

THE BUSINESS-IT ALIGNMENT IN THE DIGITAL AGE

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Abstract

The concept of Business-IT alignment seems to reduce the attention obtained as one of the most important concerns of organizations, in terms of IT administration. This paper postulates that strategic alignment initiatives continue to have the same relevance indicated by the innumerable written documents on this topic - in particular for non-IT companies – which means that digital transformation initiatives should be considering the strategic alignment between the business and the IT function as a critical issue for their success. Hence, misalignment between the business and the IT will limit the chances of success of such initiatives. Therefore, the persistent relevance and the need to measure it with updated instruments capable of assessing the degree of maturity reached and feeding back to the organization the findings obtained in this process, remain as a key topic in IT administration. Based on an updated instrument to achieve this measurement, a study was conducted to measure the strategic alignment degree between business and IT, applied to a sample of mostly large companies in Chile. The results of this study reveal important findings after this implementation.

Keywords: business IT-alignment, maturity alignment level, updated model, DT strategy.

1 Introduction

No company, no industry, no market can avoid the impact of the pervasive force of technology, changing the business models and processes, as they have traditionally been known and applied.

The digital revolution has changed the rules of businesses. With the constant diffusion of digital technologies, each industry faces its own challenges and threats. New players enter the market, leveraged by cutting-edge technology that shakes up the solid and recognized companies. (Herbert, 2017; Pppard and Ward, 2016; Rogers, 2016; Venkatraman, 2017).

To be successful in the digital world, companies must think of technology not only as a support function, but also as a strategic and competitive weapon, so it is not just about applying technology to the business as a commodity, but rather creating new business models and operational models, leveraged by the innovative use of technology. When raising this point, it is assumed that the concept of business IT alignment is still valid for certain kinds of companies. (non-IT companies). And while, for a long time, the IT units have been treated as subordinate to the commercial strategy, in the light of the literature surveyed, we coincide with corporate executives and scholars, emphasizing the importance of the alignment between business and IT, and the value that it brings to the organizations.

1.1 Business-IT mutual understanding

The need for a strategic alignment between the business and IT is vital for the functional areas and IT departments to work together and reach mutual understanding. This synergy means that both, functional and IT units must be partners in the development and execution of the organizational business strategy, recognizing that IT and business strategy are closely related, and companies are not competitive if both strategies are not strongly linked and aligned (Aversano, Grasso and Tortorella, 2016; Avison, Jones, Powell and Wilson, 2004; Coltman, Tallon, Sharma and Queiroz, 2015; Johnson and Lederer, 2010; Fonstad and Robertson (2006); Luftman, Lyytinen and Zvi, 2015; Reich and Benbasat 2000), among others.

1.2 Research question

Granting the importance of this alignment and its implications for the success of the aforementioned organizations, now in a digital environment, the research question of this article is: What aspects need to be updated in a model whose purpose is to measure the maturity of the strategic alignment between business and the IT function in this digital scenario? In order to answer the research question, the authors analysed seminal papers and models, as well as applied research articles, identifying improvement opportunities, with the purpose of contributing to this work.

2 Literature review

2.1 The business-IT alignment concept

The alignment between business and IT has been an important topic in the IT administration literature for more than three decades (Kappelman, McLean, Johnson and Gerhant, 2014), nevertheless, studies on the subject consistently indicate that the alignment of information technology with the business is an unsolved problem. As it is commented by Luftman et al., (2015): *“While significant progress has been made to understand alignment, research on IT alignment is still plagued by several problems”*. (p.1). Despite the existing awareness about the need for alignment, and the evidence documented in academic and professional publications, companies spend most of their time aligning the IT services and operations with corporate objectives instead of figuring out innovations and improvements for the business performance. (IT Web Brainstorm CIO Survey, 2014; Peppard and Ward, 2016). The latter could indicate that the concept of strategic alignment between business and IT is still managed at the operational level. In that sense: *“The challenge is, as it has always been, to harness these technologies in support of enterprise objectives and to create new high value strategies”*. (Peppard and Ward, 2016, p.16). In other words, to harness digital technologies for achieving alignment with enterprise objectives and co-creating innovative strategies and new business capabilities.

