An Inventory of the Business and IT Alignment Research Field

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Abstract. The area of business and IT alignment (BITA) has received increased attention during the last decade. As a consequence of this the amount of literature has also been growing increasingly. Since the interest for the field has grown it has also become important to follow and monitor trends and dominant directions of ongoing research within the field. The purpose of this paper is therefore to make an inventory of areas and directions that have attracted our attention in the literature. As a result of such inventory we present a set of categories that shows the focus and diversification of the BITA field. In the findings we can observe that the area of the highest research interest is development of a new instrumental support (methods, frameworks, approaches, etc.) for BITA. One dimension that seems to be partly neglected in the literature is procedural guidance about HOW to conduct and achieve business and IT alignment. The existing instrumental support that are presented in the literature has a strong focus on WHAT to do and WHAT to deal with (regarding both theoretical and practical issues concerning BITA), but they are missing the HOW dimension to a large extent.

Keywords: Business and IT alignment, Instrumental support, Literature review.

1 Introduction

A key issue in today's enterprise functioning is information technology (IT) that supports business needs, processes and strategies (Silvius, 2009). Nowadays, when a broad variety of CASE tools and IT systems are available for business functioning support, it becomes more and more complicated to control and follow their dynamic development and transformation and even more difficult to keep track of those IT tools that could potentially support current enterprise functions. The importance of using appropriate and effective IT means to facilitate business functions have been acknowledged and discussed by practitioners and scientists over the past two decades (Vargas, 2011). It has become a crucial issue for enterprise success – IT systems that fit to the business needs. The problem in this context is all the more complex due to the dynamic and evolving nature of both sides – business and IT (Luftman, 2003). To address this problem practitioners and researchers have used such terms as

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"harmony," "linkage," "fusion," "fit," "match", "integration", but in the long run the term "alignment" has been put to use. Luftman (2003) explains Business and IT Alignment (BITA) as a problem of how to get technical and business people to interpret things in the same way and to understand each other's side.

In the research community BITA is often addressed as a top concern of IT and business practitioners (Chan and Reich, 2007; Luftman and McLean, 2004). It is possibly caused by scientific and practical recognition of organizational benefits that BITA can bring to the table (Vargas, 2011). Researchers have discussed different aspects of aligning business and IT: initially the problem is often studied as relating business plan and IT plan; later on BITA have been considered as linking business strategy with IT strategy. Eventually the literature started to propose frameworks that could combine several aspects of BITA. One theory that is often referred to as the foundation model of the field is the Strategic Alignment Model (SAM). The essential idea in SAM is that organization should strive for alignment between four areas: business strategy, IT strategy, organizational infrastructure and IT infrastructure. In this relation SAM emphasize strategic fit and functional integration. Strategic fit is linking strategy and infrastructure for both business and IT, functional integration is fitting together business and IT strategy and business and IT infrastructure (De Haes et al, 2010).

Interestingly enough, the number of unsolved problems within BITA does not fall over time, which determines the increasing attention to this area. Several researchers indicate growing interest to the BITA within both the academic domain and the practice domain (Luftman, 2003). The number of aspects that are noticed and studied within BITA keeps increasing over time (Chan and Reich, 2007). Scholars propose models and frameworks that interpret BITA through various dimensions. Another popular direction of the research is supportive guidelines (for example, methods, frameworks, approaches, etc.) that can help to achieve, sustain or improve BITA (Seigerroth, 2011). Among other issues under discussion in the literature are factors that can influence BITA and various case studies.

With enduring attention to the question the amount of related literature is growing increasingly, therefore, it becomes more important to keep track of publications regarding BITA, since it is necessary to detect and follow the trends and important issues in the field. Thus, the purpose of this paper is to describe the state of the art within the domain of BITA on overall level. More specifically, the aim is to investigate the literature related to business and IT alignment in order to make an inventory about what is in focus in this research domain. The research question of this work is the following:

What are the main interest areas in business and IT alignment research?

The rest of the paper is structured in the following way: Section 2 describes the research approach that have been applied to perform our literature study (inventory), in Section 3 results are presented and analyzed, furthermore, directions for future work and validity threats of the study are discussed. The paper is then ending with conclusions in Section 4.

