Business-IT Alignment Research Field
A Systematic Literature Review

Marcos André Fernandes Spósito, Arilo C. Dias Neto and Raimundo da Silva Barreto
Instituto de Computação, Univerisidade Federal do Amazonas (UFAM), Manaus, Brazil

Keywords: Business-IT Alignment, Status and Directions for the Research Field, Systematic Literature Review.

Abstract: The business-IT alignment has become an important research field that has been widely investigated by different areas and with different viewpoints. Since the interest in the business-IT research field has grown it has become important to monitor how it has been developed and what are the directions of ongoing research within the field. This paper reports the performing of an extensive systematic literature review whose main contribution is to provide an overview of the current status of development and possible further directions for the business-IT alignment research field from the viewpoint covered by six issues: research topics, alignment dimensions, business and IT domains, research goals, types of research results and research methods. The main results indicate that BPM, IT Governance are the two most used research topic, the cultural and social alignment dimensions and the IT strategy domain have been little adopted, there is unnecessary worry about the development of the new approaches rather than taking advantage of the existing ones, the research results are overly theoretical, most of the research is not performing the empirical validity of its results. This paper indicates possible further directions and concluding that the current state of the development of the business-IT research field can still need to gain more maturity.

1 INTRODUCTION

The business-IT alignment has become an important research field that has been widely investigated by different areas and with different viewpoints. The relation between business and IT has remained a frequently revisited topic in the IS literature for several decades (Klischewski et al. 2015).

Since the interest in the business-IT research field has grown it has become important to monitor how it has been developed and what are the dominant directions of ongoing research within the field. Unfortunately, despite the larger number of literature-review-based studies presented a wide view of the characteristics, definitions and influence factors to business-IT alignment and contributed to the evolution of the field knowledge (Chan and Reich, 2007; Aversano et al., 2012; Ullah and Lai, 2011), important research issues such as goals, type of results and research methods carried out by studies in this field have been little investigated.

In order to discover the current status of development and chart out possible future directions for the business-IT alignment research field we conducted a strictly systematic process of literature review guided by six research questions that cover research topics, alignment dimensions, business and IT domains, research goals, types of research results and research methods.

This paper is organized as follows: Section 2 describes the background; Section 3 shows related studies to our research; in Section 4 we present a systematic literature review (SLR) as the research method used for this paper; Section 5 reports quantitative and qualitative results; in Section 6 we discuss the results and, finally, in Section 7 we present our conclusions.

2 BACKGROUND

There are many conceptualizations for the business-IT alignment presented in the literature. According to Henderson and Venkatraman (1993), business-IT alignment refers to strategic fit and functional integration among four domains: business strategy, IT strategy, business infrastructure, and IT infrastructure. Conforming to Reich and Benbasat (2000), it is the degree to which the IT mission, objectives and plans support and are supported by

Spósito, M., Neto, A. and Barreto, R.
Business-IT Alignment Research Field - A Systematic Literature Review.
In *Proceedings of the 18th International Conference on Enterprise Information Systems (ICEIS 2016) - Volume 2*, pages 549-558
ISBN: 978-989-758-187-8

the business mission, objectives and plans. According to Luftman (2000), business-IT alignment refers to applying IT in an appropriate and timely way, in harmony with business strategies, goals and needs. Despite these conceptualizations differ from each other, they all agree on the main goal to achieve and sustain competitive advantages.

Based on these definitions it can be seen that the alignment presents a number of debatable issues that define dimensions for the business-IT alignment. Chan and Reich (2007) identified five alignment dimensions: strategic, structural, informal structural, social and cultural dimensions. The strategic dimension refers to the degree in which the business plan and strategy and the IT plan and strategy complement each other (Chan and Reich, 2007). The structural dimension addresses the integration between the business structure and IT structure, including location of decision-making rights, centralization or decentralization of IT (Chan, 2002). The informal structural dimension is defined as structures that transcend the formal division of labor and the coordination of tasks (Chan, 2001). The social dimension related to the mutual comprehension between the business and IT executives and their commitments to objectives and missions (Reich and Benbasat, 2000). Finally, cultural dimension comprises the cultural integration between IT and business, considering styles, behaviour and beliefs (Chan and Reich, 2007).

3 RELATED STUDIES

Several literature-review-based studies have contributed to the evolution of the knowledge in the business-IT alignment research field. Chan and Reich (2007) provide one of the most complete literature reviews in business-IT alignment, addressing questions such as: What have we learned? What creates alignment? They presented alignment definition, factor, models, antecedents, outcomes and implications to business-IT alignment.

More recent studies, such as those proposed in Walentowitz (2012), Aversano et al. (2012), Kaidalova and Seigerroth (2012), Ullah and Lai (2013) and Jentsch and Beimborn (2014), also provide a widely view on this area. For example, Walentowitz (2012) developed an alignment map to structure overview of alignment types describing their relations and proposing an approach to locate additional alignment definitions amongst existing ones. Ullah and Lai (2013) conducted a systematic literature review of the alignment topics, including definitions, history, challenges, phases, measurements approaches, the importance in business industries, and contributions of software engineering to business-IT alignment.