In order to provide a context to this research and its objectives, an extensive literature review was conducted on the concept of business and IT alignment - base on Scopus database - from its origins to the present. In this regard, by tracing a timeline in the theoretical evolution of this topic, we can see how the concept of Business-IT alignment began to acquire general interest since the mid-1980s, based on the works of Benjamin, Scott-Morton and Wyman (1983), Scott-Morton and Rockart (1984), McFarlan (1984), among others, however, it was Scott-Morton who gave the initial impulse to this new field of academic interest. As described by Coltman et al., (2015), research on the strategic alignment of IT and its relationship with business strategy emerged in the 80s as part of the "MIT90s" project, led by Michael Scott-Morton at the Information Systems Research Center (CISR) at MIT.

Since the end of that decade, this topic began to be strongly promoted by new researchers who fed this new body of knowledge. (Chan, Huff, Barclay and Copeland, 1997; Henderson and Venkatraman, 1993; Luftman, Lewis and Oldach, 1993), to name just a few of the seminal works. From all of them, Henderson and Venkatraman were the ones who achieved greater notoriety in the academic community, with the proposal of the SAM framework – *Strategic Alignment Model*, which is cited in most of the research articles referring to the concept of Business-IT alignment, and for much of later publications.

At that time, academics and company managers were called to think about the conditions under which the IT strategy should support the business strategy, so that IT becomes a facilitator and co-participates in the formulation of the business strategy.

Bughin, Catlin, Hirt, and Willmott (2018), more than 30 year later - in a more technologically turbulent and dynamic environment, reinforce the need for a comprehensive vision of the organization, which translates into the need for this alignment. In this regard, they point out that when they talk to business leaders about what they understand by digitalization, some see it as the improved version of

what the IT function does, others focus on digital marketing or sales, but very few have a broad and holistic vision of what a digital proposal really means. Providing a strong support to these authors, Herbert (2017) points out: *“I speak a lot about digital transformation, from keynotes at conferences with thousands of attendees to leadership retreats with an organization’s executive suite. I’ve never once witnessed instant consensus on what digital transformation means”*. (p.2).

2.2 Fundamental pillars in a digital transformation strategy

Making a review of the most recent publications about the concept of digital transformation (DT) as well as other closely related concepts, a framework was developed by the authors, which considers three fundamental pillars for carrying out a DT strategy, that by means of it, non-IT companies can face successfully this digital environment, which are: 1) Building digital capabilities, 2) Building an innovative organizational culture, and 3) Strong leadership and a shared vision. (Herbert, 2018; Jansson and Joakim, 2019; Sacolick, 2017; Venkatraman, 2017; Westerman, Bonnet and McAfee, 2014).

These pillars contain in themselves all of the key necessary factors for driving a success digital strategy, putting the customers in the center stage, focusing in the *“pain points of consumer”* while driving any digital initiative. (Gupta, 2018). All these three pillars work in a digital ecosystem.

How these pillars, related at the same time with factors or dimensions included in the business alignment concept, and the necessity to measure their maturity level in the organization, by means of an appropriate tool, is presented in the following paragraphs.

Figure 1 show the DT strategy framework proposed for non-IT companies, in a transit to an entire digitalization of their business, which mean first, to prepare the organization structure and the appropriate leadership for strengthening their core business. Subsequently, Figure 4 will introduce - in turn - the factors (dimensions) under these three fundamental pillars commented.

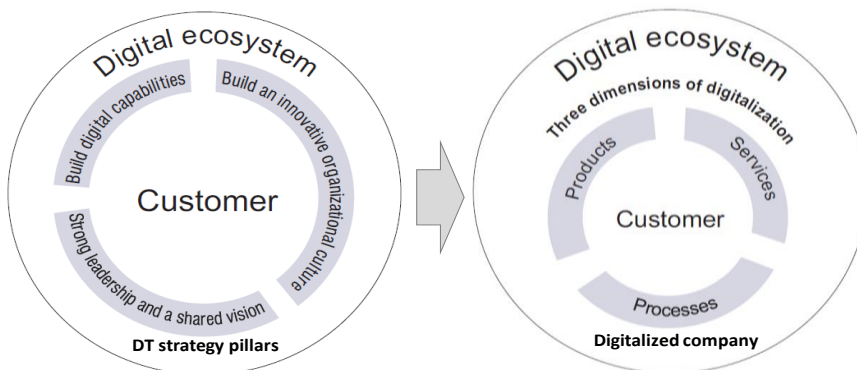


Figure 1. DT strategy framework (transit of non-IT company on the path to becoming a digital entity)

