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A literature review of Business/IT Alignment Strategies

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Abstract

In the last years, the alignment issue was addressed in several researches and numerous methods, techniques and tools were proposed. Indeed, the business and IT performance are tightly coupled, and enterprises cannot be competitive if their business and IT strategies are not aligned. This paper proposes a literature review useful for evaluating different alignment approaches, with the aim of discovering similarity, maturity, capability to measure, model, asses and evolve the alignment level existing among business and technological assets of an enterprise. The proposed framework is applied to analyse the alignment research published in the Information & Management journal and the Journal of Strategic Information Systems, that are the ones that more published on this topic. The achieved evaluation results are presented.

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1. Introduction

The alignment between business processes and supporting software systems is currently a top research issue. It was mentioned for the first time in the late 1970s and since then several studies and researches were

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conducted highlighting the alignment concerns [1]. During the last decade, several studies addressing this issue were proposed by researchers, practitioners and companies, but most of them are still at an embryonic stage. They demonstrated through case studies, surveys and empirical approaches that the business and IT (Information Technology) performance are tightly coupled [2-5], and enterprises cannot be competitive if their business and IT strategies are not aligned. The proposed studies are oriented at different abstraction levels [6], from the functional to the strategic one. In particular, Strategic Alignment of IT exists when goals, activities and processes of a business organization are in harmony with the information systems supporting them [7-8]. On the other hand at the functional level the analysis of the alignment between existing business processes and software systems is necessary for optimizing the effectiveness of the software support. In literature, different terms are used to refer the alignment concept: in [9], it is called fit; it is also defined bridge [10]; integration in [11]; harmony in [12]; linkage in [13]; fusion in [14]; and further definition and terms are in [3]. To address future research concerning the alignment, it is necessary to understand what is already addressed in the state of the art with a deep investigation of the executed researches, highlighting the unresolved critical issues. With this in mind, this paper proposes a literature review aiming at understanding: kind of studies conducted in this area; main issues covered by the proposed alignment approaches; and their effective application to a working context. The proposed review implied a careful analysis of the literature considering the alignment topics. This analysis aimed at identifying commonalities and differences among the proposed approaches. As explained in the following, the review first focused on all the journals identified by ScienceDirect treating the alignment topic. Then, the most representative ones were discussed: *Information & Management Journal* and *Journal of Strategic Information Systems*.

The rest of the paper is organized as follow: Section 2 gives an overview of the background on the alignment topic; Section 3 describes the selection process of the analysed papers; Section 4 describes the results obtained from the selected journals; Section 5 presents the results of the review of the alignment papers focusing on the modeling issue with reference to the most representative journals; and final remarks are given in the last section.

2. Background

A view of business and technological alignment defines at which degree the information technology mission, objectives, and plans, support and are supported by the business mission, objectives, and plans [15]. Moreover, it involves “fit” and “integration” among business strategy, IT strategy, business infrastructure, and IT infrastructure [6, 16]. A relevant “problem” [17] is the understanding of what business and information systems alignment is, how to obtain and maintain it. Traditional approaches addresses the alignment looking for how organizations can achieve alignment, but with little contribution on how to identify and correct misalignment. For being useful and completely applicable, it is necessary that an alignment strategy includes the following set of phases: Modeling of the various entities involved in the alignment concepts and of the links between business and IT entities; Measurement of the alignment degree existing between the chosen assets for establishing if improvement actions are necessary; Evolution for improving the degree of alignment. An automatic support is also useful for supporting all the process for the alignment management.

Several approaches were proposed to address the alignment issue from modeling to measurement. One of the first model was SAM – Strategic Alignment Model [6]. Different study were later performed for evaluating these models. For example, in [18], the SAM model was used in financial service firms for determining if it was useful to asses strategic alignment between IT and business. In [19], the general aspects concerning modeling was debated and a modeling issue was proposed. In particular, the VMOST – Vision, Mission, Objectives, Strategies, Tactics – analysis was treated to split the business strategy into the main components of vision, mission, goals, strategies and tactics, and the BRG – Business Rules Group – model

was proposed for modeling the organization's systems. In [20], the MDA – Model Driven Architecture – tool was used to support the alignment management, and meta-models were proposed for representing the entities involved in the alignment analysis. In [21], a framework was proposed for modeling the alignment at the functional level and some metrics were introduced for measuring the alignment degree between business process and software systems. In [22], criteria and associated generic metrics were proposed to quantify at which extent there is a fit between the business and system which supports it. In [23], a framework was presented for analyzing the alignment problem and proposing an approach to application architecture design with reference to a business context.