Our SLR differs from the previous literature reviews that have a rather narrow focus on definitions and characteristics of the business-IT alignment. Like them we also provide an overview of alignment issues, in special dimensions and domains, but the main concern is verify the coverage of the research issues, i.e. research method presented by the business-IT alignment field, using a strictly systematic process of literature review.

4 RESEARCH METHOD

In order to obtain an overview of the development of business-IT alignment research field, we conducted a SLR based on guidelines by Kitchenham and Charters (2007). SLR involves three main activities: planning the review, conducting the review, and reporting the review (Kitchenham and Charters, 2007). The activities concerning the planning and conducting of our SLR are described as follow in this section and the activity concerning the reporting of the results is presented in Section 5.

Research Questions: Since research questions guide the design of the review, specifying them is the most important part of any systematic review (Kitchenham and Charters, 2007). We investigated the six research questions (RQ) showed in Table 1.

Table 1: Research questions.

RQ1	What different research topics have been mostly used for addressing business-IT alignment issues?
RQ2	What alignment dimensions are most/least explored in the business-IT alignment research?
RQ3	What IT and business domains are most/least explored in the business-IT alignment research?
RQ4	What are the business-IT alignment research goals?
RQ5	What types of research results are provided by business-IT alignment researches?
RQ6	What research methods are most/least used by business-IT alignment researches?

Research Sources: Although there are many collections of research papers available to choose from in both electronic and physical (paper) form, we limited the source for only electronic collections and considered only peer-reviewed journals and conferences. We chose as research source to select papers from the scientific databases IEEE Explore and ACM Digital Library (ACM DL) because they

have a solid collection of scientific papers about a variety of research topics and allow the use of search interface that simplifies the recovered process. We also chose as research source the Proceedings of ICEIS, available in ScitePress Digital Library, because for several years, it has accepted papers that cover the business-IT alignment based on quality, relevance and originality.

Search Keywords: Due to the large number of papers related to business-IT alignment available in research sources chosen it is natural to limit the search using keywords. The main area of research within which relevant papers may be found determines the main search keywords as well 'business-IT alignment'. However, there are alternative spellings, synonyms and related terms. For example, in the literature, the alignment has also been called fit, linkage, integration, harmony (Chan and Reich, 2007). We decided not to greatly reduce the scope because our focus is to obtain an overview of the business-IT alignment research field. So, in order to use the search interface of the IEEE Explore and ACM DL, we combined by logical connectives some keywords related to major terms of the main area (see Table 2), thus building a search string. Then, it was used to search for keywords in the titles, abstract and keywords of the papers contained in these digital libraries. When the conduction of our SLR initialized, the advanced search resource of the ScitePress Digital Library search interface was not available and, for this reason, it was not possible to use a logical search string. Alternatively, we used the string 'business IT alignment' looking for its keywords in the abstracts of papers contained in the Proceedings of ICEIS.

Table 2: Search string.

Major terms	Keywords
IT/IS	IT OR Information Technology OR IS OR Information System
Business	business OR business objectives OR business goals OR business strategies OR strategies OR goals strategies OR strategic objectives
Alignment	business IT alignment OR alignment OR fit OR integration OR linkage OR harmony

Period of SLR Execution: We performed the search and analysis of the papers through IEEE Explore and ACM DL over the time span of February 2014 to June 2015. Subsequently, we identified the need to extend the coverage of our SLR and then carry out further searches for papers in the Proceedings of ICEIS over the time span of September 2015 to October 2015. In our SLR we considered to select only those papers that have been published within timeframe of years 2000-2015. According to Luftman and Brier (1999), the importance of alignment has been well known since late 70s. However, early 2000s the alignment was defined in an indefinite and vague way (Maes et al., 2000). We believe that year 2000 can be considered as a reference point for elaboration and unification of business-IT alignment research field.

Selection of Papers: After the preliminary recovery of paper using the search interface of the digital libraries, we performed two evaluation stages to ensure the relevance of the papers recovered. In the first stage, called 1st filter, we evaluated only the title and the abstract of each paper to accord inclusion criterion (IC) and exclusion criteria (EC) (see Table 3) and select papers that would be within the scope of the research questions. It is common to find papers with inconsistencies between the abstract and its full content. Therefore, in the second stage, called 2nd filter, we realized reading of the full content of all the selected papers from the 1st filter. Then, papers were included/excluded according to the same inclusion/exclusion criteria (see Table 3).

Table 3: Inclusion/exclusion criteria.

IC	Papers that describe issues, which deal with business-IT alignment.
EC1	Papers that have not been written in English.
EC2	Papers that have not got complete content or are only accessible through payment.
EC3	Paper is not derived from peer reviewed conferences or journals.
EC4	Papers that are duplicated.
EC5	Papers whose business-IT alignment issue is not clear and whose theoretical background is insufficient to provide their understanding.
EC6	Papers that do not meet the inclusion criterion

Strategy for Extracting Data: In order to extract data or answers from papers recovered by our SLR, we considered each one of the RQ (see Table 1) as follow.