2.3 Business-IT alignment a critical factor for success in legacy companies

According to Herbert (2017), when she speaks about DT everyone has a different definition of the conditions, extent, and purpose of doing it, being this lack of clarity one of the most important reason why these programs fail. In reference to the most recent increase in DT processes, we have witnessed of recognized failures, where more than two thirds of these processes fail or do not reach the expected potential, given the investments made (Baculard, Colombani, Flam, Lancry and Spaulding, 2017; Remes, Manyika, Bughin, Woetzel, Mischke, and Krishnan, 2018; Walker, 2017). Regarding this, Davenport and Westerman (2018), indicate that such initiatives do not end well, in part because digital is not just something that can be bought and connected to the organization. This is a multidimensional process, which not only involves technology.

In our point of view, these different interpretations about what DT really means entails two considerations, which are not always explicitly commented on in the literature: 1) The lack of maturity of DT

initiatives, that allow us to better understand this phenomenon. As Venkatraman says: “*We are in the early stages of this digital transformation*” (Venkatraman, 2017, p.8), so we can argue that DT - as a new concept – is not mature enough, and 2) The need for a strategic alignment between the business and the IT function, regardless of the levels of integration that the IT function has in the organization, understanding that the speed of fusion between business and IT will depend on the type of firm, industry, and market in which it develops.

In reference to these points, it is necessary to establish a difference in two aspects: On one hand, the necessary digitalization of all key processes in an organization, together with the creation of new business models and operational models to be successful in the digital era, and on the other hand, the complete fusion between business and IT. According to this, a separation is established between companies where the entire business uses technology for the execution of its operations, and those that need to harness the technology to be more competitive, while continuing to survive in this new digital scenario.

2.4 Measuring the business-IT alignment level

The updated model has its origin in the widely recognized SAMM framework – *Strategic Alignment Maturity Model*, (Luftman, 2000), and subsequent publications. SAMM considers a total of six components or dimensions, as constructs in its structure: 1) Communications, 2) Measurement of the competence and value of IT, 3) IT Governance, 4) Partnership between the IT and business, 5) Scope and architecture of the IT infrastructure, and 6) Skills. The instrument that operationalized the model consists in a questionnaire with 39 questions, distributed in the six dimensions indicated. Each question has five possible answers, from which the interviewee choose the most representative. SAMM postulates that alignment between the business and IT is the result of these six dimensions acting together, which in turn has a positive impact on the performance of the company.

2.5 Need for an updated model

Having reviewed the fundamentals of SAMM, the constructs that compose it, and the instruments that operationalize it, the authors considered that in the scenario with large-scale digital transformations, the model needs to be improved to adequately capture such changes, and although it has been an effective instrument to measure and align IT, it needs to be updated in order to more efficiently capture the state of maturity of the strategic alignment.

Based on this model, an improved one is proposed, echoing Luftman's words, when he points out that efficient tools are required with the capacity to provide useful and updated information to the organization in those aspects that should improve. “*...A tool that can provide both a descriptive assessment and a prescriptive roadmap on how to improve*”. (Luftman and Kempaiah, 2007, p.167).

From now on, we will refer to the SAMM as such, as the reference model, or as the original model, interchangeably

2.6 Fundamentals of the updated model

When confronting the reference model with the key pillars for driving a successful digital strategy, it was found that the four aspects, considered critical for a tool whose purpose is to measure the business-IT alignment level, were absent. These aspects are: 1) Engagement of the personnel and its contribution to the organizational goals and objectives, 2) Innovation as an engine for the future of any organization, 3) A rewards systems in concordance with an innovation culture, and 4) The necessary planning of the information systems, in a collaborative work, involving the whole organization.

Once the aspects that complement SAMM, to achieve a more efficient measurement of the level of strategic maturity between the business and the IT function in a digital scenario were defined, names were selected for those aspects that were absent in the reference model, which in turn become four

new dimensions. In this way, the authors, proposed an updated model that maintains the first five dimensions of the reference model, adding four new dimension, building, in this way a stronger tool.