2 Research Approach

The approach that is used in the research has involved four stages: first it was required to define the aspects to outline the selection of literature, then extracting the papers according to defined selection parameters, further categorization of extracted papers and generation of results, which is concluding with answering the research question. The outline that depicts research approach is presented in Figure 1.

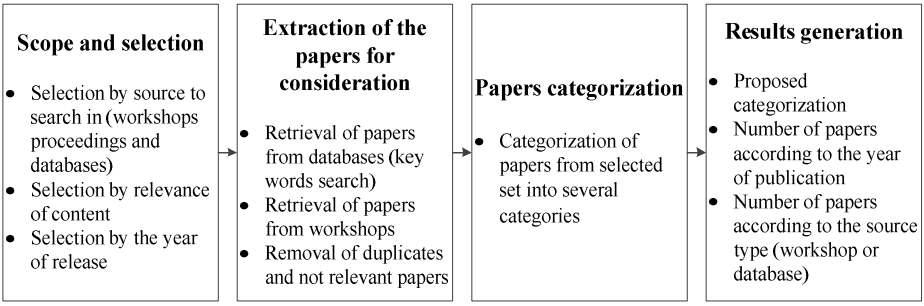

Fig. 1. Research approach

2.1 Scope and Selection

An important question to answer before performing this research was about the literature coverage. Papers for further consideration have been selected according to the following aspects:

1) Sources to extract papers
2) Relevant content
3) Time of publication

The first issue is related to sources that have been used to retrieve papers for consideration. There are several sources that have been used to seek through for relevant papers. It was decided to browse two types of sources: scientific databases (SpringerLink, ACM Digital Library and Emerald) and conference/workshop proceedings (BITA and BUSITAL). The reason to work through indicated scientific databases is that all three of them involve solid collection of scientific papers from variety of research areas and allow to use search interface that simplify the identification process. The reason to consider works that have been presented on BITA and BUSITAL workshops was that these workshops are recognized thematic events in the BITA field. Subsequently, works that have been presented there are most likely relevant for our research.

The second issue regarding relevant content of the papers has been settled in the following way. Taking into consideration increasing number of works related to BITA that are available via scientific databases, it was quite natural to limit the search using the keywords. Pondering over the most suitable keyword compositions, it was noticed that the literature shows slightly different ways to name alignment between

business and IT: business-IT alignment (for example, Luftman and Brier, 1999), business/IT alignment (for example, De Haes and Van Grembergen, 2009), IT/business alignment (for example, Saat et al., 2011), business and IT alignment (for example, Wegmann et al, 2005). Thus, it was decided to search for "Business IT alignment" within aforementioned databases. It was also decided to consider only those papers that had required phrase only in the title. Works that have been presented on BITA and BUSITAL workshops have been taken for granted in terms of relevance, thus they did not need any sorting by key words.

The third aspect to limit the extent of the literature coverage was the time of publication. According to Luftman and Brier (1999) the importance of alignment has been well known since late 70s, whereas Schlosser et al. (2012) assert that the beginning of intensive development of BITA research falls on the early 90s. It is also well known that researchers have used different terms to talk about alignment of business and IT - integration, fit, strategic alignment, harmony and other terms (Mendoza, 2009). It is fair enough, since just as any other research field, the field of BITA was developing and elaborating its own terminology. It seems reasonable within present research to consider papers that have been published after the BITA terminology has been established. Maes et al. (2000) criticize BITA research of the day because of its ambiguous nature: "In general, alignment is defined in an indefinite and vague way, if at all!" (Maes et al., 2000, p.7). Thus, we strongly believe that this point of time (year 2000) can be considered as a reference point for elaboration and unification of BITA research domain. We inclined to consider that approximately at this point BITA research area has crystallized dominating research directions and started to use more full-fledged and elaborated terminology. Thus, during present literature review we will consider papers that have been published within time frame of years 2000-2012.

2.2 Extraction of the Papers for Consideration

Extraction of papers for further categorization has been done taking into account aspects that are described above in the section 2.1. We have searched for "Business IT alignment" phrase within titles of papers from three databases (publication years from 2000 to 2012). Papers that have been presented on BITA and BUSITAL workshops have been included into the preliminary set of papers for further categorization without any filtering, since it was assumed that they are a priori relevant to the BITA research field. Preliminary number of papers that were supposed to be categorized is presented in Table 1.