Regarding RQ1, the motivation is to discover different research topics that have been used for addressing issues of business-IT alignment. Sometimes papers can describe a topic that does not deal with business-IT alignment straight, but that has indirect relation to business-IT alignment. In other cases, it can discuss problems of different research areas and describe the relation that these problems have to business-IT alignment issues. For example, according to Kaidalova and Seigerroth (2012), the

Requirements Engineering is an area that has been used for addressing issues of business-IT alignment.

Regarding RQ2, the motivation is to investigate what alignment dimensions are most/least explored in the business-IT alignment research field to discover what types of alignment need to be covered. Based on the categorization proposed by Chan and Reich (2007), the papers can be classified in one or more of the following dimensions:

- **Strategic:** the papers address mainly issues related to goals, plans, objectives, strategies, prioritization, investments, governance, projects, quality and performance;
- **Structural:** the papers address mainly issues related to organizational structure, IS applications and IT infrastructure;
- **Social:** the papers address mainly issues related to communication, involvement, interaction and collaboration;
- **Cultural**: the papers address mainly issues related to styles, behaviour, values and beliefs.

Regarding RQ3, the motivation is to discover which domains are most/least explored in the business-IT alignment research field. Based on the definition for the business-IT alignment by Henderson and Venkatraman (1993) (see Section 2) the papers can be classified in one or more of the following domains:

- **Business strategy:** the paper addresses mainly issues related to business scope, business governance and business competences;
- **IT strategy:** the paper addresses mainly issues related to technology scope, IT governance and systemic competences;
- **Business structure:** the paper addresses mainly issues related to administrative structure, organizational process and skills;
- **IT structure:** the paper addresses mainly issues related to IT architecture, IT process and skills.

Regarding RQ4, the motivation is to determine what are the business-IT alignment research goals. An analysis along these goals allows the determination of where most/least of the research interest lies. Based on the classification presented by Oca et al., (2015), the papers can be classified in one of the following research goals:

- **Understanding:** the paper investigates business-IT alignment issues, without proposing a solution approach;
- **Proposal:** the paper describes a proposal or approach for addressing business-IT alignment issues;
- **Evaluation:** the paper applies an existing approach for addressing business-IT alignment issues in the organizations,
- **Improvement:** the paper examines how to improve or extend an existing approach for addressing business-IT alignment issues.

Regarding RQ5, the motivation is to find the type of results produced by business-IT alignment research, assessing the state of the field. Based on the categorization of results for IS research presented by March and Smith (1995), the papers can be classified according to one or more of the following types of outcomes:

- **Knowledge:** the papers provide intangible results related to knowledge, for example, theoretical definitions, information collected by questionnaires and results of the evaluating business-IT alignment in the organizations;
- **Model:** the paper provides a model as result, that is, a set of characteristics, and of relationships between them, which provides a framework for specifying and evaluating requirements of business-IT alignment;
- **Method:** the paper provides a method as result, that is, a finite sequence of instructions used to address deficiencies in models and business-IT alignment issues. Methodology, technique, process, guidelines and strategy are considered as method in our SLR.
- **Tool:** the paper provides a tool as result, that is, an instrumental item that gives automatic support to the evaluation or assurance of business-IT alignment considering different methods.

Regarding RQ6, the motivation is to reveal which research methods are most/least used in the business-IT alignment research area and thereby evaluate the extension of the scientific validation of their results. Based on the categorization of research methods described by Shull et al. (2008) and Genero et al. (2011), the papers can be classified in one of the following research methods:

- **Literature review:** the paper describes a literature review, that is, a non-empirical method that consists of the review of prior research to propose general solutions;
- **Speculation:** the paper describes a proposal or approach for addressing business IT alignment issues without presenting any study or example that would indicate the feasibility of the proposal and the usefulness of the research results in practice;
- **Example:** the paper describes a proposal or approach for addressing business IT alignment

issues, where its use or application is illustrated by an example;

- **Experiment:** the paper presents an investigation of a testable hypothesis where one or more independent variables are manipulated to measure their effect on one or more dependent variables, checking if a cause-effect relationship exists between them;
- **Case Study:** the paper reports the use of a case study, that is normally aimed at tracking a specific attribute or establishing relationships between different attributes with a level of control lower than in an experiment; According to Wohlin et al. (2000), case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident;
- **Survey:** the paper reports the use of a survey, that is, often an investigation performed in retrospect, for example, when a tool or method has been in use for a period of time. The primary means of gathering qualitative and quantitative data are interviews or questionnaires through a sample that is representative of the population to be studied. The results from the survey are then analysed to derive descriptive and explanatory conclusions and are then generalized to the population from which the sample was taken (Shull et al., 2008; Wohlin et al., 2000);
- **Empirical/ Non-empirical:** research methods determine to what extent the research results are supported by empirical or non-empirical evidence. According to Genero et al. (2011) the literature review, speculation and example are considered non-empirical research methods, whilst the experiment, case study and survey are considered empirical methods.