In the proposed model, the new dimension “people”, took the place of the dimension skills (sixth dimension in the reference model), which was eliminated. The decision of replacing the skills dimension was adopted because the reference model concentrates in this construct a wide range of categories, impeding the appropriate and independent measurement of each. Under this consideration, a new construct is introduced, in order to capture how the company involves their personnel and endows them with the appropriate tools for contributing to reach the organizational objectives and goals. (Kane, O'Palmer, Nguyen, Kiron and Buckley, 2015; Mokhber, Tan, Vakilbashi, Zamil and Basiruddin, 2016).

Regarding the other three new dimensions added, the reference model draws attention to the absence of important constructs known as innovation and rewards. And while a couple of questions for these dimensions are isolated from other dimensions of the reference model, the existence of independent dimensions that specifically measure the state of the organization in these areas is considered vital. Such dimensions, although closely related to each other, measure different aspects, so it is necessary to define a specific set of questions in each case to operationalize these constructs.

Innovation and reward systems that promote a culture of innovation can be considered as the engine of the future development of any company that aspires to remain current and competitive. (Fichman, Dos Santos and Zheng, 2014; Jehanzeb, Rasheed, Rasheed A. and Aamir; 2012, Mokhber, et al. 2016).

In reference to the strategic planning of information systems dimension, which by definition, aims to align the business with IT (Altameen, Aldrees and Alsaeed, 2014; Amrollahi, Ghapanchi and Talaei-Khoei, 2014), providing users with appropriate tools at their disposal through a formal and systematic process, cannot be absent in a model of maturity measurement. Such updating - in accordance with the new scenario - is considered to contribute greatly to a better measurement of the level of maturity of the strategic alignment between the business and the IT function. As it is possible to observe in Figure 2, the updated model - containing the four new dimensions, postulates - in the same way - a positive relationship of each construct on the Business-IT maturity alignment.

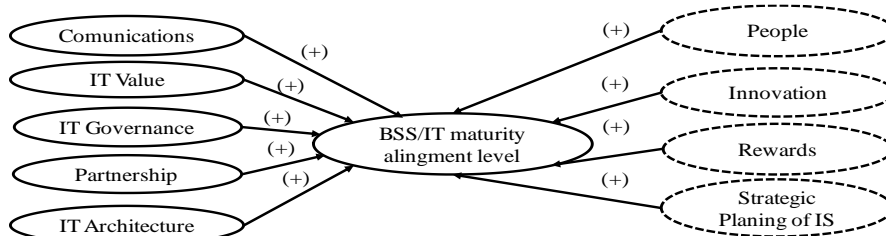


Figure 2. Updated SAMM

When the four new dimensions proposed are integrated to the maintained dimensions, in the reference model, we can see how the fundamental aforementioned pillars, are now complemented with previously absent aspects, that allow us to have an even stronger and more complete measurement of the phenomena studied. Figure 3 assuring that the DT pillars contain all relevant aspects necessary for being successful when implementing a DT strategy.

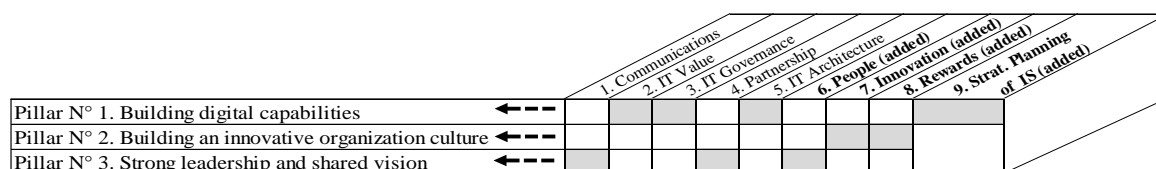


Figure 3. Pillars of a digital strategy and their dimensions

The above figure demonstrates how pillar N° 2 was not supported by any of the previously existing dimensions, leaving us with a huge gap in the reference model, that we close by adding dimension 7

and 8. The same (albeit on smaller scale) happened with pillars N°1 and N° 3, where we added new dimensions to fill in existing gaps.