Table 1. Preliminary number of papers for further consideration

	SpringerLink	ACM Digital Library	Emerald	BITA	BUSITAL	Total
Number of papers	43	53	21	10	49	176

After removing duplicates the total number of papers has decreased to 162. One more abridgement of preliminary set of papers has been done by removing false positives – works that do not deal with BITA, but that for one or another reason has been included into preliminary set. The number of papers has then decreased to 138.

2.3 Papers Categorization

After the set of relevant papers has been outlined, it was needed to categorize them. This was done simultaneously with the progress of reading papers. The process of creating categorization was inductive – papers have been studied one by one, with adding logical tags to each of them. Afterwards it was possible to gather papers of corresponding sort into one category, with distinguished differentiation between categories. Along the categorization process the following interest areas within BITA research domain evolved into what is presented in the list below:

- Paper with aim to develop BITA instrumental support (for example, method, framework, strategy, tool or other)
- Paper with aim to evaluate existing BITA instrumental support (for example, method, framework, strategy, tool or other)
- Paper with aim to apply existing BITA instrumental support (for example, method, framework, strategy, tool or other)
- Paper with aim to identify factors that can be used to influence or give indication of BITA (quite often these two types of factors have been discussed within one work)
- Paper with aim to study current state of BITA research field
- Paper that studies other issues of BITA

The elaborated content of this categorization is presented below in the section 3.1.

2.4 Generation of Results

After categorization has been done it was possible to collect the results. In order to answer the research question it was decided to analyze the results qualitatively from two points of view: number of papers per category according to the year of publication and number of paper per category according to the source type (database or workshop), see result of this in section 3.

3 Results and Discussion

3.1 Analysis of Results

Results of the work consist of two parts: the set of categories that has been generated to categorize relevant papers from the BITA research field and quantitative data that have been obtained from this categorization. Categories that have been formed are presented in Table 2 below, with corresponding description for each category.

Table 2. Categories and corresponding definitions

Category – focus in paper	**Definition**
1. Development of a new instrumental support item for BITA*	The purpose of the work is to develop instrumental support for BITA, for example, method, approach, strategy, framework, model, tool or other item. Often development of a new supportive item is accompanied by description of its usage, but the work emphasis is done on creation of it. The category also involves papers that present modified supportive items (for example, a new framework that have been produced by modifying existing one).
2. Evaluation of existing instrumental support item for BITA	The work purpose is to evaluate existing BITA instrumental support item. Evaluation of an item can be accompanied by description of its application, but the emphasis is done on the analysis or evaluation of it.
3. Application of existing instrumental support item for BITA	The purpose of the work is to apply existing BITA instrumental support item. Quite often it is a case study work that presents application of BITA supportive tool in practice. The category also involves papers that describe application of instrumental support from other areas for BITA. The category does not introduce procedural guidelines of how to apply one or another BITA method or tool, rather describes particular case of application.
4. Key performance indicators for BITA	The purpose of the work is to describe factors that can be used as key performance indicators for BITA. Often among them are mentioned: • Factors affecting BITA • Enablers and inhibitors of BITA • Effects of BITA • BITA antecedents and outcomes
5. BITA state of the art study	The purpose of the work is to study current state of BITA field. The category also involves papers that introduce framework or model that can be used to structure BITA literature in one or another way.
6. Other BITA issues	Work describes an issue that does not deal with BITA straightly, but that has indirect relation to BITA. For example, work can discuss specific problems and/or solutions that exist within a certain BITA research aspect. Alternatively, work can discuss problems of different research area, but describe the relation that these problems have to BITA issues. Work also can explain the potential influence of some factor on BITA, but does not clearly prove it (in contrast to works from category "Key performance indicators for BITA", where relation of these factors to BITA is grounded and justified).

* Instrumental support can include one or several of the following items: method, approach, strategy, framework, model, tool (Seigerroth, 2011)

As it was mentioned above, the set of relevant papers has been sorted according to created categories (1-6). Table 3 shows number of papers per each category by publication years. The highest number of paper for each year is marked in bold.