5 REPORTING THE RESULTS

As a result of the SLR conduction were selected 65 papers of the IEEE Explore, 19 papers of the ACM DL and 28 papers of the Proceedings of ICEIS. Altogether, were selected 112 papers for data extraction (see Table 4).

The papers selected were published between 2004 and 2015 (see Table 5). As the ScitePress Digital Library limited the searches from 2004 to 2015, no paper recovered by its search interface was published in the time frame 2000-2003. Four papers recovered by IEEE Explore and by ACM DL were published early 2004. Therefore, they were excluded in 2nd filter, according to EC2 (see Table 3).

Table 4: Results of selecting papers.

Scientific Database	Recovered Papers	Selected Papers	
		1st filter	2nd filter
IEEE Explore	107	72	65
ACM DL	35	21	19
ICEIS	42	30	28
Total of selected papers for data extraction			112

Table 5: Quantitative results regarding year of publication.

Years	Number of Papers per Year			Total	%
	IEEE	ACM	ICEIS		
2004	0	3	1	4	3.57
2005	2	2	0	4	3.57
2006	6	0	0	6	5.36
2007	5	1	2	8	7.14
2008	9	1	2	12	10.71
2009	11	3	1	15	13.39
2010	10	1	2	13	11.61
2011	10	2	6	18	16.07
2012	7	2	3	12	10.71
2013	5	2	2	9	8.04
2014	0	2	4	6	5.36
2015	0	0	5	5	4.46

From a temporal point of view, there was an increasing number of publications between the years 2004 and 2011 (except in 2010). The year of 2011 is the year with most published papers (16.07%), followed by 2009 (13.39%), 2010 (11.61%) and 2008 (10.71%). One can also see, according to the papers selected, in the time frame from 2012 to 2015 there was a decrease in the number of published papers. As the conduction of the SLR regarding IEEE Explore and ACM DL was initially in February 2014, not all conferences held in 2013 and 2014 had their publications indexed in these digital libraries. This may be the reason for the low number of papers in these years. Furthermore, this is the reason for our SLR not to present papers published in year 2015, regarding IEEE Explore and ACM DL.

The quantitative and qualitative results regarding each RQ are reported as follow. Note that RQ1, RQ2, RQ3 and RQ5 are not mutually exclusive. Therefore, a paper can be classified in one or more of the possible answers. The summation of the percentages is therefore over 100%. This is due to some papers falling into more than one answer.

RQ1 Results. Our SLR identified ten different topics most used for addressing business-IT alignment issues in the papers selected (see Table 6). Business Process Management (BPM) is the most used topic among all (38.39%), i.e. Lind and

Seigerroth (2010) report a research driven by the need for knowledge about how to achieve alignment between business and IT in BPM. Around 36.61% of the papers use IT Governance as research topic. For example, Nurcan et al. (2008) identified conceptual dependencies between business-IT alignment and IT governance. Around 26.79% of the papers use Enterprise Architecture (EA). For example, Wang et al. (2008) proposed a method of business-IT alignment based on EA. Around 25.89% of the papers use IS Applications as research topic. For example, Bartolini et al. (2006) investigate factors influencing enterprise to improve data quality in IS application. Around 25.00% of the papers use IT Service Management. For example, Bartolini et al. (2006) proposed an application of IT service management driven by business objectives. Around 23.21% of the papers use some business-IT performance measurement for addressing business-IT alignment issues. For example, Silva and Chaix (2008) presented an approach for identifying and measuring the alignment level between the business and IT governance by means of a more operationalized business and IT process model, including the key performance indicators (KPI) for each type of process. Around 14.29% of the papers use Requirements Engineering. For example, Bleistein et al. (2005) enhanced a requirements engineering approach for alignment of IT with business strategy. Around 13.39% of the papers use Services Oriented Architecture (SOA) as research topic, i.e. Choi et al. (2013) evaluated the impact of SOA implementation on business-IT alignment. Around 12.5% of the papers use IT Infrastructure Library (ITIL) as research topic, i.e. Esmaili et al. (2010). Around 11.61% of the papers use IT Project/Portfolio, i.e. Rahrovani et al. (2014) .

Table 6: Quantitative results regarding RQ1.

Research topics	Results	
	Number	%
Business Process Management (BPM)	43	38.39
IT Governance	41	36.61
Enterprise Architecture (EA)	30	26.79
Information System Applications	29	25.89
IT Services Management (ITSM)	28	25.00
Business-IT Performance Measurement	26	23.21
Requirements Engineering	16	14.29
Services Oriented Architecture (SOA)	15	13.39
IT Infrastructure Library (ITIL)	14	12.50
IT Project / Portfolio	13	11.61

RQ2 Results. The results for RQ2 (see Table 7) showed that all papers present strategic dimension of the business-IT alignment. For example, Iizuka et al. (2011) proposed a framework for effective IT investment from the perspective of business-IT alignment. Around 75.00% of the papers present structural dimension. For example, Esmaili et al. (2010) investigated the business-IT alignment in the ITIL perspective. Around 49.11% of the papers present social dimension. For example, Saptadi et al. (2012) developed a conceptual model for business-IT alignment that explore the competitive priorities and relationships involving IT staff, consultants and owner of the small and medium enterprises. Around 30.36% of the papers present cultural dimension. For example, El-Mekawy and Rusu (2011) conducted a case study in a multinational organization to investigate the organizational culture impact on business-IT alignment.