2.7 DT strategy pillars and business-IT alignment dimensions

Having all elements able to better measure the business-IT alignment maturity level for non-IT companies, on the path to becoming an entirely digital entity, complementing the company with those aspects in which it is necessary to make changes - as a roadmap of how to further improve – the company is doing two tasks simultaneously: 1) Strengthening their core business, and 2) Preparing the whole organization to initiate a complete transformation in the three dimensions that the digitalization involves: products, services and processes. Figure 4 shows the factors (dimensions) that each pillar in the DT strategy framework proposed contains.

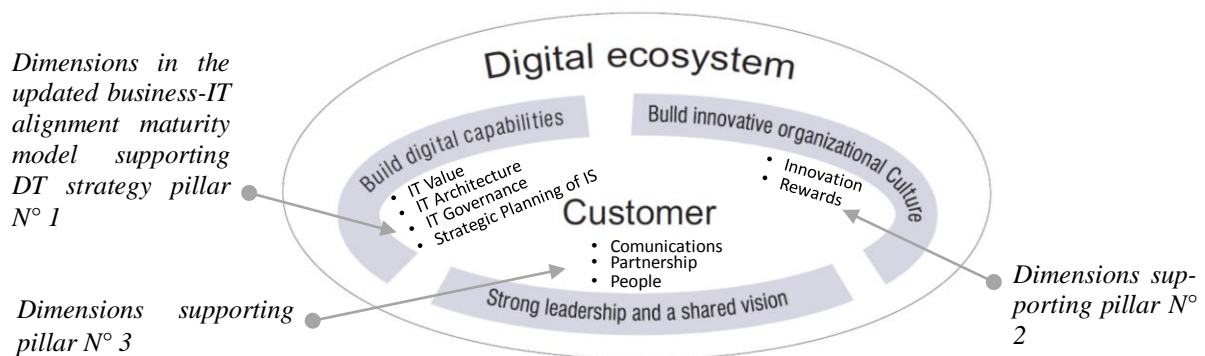


Figure 4. Dimensions supporting each DT strategy pillar

2.8 A new approach in the operationalization of the construct

After reviewing the way in which the questions are formulated in the construct that operationalizes the reference model, it was decided to propose a simpler and easier to understand structure for the interviewee, noticeably different from the structure of the first one, a questionnaire that, according to the analysis carried out, presents questions - to some extent - confusing and complex. The foregoing is considered in many cases, trying to measure more than one characteristic with the same question, technically known as double-barreled questions. While in the reference questionnaire, each question has 5 possible answers, in the new instrument, for each question a 5-level Likert scale is proposed, in consistency with the 5-level maturity scale of the reference model. Doing this, the interviewee chooses the level - from 1 to 5 - that best represents the practices of their organization for each question.

3 Research methodology

3.1 General aspects

An exploratory research was carried out for conducting the investigation. The study considered two phases: 1) Application of the new construct to the pilot sample, 2) In-depth interviews to the same sample, once the questionnaire was completed. The sample was composed by executives from IT and non IT areas in same proportions. The purpose of having two groups of respondents, from IT and operational areas, was to explore differences or similarities of perception in the measurement of maturity of Business-IT alignment, which enriches the results of the study.

3.2 Pilot sample

The pilot sample consisted of 30 interviewees, 15 of them from the IT areas, and 15, from areas related to the business operations, who expressed their opinions regarding the business IT alignment organ-

izational practices. The interviewees came from mostly large and renowned Chilean companies from industries such as non-metallic manufacturing companies, hotels and restaurants, financial intermediation, real estate activities, social and health services, transportation, storage and telecommunications, and companies classified as other activities.

3.3 Data Collection instruments

For implementing the investigative process two instruments were used. First: A structured questionnaire, which purpose was to operationalize the updated model. The questionnaire consisted a total of 54 questions, all of them posed as statements. Second: A semi-structured protocol, acting as a guide for in-depth interviews, in order to contrast the results obtained after the subsequent analysis of the new construct, and to enrich the investigative process itself, with new findings, which are not possible to capture with the sole application of a structured questionnaire.

