not covered by this instrument.

5 LUFTMAN'S INSTRUMENT VALIDATION

Management Information Systems (MIS) researchers need to validate their research instruments. In 1989, Straub was pointing out that instruments in the MIS literature were insufficiently validated. So, he put forward some of the basic principles for validating an instrument. He asserted that an instrument validation should consider some types of validity like content validity, construct validity, reliability, internal validity, statistical and conclusion validity (Straub, 1989). Although the field has progressed significantly, it seems that the majority of published studies continue not having acceptable validated instruments (Boudreau, Gefen and Straub, 2001). Therefore, a list of "mandatory", "highly recommended" and "optional, but recommended" validities have been suggested, while presenting and explaining the validity components and related techniques and heuristics (Straub, Boudreau and Gefen, 2004).

Regarding the measurement of alignment, and until recently, some authors have argued that there was no validated instrument for this measurement (Sledgianowski, Luftman and Reilly, 2006). This paper does not intend to do an exhaustive validation analysis of the Luftman's instrument. Nevertheless, it presents a short review and critique about the work that has been done.

The content validity verifies if the instrument measures cover all possible measures of the properties under investigation. It is virtually impossible to create an instrument with a complete coverage of those properties since the universe of possibilities is almost unlimited. And perhaps, its verification is even more difficult. In terms of content validity, an important research was made by Luftman which latter supported the proposal of his alignment instrument. The paper "Enablers and Inhibitors of Business-IT Alignment" provided insights into identifying areas that help or hinder business-IT alignment (Luftman et al., 1999). Business and information technology executives (1,051) from over 500 firms of the US Fortune 1,000, representing 15 industries who attended classes addressing alignment at IBM's Advanced Business Institute, were asked to describe those activities that assist in achieving alignment and those which seem to hinder it. This multi-year study, conducted from 1992 to 1997, determined the most important enablers and inhibitors to alignment, represented an excellent content validity because of not only the number of the managers asked but also the variety of its sectors provenience and its long period of time. However, it can always be said that the type of respondents were limited to large companies and so, other alignment factors could emerge if other type of managers were consulted. Also, this study was responded only by managers and it could be argued that it could include other respondents in the organization or outside the organization (e.g. academics).

Sledgianowski et al. (2006) research conducted a pilot test administered to 23 IT and business executives within one organization, revealing that, according to these authors, all items were interpreted as intended. No changes to the final questionnaire were made, which was then used to survey 153 IT and business executives from 11 business units across eight organizations.

Confirmatory factor analysis was used to evaluate the instrument. Authors proposed a second alternative SAM model, with a shorter variable set, reducing the number of items 39 to 22. The second model was a more parsimonious model of SAM. According to authors, statistical evidence provided the support of the goodness-of-fit of the SAM framework.

Although the alignment construct was measured in a different way, a recent research used the Luftman's instrument to study the relationships between the maturity constructs and the alignment itself. The study surveyed 130 business and IT executives from 22 companies in China (Chen, 2010). All variables presented adequate composite reliability showing high internal reliability for the measures. This research also evidenced that, in this particular Chinese context, it was possible a significant improvement of the instrument when reducing the number of items from 39 to 21. Except for the skills, every dimension revealed a positive influence on alignment.

The instrument was found to have acceptable goodness-of-fit in these researches. These studies seem to provide some support for the use of the Luftman's instrument to measure business-IT alignment. However, not all mandatory or recommended validities and correspondent techniques were performed (Straub et al., 2004). New studies are required for stronger validation.

6 CONCLUSIONS AND IMPLICATIONS

The Luftman's (2003) approach to measure alignment is one of the most cited instruments. Chan, Huff, Barclay & Copeland (1997), Reich & Benbasat (2000), Sabherwal & Chan (2001) seem to be the other most important alignment assessment instruments, if we take the number of citations (more than 400 at Google Scholar) as an indicator of their popularity among the academic community.

The revision made evidences that most of the studies approaches focus on the strategic level. From those, the only different approach is the Reich & Benbasat (2000) instrument with a tactical level approach. None of these instruments have an operational level approach, an IT level perspective at the project level.

Following Luftman's lenses, the analysis of the dimensions providing a degree of coverage is somehow subjective. Our classification for the communications dimension coverage of each instrument revealed that, besides a strong coverage by Luftman's instrument, it was well covered by Reich & Benbasat's (2000) instrument and moderately covered by Kearns & Lederer's (2003) instrument. Governance was the dimension better covered by all instruments. The second best covered dimension was the technology scope. Luftman's approach may improve this dimension by evaluating the direct contribution of systems to business objectives. Apart from Luftman's (2003) approach, the other analyzed instruments do not consider the skills dimension. Partnership and competency/value measurements dimensions were poorly covered in the other instruments.

The majority of published studies continue not having acceptable validated instruments (Boudreau et al., 2001) and alignment instruments are not an exception (Sledgianowski et al., 2006). Since Luftman's instrument is one of the most promising instruments and has been showing acceptable validity for some components, it deserves further attention and use in future research for the remaining mandatory validity components (Straub et al., 2004).

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