Table 7: Quantitative results regarding RQ2.

Alignment Dimensions	Number of Papers			Total	%
	IEEE	ACM	ICEIS		
Strategic	65	19	28	112	100.00
Structural	48	13	23	84	75.00
Social	37	9	9	55	49.11
Cultural	25	5	4	34	30.36

RQ3 Results. The results for RQ3 (see Table 8) showed that about 84.82% of the papers address issues related to business strategy domain. For example, Qiu and Li (2009) conducted a study for ending users' perceptions of business strategic factors among different IS/IT contexts. Around 64.29% of the papers comprise IT strategy domain. For example, Daher et al. (2013) evaluated value-based objectives for developing business and IT strategies. Around 70.54% of the papers have coverage for business structure domain. For example, Wang et al. (2008) proposed a method of business and IT alignment based on Enterprise Architecture. Around 73.21% of the papers address issues related to IT structure domain. For example, Qin et al. (2010) studied the IT application valuation in business-IT alignment.

Table 8: Quantitative results regarding RQ3.

Business and IT Domains	Number of Papers			Total	%
	IEEE	ACM	ICEIS		
Business Strategy	53	14	28	95	84.82
IT Strategy	45	11	16	72	64.29
Business Structure	44	14	21	79	70.54
IT Structure	47	16	12	75	73.21

RQ4 Results. The results for RQ4 (see Table 9) showed that about 15.18% of the papers present researches aimed at the understanding of the

business-IT alignment without proposing a solution approach. For example, Doumi et al. (2011) presented a state of art and a comparison between some business-IT alignment approaches. Around 63.39% of the papers describe a proposal or approach for addressing business-IT alignment issues. For example, Becker et al. (2008) presented an approach to support the strategic alignment of software process improvement programs. Around 11.61% of the papers present an evaluation of the business-IT alignment in the organizations as research goal. For example, Silvius and Waal (2010) evaluated the business-IT alignment maturity in Dutch educational organizations using the Strategic Alignment Maturity Model (SAMM) proposed by Luftman (2000). Around 9.82% of the papers have as research goal to improve an existing approach for addressing business-IT alignment issues. For example, El-Mekawy et al. (2012) extended the SAMM from organizational culture perspective.

Table 9: Quantitative results regarding RQ4.

Research Goals	Number of Papers			Total	%
	IEEE	ACM	ICEIS		
Understanding	10	6	1	17	15.18
Proposal	40	10	21	71	63.39
Evaluation	9	2	2	13	11.61
Improvement	6	1	4	11	9.82

RQ5 Results. The results for RQ5 (see Table 10) showed that about 26.79% of the papers provide 'knowledge' as research outcome. For example, Schlosser et al. (2012) proposed an integration of the alignment dimensions used by this paper (see RQ2) into three distinct dimensions: human, social and intellectual. Around 48.21% of the papers provide a model as research result, such as Saptadi et al. (2012) that proposed a business-IT alignment conceptual model. Around 23.21% of the papers provide a method as research result, as presented in Wang et al. (2008). Around 8.04% of the papers provide a tool as research result. For example, Lee-Klenz et al. (2010) provide a tool for sourcing business-IT aligned e-services.

Table 10: Quantitative results regarding RQ5.

Type of Outcomes	Number of Papers			Total	%
	IEEE	ACM	ICEIS		
Knowledge	19	8	3	30	26.79
Model	30	5	19	54	48.21
Method	13	6	7	26	23.21
Tool	6	1	2	9	8.04

RQ6 reSults. The results for RQ6 (see Table 11) showed that about 9.82% of the papers use a literature review as research method, such as in Ullah and Lai (2013) and Walentowitz (2012). The same percentage of the papers (9.82%) use 'speculation' (see Section 4) as research method, as presented in Tapia (2009). Around 25.89% of the papers illustrate through examples the use or application of a proposal for addressing business-IT alignment issues. For instance, Chen (2008) briefly discuss three examples showing how different modules of their approach are activated in response to different change events. Around 3.57% of the papers present an experiment as research method. For example, Barros et al. (2014) conducted an experiment with specialists to analyze their approach proposed named StrAli-BPM from the standpoint of the level of contribution, practical applicability, effectiveness, viability, usability of the prototypes and limitations. Around 36.61% of the papers conduct a case study as research method, as presented in El-Mekawy and Rusu (2011). Around 14.29% of the papers present a survey as research method. For example, Silvius and Waal (2010) undertake a survey of the students and employees to assess the alignment maturity levels in Dutch educational organizations of the Netherlands. Almost half of the papers selected described a non-empirical method to validate their research outcomes (51 or 45.54%) whilst the rest (61 or 54.46%) described empirical research method. The most widely used empirical research method is the study case (36.61%) and the most widely used non-empirical research method is the example (25.89%).