3.4 Thematic analysis

With respect to the data collected from the in-depth interviews, the thematic analysis method was chosen, characterized by its flexibility and practicality when analyzing results from unstructured information. The method allowed the construction of taxonomies according to the criteria of significance inherent to the nature of the research, and to establish the essential ideas that guided this work (Braun and Clarke, 2006)

4 Results and discussion

4.1 Validity and reliability tests

After having tested the new construct, validity and reliability tests were applied. As a result, the evaluation of the construct concluded that the new instrument is stable, showing internal consistency, obtaining a general result of 0.984 (Cronbach alpha index), which leads in the first instance to indicate that the test is reliable in its entirety. Technically, to a high degree the individual differences of the scores are attributable to real differences and not to random measurement error. As a complement to the previous coefficient, a reliability analysis was added for each dimension of the instrument, by inquiring about the high overall value obtained. As a result, the coefficients decrease while maintaining a sufficient value to maintain the internal consistency by dimension, which makes it possible to conjecture that the greater overall value in this respect is attributable to the complementation of these dimensions when it is integrated to form the construct.

In the validity test (PCA), six components captured more than 80% of the heterogeneity of the data, representing almost all of the variables. In the same way, a deeper analysis suggested to eliminate five questions from the questionnaire, considering that they do not provide more information to explain the variability of the construct. Tables 1 and 2 summarize the results of the reliability and validity tests.

Dimensions of the updated model	Cronbach Index	N° Elements	Item-test correlations		
			min	prom	max
D1: Communications	0.898	6	0.62	0.73	0.81
D2: IT Value	0.937	8	0.63	0.78	0.90
D3: IT Governance	0.932	6	0.73	0.81	0.87
D4: Partnership	0.885	5	0.59	0.73	0.83
D5: IT Architecture	0.850	7	0.49	0.61	0.75
D6: People	0.909	7	0.47	0.73	0.90
D7: Innovation	0.945	5	0.67	0.85	0.93
D8: Rewards	0.887	4	0.63	0.76	0.89
D9: Strat. Plann. of IS	0.946	6	0.76	0.84	0.92

Table 1. Cronbach's alpha values

Component (PCA)	Total	% Variance explained	% acumulated	N° questions
1	30.151	55.834	55.834	14
2	3.873	7.172	63.006	9
3	3.273	6.062	69.068	10
4	2.663	4.931	73.999	6
5	1.800	3.333	77.332	6
6	1.540	2.853	80.185	4

Table 2. Summary of principal components analysis (PCA)

In reference to the validity test (Table 2), a search for underlying concepts was carried out, with the purpose of explaining the theoretical grouping of questions in these six components suggested by the test. As a conclusion, the authors considered that the instrument, as it is designed, better segments those aspects in which it is desired to emphasize, by measuring its status and evolution.

4.2 Preliminary descriptive score

With favorable results in the validity and reliability evaluations of the new construct, we proceeded to analyse the results of the scores obtained by the interviewees with the new instrument. To carry out this task, were calculated the scores at the consolidated level, in the 9 dimensions that compose the construct, adding to the result, the score of the two groups of interviewees. The first part yielded a weighted average consolidated score - including all dimensions, and all respondents, of 3.22, with significant differences between scores by dimensions, being the weakest innovation and rewards. In the separation by groups of interviewees, the average IT score exhibited a higher value, with 3.39, while, for business executives, it was 3.06. Within the dimensions by groups of respondents, an important variability was observed, which was measured through the Standard Deviation - SD (Business Executives) / SD (IT executives) ratio. This ratio was very useful to measure the level of variability of the responses of the interviewees from the Business (BS) and IT areas, subject to the same questions for each dimension of the construct. Table 3 presents a preliminary descriptive summary of the scores obtained for all sample submitted to the pilot test.

Dimensions	Weighted averages	Min	Max	Average IT executives (IT)	Average operational areas (BS) executive	(SD BS)/(SD IT)
D1: Communications	3.33	2.90	3.73	3.59	3.07	1.00
D2: IT Value	3.08	2.60	3.40	3.37	2.80	1.14
D3: IT Governance	3.29	2.97	3.63	3.43	3.16	0.75
D4: Partnership	3.45	3.10	3.70	3.65	3.24	1.23
D5: IT Architecture	3.56	3.07	3.80	3.69	3.43	1.23
D6: People	3.29	2.90	3.50	3.51	3.06	0.43
D7: Innovation	2.95	2.80	3.23	2.88	3.02	1.29
D8: Rewards	2.30	1.87	2.80	2.32	2.28	0.72
D9: Strat. Plann. of IS	3.43	3.27	3.67	3.57	3.30	1.57
All dimensions	3.22	1.87	3.80	3.39	3.06	0.83