Table 3. Number of papers in each category (1-6) according to the year of publication

	1	2	3	4	5	6	Number of papers per year		
							DB	WS	Total
2000	0	0	**1**	0	0	0	1	0	**1**
2001	**1**	0	0	0	0	0	1	0	**1**
2002	0	0	0	0	0	0	0	0	**0**
2003	**1**	0	0	0	0	0	1	0	**1**
2004	0	0	0	**2**	0	0	2	0	**2**
2005	**3**	0	0	0	0	0	3	0	**3**
2006	**6**	0	0	3	0	2	3	8	**11**
2007	2	1	3	3	0	**6**	8	7	**15**
2008	**7**	1	3	3	1	**7**	13	9	**22**
2009	**9**	1	0	7	2	7	19	7	**26**
2010	**8**	2	4	4	1	5	11	13	**24**
2011	**12**	4	3	3	1	8	16	15	**31**
2012	0	0	0	0	1	0	1	0	**1**
	49	9	14	25	6	35	79	59	**138**

It is noticeable that the total number of papers per year has stable tendency to grow yearly – from year 2000 with 1 paper to year 2011 with 31 papers. For transparency reason number of papers per year is represented with the help of three numbers: number of papers that were retrieved from databases (DB column), number of papers that were retrieved from workshops proceedings (WS column) and total number of papers. This is done in order to see both overall decrease or growth tendency and this tendency depending on the source type. Interestingly enough, number of papers that were retrieved from databases tends to increase yearly with slight deviations, the same as total number of paper per year irrespective the source type. The distribution of papers into categories is uneven, which illustrates quite natural research phenomenon of higher interest to one research direction and comparatively lower attention to another one. The dominant area of research interest is development of instrumental support for BITA.

The largest by number of papers category consists of papers that develop new item of instrumental support to facilitate BITA. Among items for instrumental support have been introduced various methods, approaches, strategies, frameworks, models, CASE tools and other artifacts that can provide guidelines for BITA achievement, improvement, maintenance or assessment. In some cases new instrumental support items have been introduced as a solution for well-known BITA problems by modifying or improving existing ones, whereas another part of papers has introduced a solution for newly discovered BITA problems. It is also noticeable that, in the same

way as the total number of BITA publications, the number of instrumental support items steadily grows year by year - from year 2001 with 1 paper to year 2011 with 12 papers regarding this topic, reaching total number of 49 papers within considered period of time. A question that could be relevant to ask is "Do we need yet another method?".

In order to understand what kind of instrumental support is being introduced within the field it was decided to divide papers from this category according to the character of proposed instrumental support. One type of work has the purpose to develop instrumental support that involves procedural guidelines for BITA, whereas other type of work is rather creating notions or models that can facilitate BITA. These two types of instrumental support have originated by drawing an analogy with idea of Stirna and Persson (2007) that assert equal importance of two aspects involved into enterprise modeling. They argue that to obtain high quality results both modeling process and modeling language are important. According to our analysis, the number of papers that introduce some sort of procedural guidelines is much fewer than the number of other papers (see Table 4 below).

Table 4. The character of presented instrumental support

Procedural guidelines	Non-procedural guidelines
17	32

Quite minor attention in the BITA research domain is paid to evaluation of existing item for BITA instrumental support. Papers that belong to this category mostly deal with discussing strengths and weaknesses of existing BITA methods or frameworks. Comparatively higher research interest is dedicated to application of existing BITA instrumental support items. This category involves work that describes applications of BITA methods or tools in practice, but it does not propose procedural guidelines for how to apply different instrumental support. Number of papers per category is 9 and 14 respectively. Works that applies existing BITA instrumental support items mostly presents case studies of using one or another BITA framework or method in practice. Interestingly enough, papers that develop a new instrumental support items quite often describe practical application of them too, but in contrast to this type of papers, such application is not their focal research issue.

The second largest category includes work that deals with other BITA issues. This kind of work often describes minor or particularistic issues of BITA - issues that have indirect relation to BITA. Quite often authors describe problems that have originated from the BITA area, but have eventually segregated into separate research fields and started to require particular scrutiny. Alternatively, authors illuminate an issue from another research domain, but discuss potential relation of it to BITA. Within studied set of papers this type of papers started to emerge in 2006. Among concepts that are considered within papers from this group it is possible to mention the following: business requirements, requirements engineering, IS requirements, business needs, business model, goal model, value model, business process model, business process management, enterprise architecture, enterprise modeling, service modeling and others.

