Measuring the Strategic Business and IT Alignment in a Digitally Revolutionized Economy

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Abstract

The competitive environment of Information Technologies (IT) burst with a never seen intensity, transforming industries, business models, organizational culture and processes. The mutual understanding between the functional areas of the organization with the IT unit is critical for the strategic alignment. Even though significant efforts have been made to understand the relationship of the factors that influence an effective alignment between business and IT, the instruments that measure the maturity achieved between Business and IT present a delay in its evolution. This paper criticizes the available models and proposes an update for measuring the level of maturity achieved in this critical strategic topic. The model was operationalized with constructs and a survey applied to a pilot sample of executives from mostly large Chilean companies. The proposed update includes new factors, which are considered as relevant in this new digital scenario, which, according to the results of the research, are a real contribution to measuring the degree of alignment between the business and the IT function.

Key words: business IT-alignment, maturity alignment level, updated model.

Introduction

Information Technology (IT) and more recently within this field the concepts related to digital transformation, digital strategies and digitalization, among others, are changing the business models and processes as we know them. Assuming a fusion between the business and IT as a prerequisite and essential factor to boost innovation and competitiveness, many companies face the decision for innovation or extinction (Bharadwaj, El Sawy, Pavlou and Venkatraman, 2013; Kahre, Hoffmann and Ahlemann, 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 about applying technology to the business as a commodity, but rather creating new business models and operational models, leveraged by innovative uses of technology (Venkatraman, 2017). When rising this point, it is assumed that the concept of business IT alignment is still valid – in this digital enviroment – as it was in the past. And while, for a long time, IT have been treated as subordinate to the commercial strategy, in the light of the bibliographic review conducted, we coincide with corporate executives and researchers emphasizing the importance of the alignment between business and IT, and the value that it brings to the organizations.

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 understanding means that both functional areas and IT must be partners in the development and execution of the organizational business strategy, recognizing that IT and business strategy are so closely related, that companies cannot be competitive if both strategies are not strongly linked and aligned. (Aversano, Grasso and Tortorella, 2016; Avison, Jones, Powell and Willson, 2004; Chan, Sabherwal and Thatcher, 2006; Coltman, Tallon, Sharma, Queiroz, 2015; Duffy, 2001; Johnson and Lederer, 2010; Luftman, Lyytinen and Zvi, 2015).

More than thirty years passed, since the concept of Business-IT Alignment was conceived and immersed in a digital transformation scenario. 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
business performance improvements. The latter could indicate that the concept of strategic alignment between business and IT is not completely solved, but still driven at the operational level. As indicated by a study conducted by IT Web Survey applied to large companies in South Africa: "There is little time for innovation or the implementation of a digital strategy, since most of the effort is spent in the alignment of IT with the business". (IT Web Brainstorm CIO Survey, 2014). Reinforcing this issue, in the context of constructing a digital strategy, Peppard and Ward (2016), point out: “The challenge is, as it has always been, to harness these technologies in support of enterprise objectives and to create new strategies”. (p.16). In other words, to harness digital technologies for achieving alignment with enterprise objectives and co-creating innovating strategies and new business models.

In order to contextualize the scope and objectives of this research, an extensive literature review was conducted on the concept of business and IT alignment, coined and strongly promoted since the late 80's by one of its major advocates, Professor N. Venkatraman. In his latest book "The Digital Matrix, new rules for digital transformation through technology", Venkatraman made a call to both company managers and academics 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. Supporting this idea, now in a more technologically turbulent and dynamic environments, Bughin, Catlin, Hirt, and Willmott (2018), 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 in the organization, others focus on digital marketing or sales, but very few have a broad and holistic vision of what a digital proposal really means.

In reference to the most recent rise of digital transformation processes, we have witnessed renowned failures where more than two thirds of these processes fail or do not reach the potential of the investments for the business (Baculard, Colombani, Flam, Lancry and Spaulding, 2017; Remes, Manyika, Bughin, Woetzel, Mischke, and Krishnan, 2018; Walker, 2017). 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, but is a continuous process that changes the way of doing business. It requires major investments in infrastructure, major redefinition of current processes, from the strategic to the operational levels.