Table 11: Quantitative results regarding RQ6.

Research Methods	Number of Papers			Total	%
	IEEE	ACM	ICEIS		
Non-empirical	**23**	**9**	**19**	**51**	**45.54**
Literature Review	7	3	1	11	9.82
Speculation	4	2	5	11	9.82
Example	12	4	13	29	25.89
Empirical	**42**	**10**	**9**	**61**	**54.46**
Experiment	3	0	1	4	3.57
Case Study	27	7	7	41	36.61
Survey	12	3	1	16	14.29

6 DISCUSSIONS

Regarding RQ1, the main results indicate that the researches on business-IT alignment has explored strongly topics, that although not all have direct relation, they can be used efficiently to propose business-IT alignment solutions. The current state of this research field indicates wide coverage for different topics and different viewpoints have been

used to propose business-IT alignment solutions. We believe it is possible to see new directions to research field through interaction and more comprehension between these topics.

Regarding RQ2, the main results indicate that the researches have little investigated the cultural dimension. Due to its recognized importance in the organizational environment, it can be better explore and a new research direction can be to extend existing approaches to contemplate these dimensions or adopt them in new proposal. Additionally, although many researches address the structural and social dimensions, there are still gaps that can be filled and other research opportunities may arise from the further investigation on these dimensions.

Regarding RQ3, the main results indicate that the IT strategy, business strategy, IT structure and business structure have been explored in a balanced way. One can also see, currently most researches refer to the model proposed by Henderson and Venkatraman (1993). Even though, the business-IT alignment research field has explored the IT strategy but the other domains. Generally, the researches mainly concern in how to formulate the business strategy. A new research direction can be better explore how to formulate the IT strategy, so that it influences the business strategy and vice versa.

Regarding RQ4, the main results indicate that the researchers' interest lies mainly on describing a new approach for addressing business-IT alignment issues. Due to this reason, currently the research field provides a large number of similar business-IT alignment approaches. Consequently, the research goals ‘evaluation’, that consists of applying an existing approach for addressing business-IT alignment issues has been little used. We recognize that the great variety of contexts and adverse situations may require special attention to the development of the approaches. However, we question whether most of the time it is not possible to take advantage of characteristics of the existing approaches to address well-known business-IT alignment issues. When feasible, researchers must focus on improving or extending an existing approach rather than excessively worry about the development of the new solutions, generally unnecessary. We also incentive that more papers describe how the evaluation of the business-IT alignment has been accomplished.

Regarding RQ5, the main results indicate that by far the most common type of research outcome is the model. The second most common outcome, but far behind models, is that one which produces new knowledge. Closely, following knowledge and in third place are methods (in our SLR, methodology, technique, process, guidelines and strategy are also considered methods). In the last place, produced by a minimum amount of researches reported in the papers, are the tools. Then, it is possible to perceive that current state of the business-IT alignment research field is mainly characterized by theoretical and conceptual results (models and knowledge) rather than results with more pragmatic (methods and tools). We recognized the importance of researches that propose new business-IT alignment conceptual models, but it is desirable that future researches focus on producing more pragmatic business-IT alignment research outcomes for inclusive operationalize (provide a finite sequence of instructions of use) some existing models overly theoretical. Additionally, considering this same purpose, it is essential that the researchers be engaged in developing new tools to give automatic support to the evaluation or assurance of business-IT alignment considering different methods.

Regarding RQ6, the results indicate that the case study is the most used method to empirically validate the research outcomes identified in the papers selected. However, although we recognized that it is the most adequate method to investigate a contemporary phenomenon within its real-life context, in some situations it was possible that the papers establish relationships between different attributes with a higher level of control, such as in an experiment. In order to increase the level of scientific rigor and evidence in the business-IT alignment research field further researches should make more use of the experiments as empirical research method. Furthermore, the finding that the rate of the research results in empirical and non-empirical presents a balanced distribution could be interpreted as an indication that the business-IT alignment research field can still need to gain maturity. Indeed, in our SLR we detected that there is a great number of papers that propose new approaches to address business-IT alignment issues, such as models and methods, without determining the empirical validity of the usefulness of these results in practice. Like this, a considerable amount of papers describe a proposal or approach for addressing business-IT alignment issues without presenting any study or example (speculation). The same way, other papers illustrated the use or applications of this approach exclusively by an example or simulation. These gaps must be filled in further investigation, increasing the level of scientific validation of the proposed results.

7 CONCLUSIONS

This paper reports the performing of a SLR whose main contribution was to provide an overview of the current status of development of the business-IT alignment research field in the last 15 years and its possible further directions.

The main threat to the validity is the bias in the selection of publication. We used only three scientific databases that cover peer-reviewed journals and conferences, including the ICEIS. Nevertheless, the scope covered by them is sufficiently wide to attain reasonable completeness in the business-IT research field. Furthermore, this threat to the validity was reduced because we used a rigorous selection and two evaluate stages to ensure the relevance of the papers selected.