The Business and Information Systems Misalignment Model (BISMAM), is proposed, to understand, classify and manage misalignments [15, 24]. The proposal addresses the alignment problem combining the misalignment approach with medical sciences approaches. The authors believe that the misalignment approach is closer to organizations real life and that medical sciences approaches provide relevant concepts and techniques for misalignment management.

The research constructs were measured using multi-item scales adapted from the SAM framework [25]. The relationship existing between the alignment maturity dimensions and IS strategic alignment was examined. In [26], a new conceptualization of alignment was reported together with the development and testing of a model which addresses this issue. Data from a survey of 415 medium-large companies were used to test the model. It was found that IS-marketing alignment had a positive impact on both business and marketing performances. This study extended the application of Venkatraman's work [13] and offered a support to the robustness of his conceptualization and measurement of strategic orientation.

In [27], it is debated that Software Process Improvement (SPI) programs increase the competitiveness of software development organizations, and that QFD (Quality Function Deployment) is an effective technique that can be used for institutionalizing improvement processes.

As highlighted by Kitchenham [28], a systematic literature review is a means for evaluating and interpreting all the available research that relevant to a particular research question, topic area, or phenomenon of interest. Systematic reviews aim to present a fair evaluation of a research topic by using a trustworthy, rigorous, and auditable methodology. In particular, Kitchenham [28] proposes a comprehensive guideline for performing systematic literature reviews appropriate for software engineering researches. This guideline was applied in numerous systematic studies, such as the one regarding for cost estimation studies [29], or that one included in [31] for exploring the evidence on the use of expert judgment, formal models and a combination of the two when estimating the software development work effort. The study proposed in this paper follows the guidelines presented in the current literature.

3. Description of the papers selection process

The proposed literature review was obtained by analyzing some alignment papers selected from the literature. In particular, a full investigation of the research papers concerning alignment was performed. Numerous journals and conference papers were identified. Therefore, it was decided to concentrate the attention on journal papers as they should publish more mature research results. With this in mind, the Science Direct database was queried.

The identification of relevant studies was based on an examination of papers found through a manual inspection of the papers resulting by querying the Science Direct database. The first query aimed to recover papers including the term 'alignment'. Then, the selection was refined applying the 'business management and accounting', 'computer science', 'decision science', and 'economics, econometrics and Finance' subject terms, from 2003 to present, and including also journals. In total, 1483 paper were found, in the first phase all papers was examined by using a manual inspection of titles, and if unsure, the abstracts. After this primary

study, 131 papers distributed within 46 journal were selected. In a second phase, a deep analysis of the papers was conducted and 90 papers on 37 journals were selected.

Following the first analysis, the journals that were discovered to be the most representative of the alignment topic, and modeling in particular, were Information & Management Journal and Journal of Strategic Information Systems from Elsevier. From the first journal, 28 articles were identified, 16 of which were discarded as 5 of them were not available on-line, 3 were published before 2003, and 4 did not concern Business and IT alignment. Therefore, the 16 papers listed in the table of the Appendix were considered for being analyzed. From Journal of Strategic Information Systems, 18 articles were identified: 8 of them were published before 2003, and 3 were discarded as they were out of topic. The 7 remaining papers, listed in the table of the Appendix, were included in the analysis.

4. Alignment strategies in the analysed papers

As explained in the previous section, the search of papers regarding Software and Business alignment in Science Direct brought to the identification of 90 papers distributed in 37 journal and published in the period 2003-2012. The first aspect that came out was that the publisher of all the identified journals was Elsevier. It was also found that the total number of journals treating alignment aspects was quite high, or at least higher than expected. In any case, except in some case, each journal published a small number of papers. This results quite evident by observing Table 1, where all the involved papers are listed in the second column. The table also lists the number, proportion, and cumulative proportion of the papers published in each journal.