The third largest category consists of work that describes key performance indicators for BITA. The purpose of such work is to describe factors that can be used as influencing or indicating BITA. Often these two types of factors have been discussed together. Among issues that are being debated are factors affecting BITA, enablers and inhibitors of BITA, effects of BITA, BITA antecedents and outcomes and others. The number of papers in this category has a tendency to grow too, but quite irregularly, so that it reached its peak in 2009 with 7 published works.

The smallest category in number of papers is BITA state of the art. This category has 6 papers that have been presented within studied period of time.

Another part of extracted quantitative data includes number of papers per each category by source type, where DB stands for databases, WS stands for workshops (see Table 5). The highest number of papers from each source type is marked in bold.

Table 5. Number of papers in each category according to the source

	Development of a new instrumental support item for BITA	Evaluation of existing instrumental support item for BITA	Application of existing instrumental support item for BITA	Key performance indicators for BITA	BITA state of the art study	Other BITA issues	Total
DB	**35**	8	12	24	6	0	85
WS	14	1	2	1	0	**35**	53

The most significant finding that we can draw from this view on data is that papers that have been presented on workshops are mostly dealing with minor or particularistic issues of BITA. It is quite reasonable, since such thematic event as workshop has purpose of discussing the interest area in details. It leads to quite significant diversification of the research directions and elaboration of specified problems closely and particularly.

3.2 Future Work

Potential direction for further work is elaboration of presented categorization by adding new layers to it. These layers can involve the following aspects:

1) What types of problems is BITA instrumental support supposed to solve?
2) For what processes can BITA instrumental support serve as guidelines? (BITA achievement, improvement, maintenance, assessment, etc.)
3) What nature does BITA research domain have? (theoretical vs. practical)

3.3 Source of Errors

There are several threats to validity in our research. First, categories have been generated in parallel with reading selected papers. It is possible that another category of BITA research domain does exist. We could possibly not include it in our

categorization, since considered set of papers might simply not have papers that belong to this category.

Categorization of papers as it has been done in this research is a materially subjective process, since it is a result of interpretation of phenomenon by human. However, we tried to avoid it by providing detailed definition of each category, so that they are clearly distinguished from each other.

We have also limited out search within databases by choosing only those papers that have required key words in the title. It is double-edged sword: from one point of view it increased the probability to get mostly relevant papers, but from another point of view it prevents getting broader picture of BITA research area. Thus, we cannot guaranty that considered set of papers provides comprehensive view over the BITA field.

4 Conclusion

The purpose of this paper is to provide overall picture of the BITA research domain in terms of the main interest areas of BITA literature. To achieve this we have developed a set of categories that were used to classify the literature in the field. Categories that have been generated are the following: development of a new instrumental support, evaluation of existing instrumental support, application of existing instrumental support, key performance indicators, state of the art studies, and other BITA issues. These categories do not indicate very specific aspects of the BITA research domain, thus, the created categorization can to a large extend be considered as a quite general way to distinguish research directions within the field. This is due to the purpose of the paper to get an overall and high-level description of the research domain without going into details of each research direction. Elaboration of presented classification will be one aspect to pursue in future work.

Evidently the total number of papers per year has a stable tendency to grow. Research direction that attracts the highest attention consists of work that develops new instrumental support artifacts for BITA. Such work focuses primarily on WHAT to do and WHAT to deal with in order to facilitate BITA, in terms of both theoretical and practical issues, whereas dimension of providing procedural guidelines about HOW to conduct and achieve BITA seems partly neglected. The category of papers that takes the third place by number consists of work discussing factors that influence BITA or indicate that BITA has been achieved on one or another way. We strongly believe that these two categories are related to each other in sense that both categories aimed on presenting derived know-how. Evidently, the research community tends to intensively propose theoretical and practical solutions for various problems that emerge within the area. However, a question that could be relevant to ask is “Do we need yet another method?”.

Another area of relatively high interest from research community involves various minor and specific issues of BITA. Interestingly, this category consists basically of papers that have been presented on thematic BITA workshops. It is logical and can be explained by the essence of such thematic event as workshop, since it has to gather

and present all the work from the field and its branches, which causes substantial segregation of the research discussion within respective workshops.

A research direction that has attracted relatively low attention from the research community is study of BITA state of the art. One possible reason for it is the orientation of the BITA research, which tends to be rather practical.

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