The central question of this research is: are current strategic IT alignment models capable of measuring the maturity of the strategic alignment between the business and the IT function in a digital revolutionized scenario? In order to answer the research question, the authors analyzed seminal papers and models, as well as applied research articles including such models in the past to identify needs and opportunities for improvement. Then, updates to a widely used model are proposed and tested with a sample of companies.

**The Updated Model**

Proposing and testing updates and improvements for the models to measure the maturity of the alignment between the business and IT is considered a strategic imperative in the rapid and turbulent evolution of the digital transformations. Doing so, allows organizations to obtain feedback after the implementation of different digital initiatives, so that companies can assess and define instances for alignment and improvement. Echoing various researchers, it is agreed that the absence of a measurement of the impact of strategic alignment initiatives between business and IT, conspired against the execution of such processes, and hides the degree to which this alignment effectively contributes to the results of the companies (Luftman and Kempaiah, 2007; Neiroti, Cantamessa and Paolucci, 2006; Santana, Vemuri, Ferrer, Bretherton and Hylad, 2010).

After revising the literature and examining some models developed since the year 2000 to conduct this measurement, it is possible to confirm that even though significant efforts have been made to understand the factor that allow companies to reach the alignment between business and IT, the same has not happened with the instruments that measure the level of maturity achieved. As Luftman and Kempaiah (2007) point out, an efficient tool is required to evaluate the maturity of this alignment. In they words: “A tool that can provide both a descriptive assessment and a prescriptive roadmap on how to improve”. (p.167).

Among the models of maturity measurement reviewed, the SAMM model (Luftman, 2000) and subsequent publications, is the one that has achieved greater recognition among academics and the business
community. SAMM stands out among those analyzed, for its theoretical support and a clear methodology to assess the level of maturity, aspects that are not developed in other models of maturity measurement analyzed.

Before we continue, and to avoid confusion, it is important to note that Luftman denominates his model as SAM, nevertheless, for this work we will refer to it as SAMM (Strategic Alignment Maturity Model), establishing a difference with SAM (Strategy Alignment Model by Henderson and Venkatraman, 1989).

Having reviewed the fundamentals of SAMM, the constructs that compose it, and the instruments that operationalize it (Luftman et al., 2015), 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. In this respect, the improvements on the SAMM that are postulated do not refer to the critics raise for some authors (Belfo and Dinis, 2012; Chen, 2010; Straub, Boudreau, and Gefen, 2004; Van der Raadt, Hoorn, and Van Vliet, 2005), but rather with some aspects that this model does not contemplate and that are considered key in a digitally revolutionized scenario.

**SAMM model review**

The SAMM Model, to which for this investigation we will refer hereinafter as the reference model, 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 5 possible answers, from which the interviewee choose the most representative.

The reference model 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, while none of these dimensions acting separately has such an effect. According to that, as it is shown in the figure N°1, for each dimension is presented the hypotheses of positive impact on Business and IT alignment.

![Figure N°1. The reference model](image)

**Basis for an update of the reference model**

The proposed updated model maintains the first 5 dimensions of the reference model, replacing the sixth dimension "skills", for a new dimension called "People". Also, three new dimensions are added: "Innovation", "Rewards" and "Strategic planning of information systems". 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 the state of each. Under this consideration, a new construct is introduced, which purpose is to capture – in an independent way - how the company involves their personnel and give to them the appropriate tools for contributing to reach the organizational objectives and goals. (Kane, O’Palmer, Nguyen, Kiron and Buckley, 2015; Nautin, 2014).

Another aspect that draws attention in the reference model, is the absence of important constructs in the current scenario, they are innovation and rewards. And while a couple of questions for these dimensions are present in isolation 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 the constructs.