We hope that this paper can help students and researchers increase their knowledge in business-IT alignment and, more than that, help them improve the maturity of the development of the research field, reducing the gaps reported. As future work we suggest investigate what benefits and challenges are inherent to the research topics identified in our SLR, when they are jointly applied in the context of business-IT alignment.

ACKNOWLEDGEMENTS

We would like to acknowledge the support granted by FAPEAM (project 582/2014), CAPES and IFRR.

REFERENCES

Aversano, L., Grasso, C. & Tortorella, M., 2012. A Literature Review of Business/IT Alignment Strategies. *Procedia Technology*, 5, pp.462–474.

Barros, V.A. et al., 2014. Deriving Service Level Agreements from Business Level Agreements An Approach Towards Strategic Alignment in Organizations. *Proceedings of the 16th International Conference on Enterprise Information Systems - Volume 3*, 1, pp.214–225.

Bartolini, C., Sallé, M. & Trastour, D., 2006. IT service management driven by business objectives An application to incident management. In *Network Operations and Management Symposium, 2006. NOMS 2006. 10th IEEE/IFIP*. Vancouver, BC: IEEE Computer Society, pp. 45–55.

Becker, A.L., Audy, J.L.N. & Prikladnicki, R., 2008. An Approach to Support the Strategic Alignment of Software Process Improvement Programs. In *Proceedings of the Tenth International Conference on Enterprise Information Systems*. Barcelona, Spain: ScitePress, pp. 66–73.

Bleistein, S.J., Cox, K. & Verner, J., 2005. Strategic alignment in requirements analysis for organizational IT: an integrated approach. In *Proceedings of the 2005 ACM symposium on Applied computing*. Santa Fe, New Mexico, USA: ACM New York, pp. 1300–1307.

Chan, Y.E., 2001. Strategic Information Technology: Opportunities for competitive advantage. In *Information Systems Strategy, Structure and Alignment*. Hershey, PA: Idea Group Publishing, pp. 56–81.

Chan, Y.E., 2002. Why Haven't We Mastered Alignment? The Importance Of The Informal Organization Structure. *MIS Quarterly Executive*, 1(2), pp.97–112.

Chan, Y.E. & Reich, B.H., 2007. IT alignment: what have we learned? *Journal of Information technology*, 22(4), pp.297–315.

Chen, H.-M., 2008. Towards service engineering: service orientation and business-IT alignment. In *Hawaii International Conference on System Sciences, Proceedings of the 41st Annual*. Waikoloa, HI: IEEE Computer Society, p. 114.

Choi, J., Nazareth, D.L. & Jain, H.K., 2013. The impact of SOA implementation on IT-Business alignment: A system dynamics approach. *ACM Transactions on Management Information Systems (TMIS)*, 4(1), p.3.

Daher, S.F.D., Costa, A.P.C.. & Almeida, A.T., 2013. Assessing value-based objectives for developing business-IT strategies. In *Enterprise Systems Conference (ES), 2013*. Cape Town, South Africa: IEEE Computer Society, pp. 1–6.

Doumi, K., Baïna, S. & Baïna, K., 2011. Business IT Alignment - A Survey. In *Proceedings of the 13th International Conference on Enterprise Information Systems*. pp. 493–499.

El-Mekawy, M., Kaboudvand, E. & Rusu, L., 2012. Extending BITA Maturity Model from Organizational Culture Perspective. In *System Science (HICSS), 2012 45th Hawaii International Conference on*. Maui, HI: IEEE Computer Society, pp. 5011–5022.

El-Mekawy, M. & Rusu, L., 2011. Organizational culture impact on business-IT alignment: A case study of a multinational organization. In *System Sciences (HICSS), 2011 44th Hawaii International Conference on*. Kauai, HI: IEEE Computer Society, pp. 1–11.

Esmaili, H.B., Gardesh, H. & Sikari, S.S., 2010. Validating ITIL maturity to strategic business-IT alignment. In *Computer Technology and Development (ICCTD), 2010 2nd International Conference on*. Cairo, Egipto: IEEE Computer Society, pp. 556–561.

Genero, M. et al., 2011. Research Review: A Systematic Literature Review on the Quality of UML Models. *Journal of Database Management*, 22(3), pp.46–70.

Henderson, J.C. & Venkatraman, N., 1993. Strategic alignment: Leveraging information technology for transforming organizations. *IBM systems journal*, 32(1), pp.4–16.

Iizuka, K., Kudo, S. & Michiko, M., 2011. A Framework for effective IT Investment from the Perspective of

Business IT Alignment and Organization. In *Proceedings of the 13th International Conference on Enterprise Information Systems*. ScitePress, pp. 344–349.

Jentsch, C. & Beimborn, D., 2014. Shared Understanding Among Business and IT - A Literature Review and Research Agenda. In *Proceedings of the 22nd European Conference on Information Sys- tems (ECIS)*.