Table 3. Summary of preliminary descriptive scores

4.3 Regrouping companies according to their scores

After reviewing the results at the aggregate level, a criterion of segmentation was applied, in order to differentiate the behaviour of the different companies submitted to the study. The criteria used to segment the companies consisted of grouping them according to the score obtained in the questionnaire. For scores above this average, the companies were considered with a greater development in the level of alignment between the business and IT. Following this criterion, the companies with a score above the weighted average of the whole sample were assigned to group 1, while the companies with scores below this average, were assigned to group 2. The regrouping procedure gave as result 16 companies with scores above the weighted average and 14, below this. The procedure also meant separating the scores between the two types of executives subject to the process (IT and operational areas).

After calculating the new scores, the variability presented in the first approach to the scores (Table 3), decreases significantly, not only between dimensions, but also between type of executives. It was possible to observe this behavior amongst both the scores of group 1, and group 2, which is representing partially in Table 5.

At the same time, it was possible to observe that the ratio (SD BS) / (SD IT), obtained for companies in group 1, was closer to 1 for each dimension, compared to the same calculation shown in the preliminary scores, a fact that indicates that the variability in the responses of the reporting units for this

group is smaller. In other words, there would be less discrepancy in how the practices of the organization are perceived from the point of view of each reporting unit, for each of the dimensions evaluated.

4.4 Treatment of the in-depth interview phase

The answers obtained in the application of the semi-structured interview protocol were tabulated, seeking spontaneous answers from the interviewees, which were not possible to obtain by applying the new construct alone. As a result of this phase, and following the methodology of thematic analysis, the different responses were categorized. After that, the resulting categories were characterized as facilitators (+) or inhibitors (-) of strategic alignment processes between the IT function and the business. This categorization and characterization was carried out separately, both for the responses of IT informants, and for informants coming from functional areas, as is possible to observe below.

Facilitating categories (+)						Inhibitory categories (-)		
IT executives			Business executives			IT executives	Business executives	
IT-1	IT-8	IT-18	BS-1	BS-12	BS-23	IT-12	BS-2	BS-22
IT-2	IT-9	IT-22	BS-4	BS-13		IT-16	BS-3	
IT-3	IT-10	IT-23	BS-5	BS-14		IT-17	BS-6	
IT-4	IT-11	IT-24	BS-7	BS-15		IT-19	BS-9	
IT-5	IT-13	IT-25	BS-8	BS-17		IT-20	BS-16	
IT-6	IT-14	IT-26	BS-10	BS-18		IT-21	BS-20	
IT-7	IT-15	IT-27	BS-11	BS-19			BS-21	

Table 4. Facilitating and inhibitory categories

4.5 Combined analysis after regrouping (scores and in-depth interviews)

Based on the previous segmentation by score and the findings of the interview phase, a combined analysis was made. The results reveal consistency between scores considered high for this analysis, with categories of responses considered as facilitators (+) in alignment processes of this nature. In the same way, consistency was evidenced between scores considered low, with categorizations of responses characterized as inhibitors (-) in strategic alignment processes.

The response categories of the in-depth interview phase, revealed by the reporting units, gave broad support to what was previously reviewed in the literature, in reference to such processes. Table 5 represents the segmentation described above, combining scores gotten from the new construct, with spontaneous answers.