Table 1. Science Direct papers treating Alignment topics

Journal	Count	Proportion (fk)	Cumulative Proportion (Fk)
Journal Information & Management	16	17.78%	17.78%
Journal of Strategic Information Systems	7	7.78%	25.56%
Journal of Operations Management	5	5.56%	31.11%
Industrial Marketing Management	5	5.56%	36.67%
Expert Systems with Applications	5	5.56%	42.22%
Int. J. Production Economics	5	5.56%	47.78%
Long Range Planning	4	4.44%	52.22%
Government Information Quarterly	4	4.44%	56.67%
Journal of Business Research	3	3.33%	60.00%
Int. Journal of Information Management	3	3.33%	63.33%
Hospitality Management	3	3.33%	66.67%
Journal of Purchasing & Supply Management	2	2.22%	68.89%
Int. Journal of Project Management	2	2.22%	71.11%
Information and Software Technology	2	2.22%	73.33%
Information and Organization	2	2.22%	75.56%
Others	22	24.44%	100%
Sum	90	100%	

The cumulative proportion shows that more than 50 percent of the alignment papers were published in 7 journals, and just 15 journals published more than the three fourth of all the involved papers. Each of the other journal published only one paper regarding alignment. In addition, in the considered period the most

representative journal regarding this topic is Journal Information & Management with 16 papers, followed by Journal of Strategic Information Systems with 7 papers.

Table 2 shows the distribution of the publication of the analyzed journals in the period going from 2003 to 2012. It is worth noticing that except for a small peak in 2005, the large amount of publications were published in the last years. In fact, if it is considered that year 2012 is not yet finish yet, the large part of publications is concentrated in the last years starting from 2009.

Table 2. Distribution of the published paper in the period 2003-2012

Year	Count	Proportion(fk)	Cumulative Proportion(Fk)
2012	2	2.22%	2.22%
2011	17	18.89%	21.11%
2010	17	18.89%	40.00%
2009	11	12.22%	52.22%
2008	5	5.56%	57.78%
2007	8	8.89%	66.67%
2006	9	10.00%	76.67%
2005	10	11.11%	87.78%
2004	9	10.00%	97.78%
2003	2	2.22%	100.00%
Sum	90	100%	

Besides the publication year, the papers were analyzed for their typology. Three kinds of typologies were considered: Industrial survey, Research and Practice. The papers classified as Industrial Survey were those ones describing interviews performed within operative organizations for understanding if and how they were facing the problem of the alignment between different entities and with reference to which abstraction level. The Research papers were those ones proposing innovative strategies for managing the alignment. The papers classified as Practice were those describing experiences for experimenting defined strategies. Research Surveys and Systematic Reviews were also searched, but no journals published these kinds of study.

Table 3 shows that, with reference to the typology, the papers were about uniformly distributed in almost all the considered journals. In addition, the belonging to a certain typology was not exclusive, as some papers were classified as research ones, but also discussed practice experiences, or were industrial survey and in the same time experimented some alignment approach. In particular, some journals, such as Expert Systems with Applications and Long Range Planning, were mainly oriented to present new alignment strategies and experiment them in practical experiences, instead of discussing the alignment status within organizations. On the other hand, the papers of other journal, such Journal of Business Research and Information and Organization, presented the results of industrial investigations. In some case, the results of the Industrial surveys were used for defining alignment strategies adapt to the investigated organizations. At this point, the performed analysis tried to understand the way the papers listed in Table 1 faced the alignment topic. The results of the analysis showed that they considered different aspects of the alignment and analyze it at different abstraction levels. This preliminary analysis indicated that more of the 50% of the papers proposed new strategies articulated in different phases, each of which facing a particular aspect. Also reading other literature, the main aspects that an alignment strategy should at least consider are the following three: Modeling, Alignment evaluation, Evolution execution.

These three concerns represent a synthesis of all the aspects that the definition of an alignment strategy should include. In the following a description of the three aspects is given:

1. **Modeling.** All the entities involved by the alignment analysis should be modeled, so to exclude all the business and technological details that are not relevant for the study to be conducted. This phase is necessary to understand which is the information considered for analyzing the alignment, and if enough knowledge is available for performing the task. In addition, the modeled entities regarding the different aspects should be mapped, so to facilitate the next analysis [32].
2. **Alignment evaluation.** An alignment approach should quantitatively evaluate the alignment degree of the considered entities for objectively analyzing it and understanding if it reaches a satisfying level or improvement actions should be performed for advancing it. The quantitative evaluation could require the definition of suitable metrics easily quantifiable by using the models.
3. **Evolution execution.** If the alignment level does not reach a satisfying level, a misalignment in the analyzed entities exists and an alignment strategy should include activities for identifying the evolution actions to be performed for increasing the alignment level, and executes the planned actions.