At this point, the reader might ask: what was the criterion used to add innovation and rewards as new dimensions of the model? In response to this question, abundant literature supports the importance of these variables in a scenario of digital transformation. Innovation and reward systems that promote a culture of innovation can be considered as engines 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, Tan, Vakilbashi, Zamil and Basiruddin, 2016, Wang, Elliger and Wu, 2013).

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; Newkirk, Lederer and Johnson, 2008), providing users with tools appropriate to their needs, through a formal and systematic process, cannot be absent from 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 the figure N°2, the updated model also postulated a positive relationship of each construct on the Business IT maturity alignment.

Figure N°2: Updated model

A new way to operationalize the updated model

In reference to the way in which the questions are formulated in the new instrument, that operationalizes the updated model, it was decided to propose a simpler and easier to understand structure for the interviewee, noticeably different from the structure of the reference model, a questionnaire that, according to the empirical data collected and analyzed, 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. In this way, while in the reference questionnaire, each question has five possible answers, in the new instrument, for each question a 5-level Likert scale is proposed, in consistency with 5-level maturity scale of the reference model. In this way, the interviewee chooses the level - from 1 to 5 - that best represents the practices of their organization for that question. Implementing this transformation meant analyzing each question of the reference questionnaire, with its
respective response options, looking for the question that in each case best mediates the dimension in which it was found. Regarding the first five original dimensions of the reference model, it was necessary - in several cases - to reformulate questions, redistribute questions among dimensions, considering that some questions represent better a different dimension. This transformation meant questioning all the questions, as assertions, in order to properly apply the Likert scale and the treatment of the data collected. It is considered that the aforementioned changes, in reference to the format of the new model questionnaire, make it easier for the interviewee to interpret it, at the same time that it is simpler to apply by the interviewer.

**Research methodology**

For implementing the investigative process, an exploratory research was designed and applied to a pilot sample. Two instruments were used to carry out the investigation: 1) A structured questionnaire, which purpose was to operationalize the updated model, 2) A semi-structured instrument, acting as a guide for in-depth interviews, in order to contrast, on the one hand, the results obtained after the subsequent analysis of the new construct, and, on the other hand, to enrich the investigative process, with new findings, which are not possible to capture with the sole application of a structured questionnaire. Both techniques adopted are recognized by the academic community as appropriate to validate the updated model in an exploratory context.

**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 organizational 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. The instruments were applied during the same interview to the same interviewees.

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 will enrich the results of the study.

**Validity and reliability testing of the new construct.**

In relation to the questionnaire applied, and considering that it corresponds to a new instrument, evaluations were carried out using correlational techniques (Cronbach's Alpha, for reliability analysis) and multivariate techniques (Exploratory factor analysis, for validity analysis, based on the principal components analysis - PCA). (Corral, 2009; Meraz and Maldonado, 2015 Morales, 2007; Zambrano, Fernández, Rivera and Zapata, 2014).

**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; Mieles, Tonon and Alvarado, 2012).

**Results and discussion**

**Validity and reliability of the new construct.**

The reliability evaluation of the construct concluded that the new instrument is stable, that is, has internal consistency, obtaining a general result of 0.984, which leads in the first instance to indicate that the test is reliable in its entirety. That is, taking its conditions as a standard, if applied to the same group at another
time, will produce similar results. 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, an analysis of reliability was added by dimensions of the instrument, by way of inquiry about its high value: the coefficients decrease while maintaining a sufficient value to sustain the internal consistency by dimension, thus making it possible to conjecture that the greater general value in this respect is attributable to the complementation of these dimensions when integrating to conform 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. In tables N°1 and N°2 it is possible to observe the summarized results of the reliability and validity tests, respectively.