Group according score	N° informants	Consolidated average score	IT average score	BS average score	Categories in-depth interview IT (+)	Categories in-depth interview IT (-)	Categories in-depth interview BS (+)	Categories in-depth interview BS (-)
Group 1	16 (9 IT - 7 BS)	3.91	4.00	3.79	IT1, IT2, IT3, IT4, IT5, IT6, IT7, IT8, IT10, IT11, IT13, IT14, IT8, IT22, IT23, IT24, IT25, IT26	IT12, IT17, IT21	BS1, BS4, BS5, BS7, BS8, BS10, BS11, BS12, BS13, BS14, BS15, BS17, BS18, BS19, BS23	BS6, BS9, BS20, BS21
Group 2	14 (6 IT - 8 BS)	2.37	2.34	2.39	IT2, IT6, IT9, IT10, IT11, IT15, IT17, IT27	IT16, IT19, IT20, IT21	BS5, BS7, BS13, BS14, BS17, BS23	BS2, BS3, BS6, BS9, BS16, BS20, BS22

Table 5. Summary of combined analysis (scores and in-depth interviews)

Summarizing the findings of both phases, we can conclude that: As well as a good perception of the practices of the organization, measures in the dimensions of the new model evaluated, result in higher levels of alignment (higher scores). Practices such as those indicated in the resulting categories from in-depth interviews have a positive and therefore desirable impact on any organization that aspires to align the business with the IT function.

5 Research scope

5.1 Approach to the investigation

The research was proposed and implemented in a sequence of formal stages, following a traditional approach when testing a new instrument, adhering to the precepts of the scientific method, until arriving at the application of a pilot test of the instrument to a subset of the population of interest, in order to test the updated model in a first "staging". The purpose of applying this sequence was to explore how the model can be operationalized by means of this new instrument, allowing the contextual adjustment and balance of its content, showing a preliminary version of its scope through its results. The exploratory results would give us an advanced look at its massive application to firms in the industry, and a firsthand knowledge of potential conclusions about the maturity degree in the strategic alignment of IS.

5.2 Limitations

The nature of the investigation, with a non-probabilistic conformation of the sample, it is understood that the results of the study exploring the modifications to SAMM are limited by such definition; therefore, this study is neither predictive nor confirmatory. Accordingly, it is not possible to make inferences about the results, despite the application of an empirical, rational and analytical method.

5.3 Future improvements

It is recommended to test the updated model with a larger sample, by means of a sample design that allows confirmatory conclusions, as well as to reinforce this application with qualitative techniques that can suggest revisions to the alignment maturity measurement models, or elements to modify the dimensions already incorporated in the updated model.

6 Conclusions

As the reader can notice, although the main topic of this work is to highlight the importance of those aspects to be included in the updated model to measure the degree of alignment between the business and the function of IT in the new digital scenario, it is not possible to evaluate the results of a model like the one proposed, without evaluating at the same time, the behavior of the latter acting as a whole.

Having therefore evaluated the behavior of the updated model, and the construct that operationalizes it, in a relevant sample of companies, it is possible to conclude that the new construct obtained favorable results in the validity and reliability tests, so that the results obtained from it - measured in scores - are relevant when establishing exploratory conclusions from its implementation, which, combined with the in-depth interview phase of this investigation, reinforces the results obtained by the application of the new questionnaire, showing - at the same time - consistency within the literature review carried out for these kinds of processes, getting positive results in both contrasts. In this regards it is possible to conclude that the decision of using two data collection tools, is considered a valuable contribution to the research.

By explicitly observing the four dimensions that update the reference model, it is possible to point out that they are an important contribution to this kind of tool, so it is suggested that they should be incorporated into models whose objective is to measure the maturity degree of alignment between the IT function and the business.

In summary, the purpose of this article is to present an updated model for measuring the maturity alignment level for non-IT organizations, where the imperative is to digitalize all key processes, while at the same time developing new business models and operational models, strengthening its core business, on a path to becoming an entirely digital entity, we find that the same aspects were absent in an

appropriate instrument to carry out this task: 1) The involvement of the personnel in the organizational progress, 2) The innovation as an engine for the future of any organization, encouraging innovation from all areas of the company, 3) A reward system consistent and congruent with a culture of innovation, as a driving force for the future development of any organization, and 4) The adequate planning of information systems, in a collaborative activity, involving the functional and managerial areas. These elements cannot be absent in models that aspire to capture changes in the new environment, aligning the IT function with the operational areas. The lack of an updated business-IT alignment maturity level tool, will limit the chances of being successful when carrying out a DT Strategy.

After a theoretical review on the concept of strategic alignment between the business and IT, and having carried out an empirical implementation of an updated model to measure the maturity level of the alignment between IT and the business, integrated in a digital transformation strategy framework, we place at the disposal of the academic community the results of this research, for its evaluation and consideration.

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