Table 3. Typology of the Science Direct papers

Journal	Count	Industrial Survey		Research		Practice	
		Count	%	Count	%	Count	%
Journal Information & Management	16	7	19.44%	8	19.51%	4	8.00%
Journal of Strategic Information Systems	7	2	5.57%	4	9.76%	2	4.00%
Industrial Marketing Management	5	1	2.78%	2	4.88%	4	8.00%
Journal of Operations Management	5	0	0.00%	4	9.76%	3	6.00%
Expert Systems with Applications	5	0	0.00%	5	12.20%	4	4.00%
Int. J. Production Economics	5	0	0.00%	2	4.88%	3	8.00%
Government Information Quarterly	4	0	0.00%	2	4.88%	3	6.00%
Long Range Planning	4	0	0.00%	4	9.76%	0	0.00%
Hospitality Management	3	2	5.56%	0	0.00%	3	6.00%
Int. Journal of Information Management	3	2	5.56%	1	2.44%	1	2.00%
Journal of Business Research	3	3	8.33%	0	0.00%	3	6.00%
Information and Organization	2	2	5.56%	0	0.00%	2	4.00%
Information and Software Technology	2	1	2.78%	1	2.44%	1	2.00%
Information and Software Technology	2	2	5.56%	0	0.00%	2	4.00%
Int.l Journal of Project Management	2	1	2.78%	1	2.44%	1	2.00%
Journal of Purchasing & Supply Management	2	1	2.78%	1	2.44%	1	2.00%
Others	22	13	36.11%	6	14.64%	16	32.00%
Sum	90	36	100%	41	100%	50	100%

A first analysis of the papers showed that the main proposed strategies regarded the modelling of entities involved in the alignment management and almost none of them treated the aspect of the evolution. Table 4 shows the results of the analysis: there are some columns regarding the modelling and other ones concerning the evaluation, while the evolution aspect is not included as the related columns would have been null.

All the approaches proposed by the analysed papers did not offer any technological support to the proposed solutions. A tool was proposed just in one of the papers published in the Int. J. Production Economics and in the one of Information and Software Technology.

Almost all the considered journals consider the modelling and more than 50% of the analysed papers treat modelling techniques and methods. On the contrary, many journals do not include papers, published in the analysed period, dealing with the alignment evaluation, and only the 27% of the papers consider this aspect. This motivates the content of the next section that analyses various aspects of the modelling strategies included in the papers of some of the journals. In particular, Table 4 highlights that the journals presenting the larger number of solutions regarding this aspect are the first two: Journal Information & Management and Journal of Strategic Information Systems. In fact, they exhibit the higher percentage of published papers. Finally, the kind of verification presented in the selected papers was analysed.

Three kinds of verifications were considered. The first kind concerned the execution of simple case studies, very often performed in-vitro in a laboratory. The second kind regarded the execution of experiences on the field with the collaboration of a working organization. Then, empirical studies were considered. Table 5 shows that the performed verifications were mainly executed on the field and in empirical study. In addition, the journals that published a higher number of papers regarding alignment, were also those that paid more attention to these kinds of experiences.

Table 4. Alignment activities treated in the Science Direct papers

Journal	Count	Modeling Approach			Alignment Evaluation		
		Count	%	Prop.	Count	%	Prop.
Journal Information & Management	16	12	75.0%	26.09%	5	31.3%	20.83%
Journal of Strategic Information Systems	7	6	85.7%	13.04%	1	14.3%	4.17%
Journal of Operations Management	5	3	60.0%	6.52%	2	40.0%	8.33%
Industrial Marketing Management	5	3	60.0%	6.52%	1	20.0%	4.17%
Expert Systems with Applications	5	4	80.0%	8.70%	3	60.0%	12.50%
Int. J. Production Economics	5	2	40.0%	4.35%	0	0.0%	0.00%
Long Range Planning	4	1	25.0%	2.17%	3	75.0%	12.50%
Government Information Quarterly	4	2	50.0%	4.35%	0	0.0%	0.00%
Journal of Business Research	3	0	0.0%	0.00%	1	33.3%	4.17%
Int. Journal of Information Management	3	1	33.3%	2.17%	0	0.0%	0.00%
Hospitality Management	3	2	66.7%	4.35%	2	66.7%	8.33%
Journal of Purchasing & Supply Management	2	1	50.0%	2.17%	0	0.0%	0.00%
Int. Journal of Project Management	2	1	50.0%	2.17%	0	0.0%	0.00%
Information and Software Technology	2	1	50.0%	2.17%	0	0.0%	0.00%
Information and Organization	2	0	0.0%	0.00%	0	0.0%	0.00%
Other	22	7	31.8%	15.22%	6	27.3%	25%
Sum	90	46			24		