<table>
<thead>
<tr>
<th>Dimensions of the updated model</th>
<th>Cronbach Index</th>
<th>N° Elements</th>
<th>Item-test correlations</th>
<th>Component (PCA)</th>
<th>Total</th>
<th>% Variance explained</th>
<th>% accumulated</th>
<th>N° questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comunications</td>
<td>0.898</td>
<td>6</td>
<td>0.62 0.73 0.81</td>
<td>1</td>
<td>30.151</td>
<td>55.834</td>
<td>55.834</td>
<td>14</td>
</tr>
<tr>
<td>IT Value</td>
<td>0.937</td>
<td>8</td>
<td>0.63 0.78 0.90</td>
<td>2</td>
<td>3.873</td>
<td>7.172</td>
<td>63.006</td>
<td>9</td>
</tr>
<tr>
<td>IT Governance</td>
<td>0.932</td>
<td>6</td>
<td>0.73 0.81 0.87</td>
<td>3</td>
<td>3.273</td>
<td>6.062</td>
<td>60.668</td>
<td>10</td>
</tr>
<tr>
<td>Partnership</td>
<td>0.885</td>
<td>5</td>
<td>0.59 0.73 0.85</td>
<td>4</td>
<td>2.063</td>
<td>4.931</td>
<td>73.999</td>
<td>6</td>
</tr>
<tr>
<td>IT Architecture</td>
<td>0.850</td>
<td>7</td>
<td>0.49 0.61 0.75</td>
<td>5</td>
<td>1.800</td>
<td>3.333</td>
<td>77.332</td>
<td>6</td>
</tr>
<tr>
<td>People</td>
<td>0.909</td>
<td>7</td>
<td>0.47 0.73 0.90</td>
<td>6</td>
<td>1.540</td>
<td>2.853</td>
<td>80.185</td>
<td>4</td>
</tr>
</tbody>
</table>

Table N°1. Cronbach’s Alpha values

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.

Treatment of the results from the in-depth interviews

The findings obtained in the application of in-depth interviews 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, characterizing them as facilitators (+), or inhibitors (-) of strategic alignment processes between the IT function and the business. This categorization and characterization was conducted separately, both for the responses of IT informants, and for informants coming from functional areas, as it is possible to see in table N°3. As a conclusion of this task, examining the information provided by the two groups of interviewees and the scores obtained from questionnaire, was possible to observe a solid consistence in this contrast.

<table>
<thead>
<tr>
<th>Facilitating categories (+)</th>
<th>Inhibitory categories (-)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IT executives</td>
<td>Business executives</td>
</tr>
<tr>
<td>T11</td>
<td>T13</td>
</tr>
<tr>
<td>T12</td>
<td>T14</td>
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<tr>
<td>T13</td>
<td>T15</td>
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<td>T14</td>
<td>T18</td>
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<td>T15</td>
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<td>T16</td>
<td>T23</td>
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<td>T17</td>
<td>T24</td>
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<td>T18</td>
<td>T25</td>
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<tr>
<td>T19</td>
<td>T26</td>
</tr>
<tr>
<td>T110</td>
<td>T127</td>
</tr>
</tbody>
</table>

Table N° 3. Facilitating and inhibitory categories
Relevance of the new dimensions according to the interviewees

In the analysis of the spontaneous responses of the interviewees, after the application of the structured questionnaire, responses were found that reinforce the need to include the new dimensions proposed in the updated model. In reference to the *people dimension*, an interviewed from an operating area of a retail company said: "The implementation of new platforms in the company has had an impact on the people who use these new technological applications, which shows they are more efficient in their work". Similarly, an IT executive from an air transport company commented: "As a result of involving personnel, giving them knowledge of organizational objectives and goals, and understanding their needs, we use new applications that promote collaborative work and the efficiency of operations". In reverse, this is; in reference to the lack of more active involvement of the people in the operation of the company, an executive from a functional area of a company - classified in other services - said: "There is some degree of rapprochement between IT and the business at the managerial level, but this it does not go down to the operational level. The operating personnel do not have the vision of the business, because the management does not share it".

In reference to the *innovation dimension*, which together with the *rewards dimension* presented the lowest score in the applied instrument, we find spontaneous answers, such as: "As a technology company, the contribution of IT to the business is fundamental. Without IT the company could not operate, however, innovation is lacking to be more competitive" - comment indicated by a commercial executive of a technology company. In the same sense, an executive of a company of the retail sector said: "The Company does not have a budget to innovate without guarantee of results, and if that were the case, it would encourage the IT area and its personnel to be more proactive in the search for new solutions for the final and internal client".