Kaidalova, J. & Seigerroth, U., 2012. An Inventory of the Business and IT Alignment Research Field. In W. Abramowicz, J. Domingue, & K. Węcel, eds. *BIS 2012 International Workshops and Future Internet Symposium*. Vilnius, Lithuania: Springer Berlin Heidelberg, pp. 116–126.

Kitchenham, B. & Charters, S., 2007. *Guidelines for performing Systematic Literature reviews in Software Engineering Version 2.3.*, Durham, UK: Keele University and University of Durham.

Klischewski, R. et al., 2015. Business-IT Alignment In The Arab World – Is There a Fast Track to Maturity? Related Research on Improving Business-IT Alignment. In *ECIS 2015 Proceedings*. pp. 1–14.

Lee-Klenz, S., Sampaio, P. & Wood-Harper, T., 2010. A requirements elicitation framework and tool for sourcing business-IT aligned e-services. In *Proceedings of the 2010 ACM Symposium on Applied Computing*. ACM New York, pp. 111–117.

Lind, M. & Seigerroth, U., 2010. Multi-Layered Process Modeling for Business and IT Alignment. *2010 43rd Hawaii International Conference on System Sciences*, pp.1–10.

Luftman, J., 2000. Assessing Business-IT Alignment Maturity. *Communications of the Association for Information Systems*, 4(14), p.50.

Maes, R.E. et al., 2000. Redefining business-IT alignment through a unified framework.

March, S.T. & Smith, G.F., 1995. Design and natural science research on information technology. *Decision Support Systems*, 15(4), pp.251–266.

Nurcan, S., Claudepierre, B. & Gmati, I., 2008. Conceptual Dependencies between two connected IT domains: Business/IS alignment and IT governance. In *Research Challenges in Information Science, 2008. RCIS 2008. Second International Conference on*. Marrakech, Marocco: Ieee, pp. 87–98.

Oca, I.M.-M. de et al., 2015. A systematic literature review of studies on business process modeling quality. *Information and Software Technology*, 58(0), pp.187–205.

Qin, J., Liu, K. & Han, J., 2010. Service valuation in business and IT alignment: with a case study in banking in China. In *Management of Innovation and Technology (ICMIT), 2010 IEEE International Conference on*. Singapore: IEEE Computer Society, pp. 390–395.

Qiu, W. & Li, D., 2009. A study for end users' perceptions of business strategic factors among different IS/IT contexts. *ACM SIGMIS Database*, 40(1), pp.52–61.

Rahrovani, Y., Kermanshah, A. & Pinsonneault, A., 2014. Aligning IT for Future Business Value: Conceptualizing IT Project Portfolio Alignment. *ACM SIGMIS Database*, 45(3), pp.30–53.

Reich, B.H. & Benbasat, I., 2000. Factors that influence the social dimension of alignment between business and information technology objectives. *MIS quarterly*, pp.81–113.

Saptadi, S. et al., 2012. Business-IT alignment success framework for manufacturing SMEs (A conceptual model). In *Management of Innovation and Technology (ICMIT), 2012 IEEE International Conference on*. Sanur Bali: IEEE Computer Society, pp. 400–404.

Schlosser, F., Wagner, H.-T. & Coltman, T., 2012. Reconsidering the Dimensions of Business-IT Alignment. *2012 45th Hawaii International Conference on System Sciences*, pp.5053–5061.

Shull, F., Singer, J. & Sjøberg, D.I.K., 2008. *Guide to advanced empirical software engineering*, Berlin, Germany: Springer.

Silva, E. & Chaix, Y., 2008. Business and IT governance alignment simulation essay on a business process and IT service model. In *Hawaii International Conference on System Sciences, Proceedings of the 41st Annual*. Waikoloa, HI: IEEE Computer Society, p. 434.

Silvius, A.J.G. & Waal, B. de, 2010. Assessing business and IT alignment in educational organizations. In *Computational Intelligence and Software Engineering (CiSE), 2010 International Conference on*. Wuhan: IEEE Computer Society, pp. 1–7.

Tapia, R.S., 2009. Coordination and partnering structure are vital domains in collaborative business-IT alignment: Elaborating on the ICoNOs MM. In *Integrated Network Management-Workshops, 2009. IM '09. IFIP/IEEE International Symposium on*. New York, NY: IEEE Computer Society, pp. 73–74.

Ullah, A. & Lai, R., 2013. A Systematic Review of Business and Information Technology Alignment. *ACM Transactions on Management Information Systems (TMIS)*, 4(1), p.4.

Ullah, A. & Lai, R., 2011. Modeling business goal for business/it alignment using requirements engineering. *Journal of Computer Information Systems*, 51, p.21.

Walentowitz, K., 2012. Aligning Multiple Definitions of Alignment--A Literature Review. *45th Hawaii International Conference on System Sciences*, pp.4962–4971.

Wang, X., Zhou, X. & Jiang, L., 2008. A method of business and IT alignment based on enterprise architecture. In *Service Operations and Logistics, and Informatics, 2008. IEEE/SOLI 2008. IEEE International Conference on*. Beijing, China: IEEE Computer Society, pp. 740–745.