Table 5. Kind of performed experimentation

Journal	Count	Case study	Case study%	On the field	On the field %	Empirical studies	Empirical Studies %
Journal Information & Management	16	3	18.75%	10	62.50%	11	68.75%
Journal of Strategic Information Systems	7	2	28.57%	3	42.86%	2	28.57%
Journal of Operations Management	5	1	20.00%	3	60.00%	4	80.00%
Industrial Marketing Management	5	0	0.00%	1	20.00%	1	20.00%
Expert Systems with Applications	5	1	20.00%	1	20.00%	2	40.00%
Int. J. Production Economics	5	1	20.00%	0	0.00%	1	20.00%
Government Information Quarterly	4	2	50.00%	2	50.00%	0	0.00%
Long Range Planning	4	0	0.00%	1	25.00%	1	25.00%
Hospitality Management	3	0	0.00%	2	66.67%	2	66.67%
Int. Journal of Information Management	3	1	33.33%	1	33.33%	1	33.33%
Journal of Business Research	3	0	0.00%	2	66.67%	1	33.33%
Information and Organization	2	0	0.00%	0	0.00%	2	100.00%
Information and Software Technology	2	0	0.00%	1	50.00%	1	50.00%
Int. Journal of Project Management	2	0	0.00%	0	0.00%	1	50.00%
Journal of Purchasing & Supply Management	2	0	0.00%	0	0.00%	1	50.00%
Others	22	10	50.00%	12	54.54%	8	36.36%
Sum	90	24	26.67%	39	43.33%	39	43.33%

5. Modeling strategies in the analysed papers

The modelling phase is necessary to understand which is the information that the considered alignment approach uses for analyzing the alignment at the considered abstraction level and if enough knowledge is available for performing the task. All the entities involved by the alignment analysis should be modelled, so to exclude all the business and technological details that are not relevant for the study to be conducted.

As previously explained, the second paper of the performed literature review focused on the aspects dealing with the modelling activities. The two journals that most dealt with this aspect were Journal Information & Management and Journal of Strategic Information Systems. The aim of the analysis was to investigate the completeness of the available information regarding the existence of modeling techniques and the possibility of representing the elementary entities involved in the alignment analysis and related reciprocal relationships. Moreover, the maturity of an analyzed modeling approach was investigated by verifying if its definition depended on other approaches and if it was already applied to case studies or working contexts. In particular, the following questions were used as drivers for conducting the review: Are models to represent alignment used? Are models to represent the separate entities used? Is the proposed model based on existing research approaches? Is the modeling automatically supported? Was the proposed modeling approach applied to case studies? Was the proposed modeling approach applied on the field?

The results were obtained by analyzing the documentation related to the considered strategy and assigning as answer one of the following value to the questions above: Yes, indicating that the information required by the question was clearly and completely described; No, indicating that the analyzed documentation did not consider the specific aspect; Partially, indicating that the aspect indicated in the question was only partial addressed; Not clear, indicating that the documentation did not clearly describe the information needed.

Table 6 shows that in the large part of the considered papers, models are used to represent the alignment. But only half of the reviewed papers used specific models for representing the separate entities involved in the

alignment. What clearly emerges from Table 6 is that only S2 and S7 studies propose a modelling strategy automatically supported, while all the other strategy propose a not automated approach. Moreover, case studies are discussed just in few cases (S2, S3, S6, S14, S20, S21, S22, S23). The same happens for the application on the field. Table 6 also shows that a significant part of the approaches are based on already existing modelling approaches. Table 7 includes the distribution of the analysed papers with reference to the considered dimension. It is worth noticing that the large part of the papers considers the alignment at the strategic level and only some at the functional level. Some approaches, such as S1,S3, S15, S22 and S23, consider both levels, strategic and functional. The entities involved in the reviewed approaches, are reported in Table 8. The table shows that the large part of the approaches considers business entities, with particular reference to business strategies and processes; while, a minor part of them also considers the IT components.