Regarding the *rewards dimension*, closely linked to the *innovation dimension*, but measuring different variables, although the interviewees did not directly express spontaneous answers regarding the degree of conformity or disagreement with the reward system in their organizations, which encourages an innovation culture, the results for this new dimension are based on the findings obtained after applying the new instrument, and the analysis of the questions associated with it. In this analysis we can see the lack of a reward system that encourages innovation as the engine of future development of the companies.

Finally, in reference to the dimension *strategic planning of information systems*, an interviewee from an IT unit whose company participates in the real estate sector said: "Different areas of the company were equipped with information systems according to their needs and requirements, with which the productivity of the employees improved. This initiative has been encouraged by the management committee of the holding, as a generalized practice for all companies in the group". In the same sense, another interviewee from an operating unit of a non-metallic manufacturing company stated: "Customized platforms have been developed integrated to the customer's systems, which has optimized many processes that were previously less efficient".

Research scope: limitations, advantages and future improvements

The research was proposed and implemented in a sequence of formal stages, typical of 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 and showing a preliminary version of its scope through its results. The exploratory results would give us an advance of its massive application to companies in the industry, and a first knowledge of potential conclusions about the maturity degree in the strategic alignment of IS.

Limitations

Given the exploratory 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 of the study, despite the application of an empirical, rational and analytical method.

Also, as part of the research, it was found that some companies - particularly the larger ones - were implementing parallel IT structures, a concept known from recent literature as bimodal-IT (Haffke, Kalgovas and Benlian, 2017; Horlach, Drews and Schirmer, 2016), which objective is to make major changes in the organization, redefining and optimizing processes, along with carrying out the experimentation necessary to support innovative uses of IT in a digital business context, thus not affecting the operation of the company supported by its current IT area. In this sense, the scope of the present work is to propose a model of maturity measurement of the alignment between the business and the IT areas, where the functions between operational areas and IT areas are differentiated. It is understood, therefore, that organizations with the capacity to implement such changes question the classical IT structure, blurring the classical line between "us" and "them" from the IT perspective, presenting a new approach in the relationship between business and the IT, which needs to be addressed. Our study does not address different types of organizations, which in the digital age make up a digital ecosystem where competition and cooperation are amalgamated with the purpose of achieving new ways of satisfying the final client. These companies classified by some authors as Incumbents, Digital giants and Tech entrepreneurs (Venkatraman, 2017), and their differences in the constitution of their functional units and technological support, are not analyzed in this work.

**Advantages**

The decision of using two data collection tools, is considered a valuable contribution to the research and its conclusions, giving greater strength to the findings obtained throughout the process. The result obtained for both tools allowed, on the one hand, to test the new construct, applying in this process the rigor of an academic research, verifying its internal consistency and validity. On the other hand, the in-depth interviews phase allowed complementing the analysis of the pilot test results, having found favorable results in both contrasts.

**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 model.

**Conclusions**

Having concluded this work, three points deserve to be highlighted: 1) With the emergence of digital transformation initiatives, the Business IT Alignment concept lost its leading protagonist year after year, having being considered one of the most important concerns of the organizations, in terms of IT administration (Kappelman, McLean, Johnson and Gerhant, 2014). This paper emphasizes that strategic alignment initiatives continue to have the same relevance indicated by innumerable written documents on this topic, so that digital transformation initiatives should consider as a prerequisite a strategic alignment between the business and the IT function. Misalignment between the business and the IT will limit the chances of success of such initiatives, 2) It is therefore, the alignment between the business and the IT function of such relevance, that it is necessary to have instruments capable of measuring the degree of maturity achieved in these implementations, feeding back to the organization with the results of such measurements, and 3) It is possible to conclude that the research results respond overwhelmingly to the research question, proposing an updated model that more efficiently captures the maturity state of the alignment between the IT function and the operating units, in this new scenario, which is made available to the academic and business community for its consideration.
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