Table 6. Results of the analysis of the considered papers

	Model used	Separate entities	Existing approach	Automatically supported	Case studies	On the field
Information & Management Journal						
S1	no	no	no	no	no	no
S2	yes	no	no	part	yes	no
S3	yes	yes	ncl	no	yes	yes
S4	yes	no	no	no	no	yes
S5	yes	no	no	no	no	yes
S6	yes	yes	yes	no	yes	yes
S7	no	no	yes	part	no	yes
S8	no	no	no	no	no	no
S9	part	yes	yes	no	no	yes
S10	yes	yes	ncl	no	no	yes
S11	yes	no	ncl	no	no	yes
S12	no	no	no	no	no	no
S13	yes	yes	yes	no	no	yes
S14	yes	no	yes	no	yes	no
S15	yes	no	yes	no	no	no
S16	yes	yes	ncl	no	no	yes
Journal of Strategic Information Systems						
S17	no	no	no	no	no	no
S18	yes	yes	yes	no	no	yes
S19	yes	yes	part	no	no	yes
S20	yes	yes	yes	no	yes	no
S21	yes	no	yes	no	yes	no
S22	yes	yes	yes	no	yes	no
S23	yes	yes	yes	no	yes	no

Table 7. Distribution of the papers with reference to dimension

Dimension of alignment	Paper
Strategic	S1,S3,S4,S5,S6,S7,S8,S9,S11,S12,S13,S15, S17,S19,S20,S22,S23
Functional	S1,S2,S3,S14,S15,S16,S18,S21, S22,S23

Table 8. Involved entities

Involved Entities	Paper
Business Strategy	S2,S5,S8,S7,S9,S10,S13, S3,S22,S20,S23,S17
IT strategy	S5, S8,S10,S13, S22
IT investment	S8,S13
Business performance	S7, S8,S3
Business Structure	S10,S20,S23
IT Structure	S10,S13, S20,S23
Business process	S3, S13, S15
Organization's structure	S13
Human resource	S15
ERP Strategy, Time cost, Financial Benefits	S9
Critical success factor	S3
IT systems	S3,S5
Business objectives, E-business performance, E-commerce strategy, E-commerce strength and opportunities	S4
Business rule	S14,S15
Service systems	S14
Environmental uncertainty, Information intensity, Business dependence on It, IT participation in Business Planning, IT Plan, Business Plan, Competitive advantage	S16, S20
IS managers, Systems development methodologies	S1
Goal (enterprise level), Functional (scenario level), Data, Output misfits (activity level)	S2
IS Strategy, Corporate Strategy	S20,S23
Organization's IS	S7
Technical elements of IT Infrastructure, Human elements of IT Infrastructure, Process elements of IT Infrastructure	S11
IS/IT manager, Business manager	S20
Infrastructure, Application	S5
Organisational infrastructure and processes	S22
IT infrastructure and processes	S22,S18
IT Sub-Unit	S18
IS Capability,IS Competencies	S19
Business and technical skills, knowledge, experience	S19

Table 9 describes the modelling techniques used in the analysed papers. Many papers consider the SAM – Strategic Alignment Model – model [13]. It is useful to treat the IS strategy alignment and becomes a support for a collaborative process between the business strategy, business organisation, IS infrastructure, and IT strategy, at two different abstraction level of the alignment: functional and strategic. The *Path model* is used to organize different variables. In particular, in S9, hypotheses are considered, having as a starting point, the importance of the strategic alignment, and motivations and success of the ERP projects. The model captures the relationships between the degree of success of ERP projects, the associated business process changes, and subsequent internal efficiency benefits. Then, it captures the impact of internal process efficiency on customer

and financial benefits. Paper S10 adopts the *gestalt research model* considering a perspective of fit, and looking at a large number of variables that collectively define a meaningful and coherent slice of organizational reality. The *Business rules services model* is considered in S14. It provides high level services and functions that evolve during the maturity and expands the scope of the business rules deployments across an enterprise. The *Business Rules Deployment Maturity Model* identifies maturity along five dimensions, including organizational scope, ownership, structure, development responsibility, and implementation responsibility. In addition, many analysed papers define their own measurement approach. Finally, many papers apply the proposed approach as indicated in Table 10. In particular, they include applications on the field and empirical studies.

Table 9. Used Modelling techniques

Model	Information & Management Journal	Journal of Strategic Information Systems
SAM Strategic Alignment Model	S6,S15	S22,S20,S23
Path model	S9	
Gestalt model of strategic alignment	S10	
Business rules deployment maturity model	S14, S16	
Business rules tasks/services model	S14	
UML model	S2	
Integrated Model of Alignment within IT unit - adapted from Luftman and Kempaiah (2007)		S18
A model of the IS capability(Influenced by the work of Caldeira (1998))		S19
Other	S4,S3,S7,S11, S13,	S21

Table 10. Kind of the application of the proposed approach

Type	Information & Management Journal	Journal of Strategic Information Systems
Case Study	S2,S3,S14	S20,S22
On the field	S4,S3,S5,S6,S7,S10, S11,S12,S16, S13	S17,S18,S23,
Empirical Study	S5,S6,S7,S8,S9,S10,S11,S13,	S17,S23

6. Conclusions

The alignment between business and information systems assumed a growing relevance in the last years. This research issue was addressed in several researches proposing numerous methods, techniques and tools. This paper proposes a literature review to evaluate different approaches, with aim of discovering similarity, maturity, capability to measure, to model to asses and to evolve the alignment. This kind of investigation is aimed to support and address future research concerning the alignment. Indeed, it is necessary to understand what are the aspects considered in the literature of this area with a systematic approach.

The proposed analysis was applied to the research works regarding the alignment topics published in Journal Information & Management and the Journal of Strategic Information System, and the results of the evaluation is presented. From the conducted study it emerges that the modeling, measurement and evolution phases of an alignment approach are not adequately addressed in the analyzed strategies. Obviously these results need the confirmation of a wider investigation involving more and more research approaches. Indeed, this is the main future work on which the authors are working.

As future work, a survey of the studies presented in the literature can be produced to understand how to better address the research issues in the alignment area. Also with the aim to classify different model approach, measurement methodology, and quantitative approach to address the issue of alignment at different level of abstraction. Further purpose is understand what are the methodologies, tool and technique more useful in different field of alignment. Because the field of alignment is wide and concern different aspect, this study, moreover, will help practitioner, student, Ph.D and researcher to focalize the attention on the particular interested issue.

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Appendix A. The analysed papers

Considered papers from Journal Information & Management

- S1. Huisman, M., Iivari, J., 2006. Deployment of systems development methodologies: Perceptual congruence between IS managers and systems developers, 43(1), pp.29-49.
- S2. Wu, J., Shin, S., Heng, M.S.H., 2007. A methodology for ERP misfit analysis, 44(8), pp.666-680.
- S3. Peak, D., Guynes, C.S., Kroon, V., 2005. Information technology Alignment Planning—a case study. 42(4), pp.619-633.
- S4. Kearns, G. S., 2005 An electronic commerce strategic typology: insights from case studies, 42(7), pp.1023-1036.
- S5. Cumps, B., Martens, D., De Backer, M., Haesen, R., Viaene, S., Dedene, G., Baesens, B., Snoeck, M., 2009. Inferring comprehensible business/ICT alignment rules. 46(2), pp.116-124.
- S6. Chen, L., 2010. Business–IT alignment maturity of companies in China. 47(1), pp.9-16.
- S7. Johnson, A. M., Lederer, A. L., 2010 CEO/CIO mutual understanding, strategic alignment, and the contribution of IS to the organization, 47(3), pp.138-149.
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- S16. Kearns, G. S., Lederer, A. L., 2004 The impact of industry contextual factors on IT focus and the use of IT for competitive advantage, 41(7), pp. 899-919.

Considered papers from Journal of Strategic Information Systems

- S17. Mohdzaher B. Mohdzain, John M. Ward, 2007. A study of subsidiaries' views of information systems strategic planning in multinational organizations, 16 pp. 324–352.
- S18. Dhaliwal, J., Onita, C., G. Poston, R., Zhang, X., P., 2011. Alignment within the software development unit: Assessing structural and relational dimensions between developers and testers, 20 pp. 323–342
- S19. Peppard, J., Ward, J., 2004. Beyond strategic information systems: towards an IS capability, 13 pp. 167–194
- S20. Boonstra, A., Broekhuis, M., van Offenbeek, M., Wortmann, H., 2011. Strategic alternatives in telecare design Developing a value-configuration-based alignment framework, 20 pp. 198–214
- S21. Beard, J., W., Sumner, M., 2004. Seeking strategic advantage in the post-net era: viewing ERP systems from the resource-based perspective, 13 pp. 129–150
- S22. Wijnhoven, F., Spil, T., Stegwee, R., Tjang A Fa. R., 2006. Post-merger IT integration strategies: An IT alignment perspective, 15 pp. 5–28
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