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## IT-Business Alignment: A Systematic Literature Review

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### Abstract

IT-business alignment has been the focus for top managers in the last two decades. Literature reported IT-business alignment as one of the key enablers for the success of IT in an organization. Given its importance, this study aimed at exploring the reported benefits of IT-business alignment, the proposed methodologies and the challenges in implementing these models. To do so, a systematic literature review was conducted to find answers to these questions. This study reveals that applying IT in an appropriate and timely way, in harmony with business strategies, goals and needs can result in plenty of benefits for an organization. These benefits include enhanced cooperation among members, competitive advantage, performance enhancement, high return on investment, facilitation of processes and growth among others. In fact, IT today is not only a tool but has become a business enabler delivering values for organization and this implies that huge investment on IT must be well managed and controlled in order to align IT with business. Also, the study reviewed some proposed methodologies or models that have contributed in achieving sustained alignment between business and IT. Lastly, the study reveals that, despite the inevitable benefits, there are still some difficulties or challenges organizations faced in establishing an atmosphere of honesty and humility between IT and business. These challenges are lack of effective communication, low return on IT investments, lack of the necessary skills to adapt to changes in technology or conflicting priorities.

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## 1. INTRODUCTION

Information technology (IT) plays a prominent role in organizations worldwide. Back in 2011, IT and business alignment appeared as a top concern for IT practitioners and company executives [1]. This interest lies in the potential of IT– business alignment to drive not only technological success, but organizational success as well, and above all it facilitates competitive and strategic advantages of an organization. Moreover, IT is transforming the way companies operate. In particular, IT affects business processes, how companies deliver their services to customers, their communication means with customers, suppliers, and even employees inside the organization [2]. However, many organizations and consultants have realized that IT cannot in itself offer these benefits, but it is rather through its proper use and management, in alignment with the business objectives, that corporate value can be obtained [3]. Hence, for any organization to achieve long-term sustainable success, it is essential that all elements that comprise the organization, in particular IT, fully understand the business objectives and work together in a duly controlled and coordinated way to ensure that those objectives are met.

The concept of IT-business alignment entails IT and business working in communion. In this paper, authors adopt the definition provided in [4] given the seminal importance of the work. In this paper, the alignment between business and IT is defined as the degree of fit and integration between business strategy, IT strategy, organisational infrastructure and IT infrastructure. More precisely, alignment is the degree to which business and IT depend on one another and share their domain knowledge to achieve a common goal.

Unfortunately, the majority of research in the last fifteen years in the topic has treated IT and the business as diverse and separate organizational areas [5]. This approach has been criticized as it creates artificial boundaries, which in turn lead to misalignment. The claim is that large investments required for IT projects often raise questions regarding their business justification. Some companies, for instance, poured millions of dollars into enterprise resource planning (ERP) systems, only to find ineffective operations, work disruption, or even lost revenues[6]. It also argues that IT alignment remains elusive, not because of a lack of understanding of the requirement or challenge, but rather because of a lack of clarity as to who should be held responsible, which parties should contribute and what mechanisms should be employed[7]. In particular, the collective role of the board and the chief information officer (CIO) in an organization still remain vague. Given the importance of the subject, authors carried out a systematic literature review (SLR) in order to find out the different initiatives reported to achieve this alignment, as well as the main challenges and benefits reported.

## 2. RESEARCH METHODOLOGY

We adopted SLR as the technique to conduct the literature review. A SLR is a means of identification, evaluation and interpretation of research relevant to a specific research question or a subject of interest. The reference guide for this piece of work is adapted from [8]. In the next subsection, the research questions defining the focus and aim of this paper are presented. Finally, authors will explicitly describe the process of review protocol and data sources.

### 2.1. Research questions

The following research questions were examined:

Q1: What are the reported benefits of IT-Business alignment?

Q2: What are the available models of IT- Business alignment?

Q3: What are the challenges in adopting IT-Business alignment models?

### 2.2. The process of systematic review protocol

This subsection comprises of a series of steps, as follows: establishing a reliable data source for the research questions, conducting a search strategy, study process, selection of relevant primary studies (inclusion and exclusion criteria), quality assessment and data extraction.

#### 2.2.1. Data sources

To find relevant literature on the benefits and challenges of IT and business alignment, five databases were

selected and used for this study as follows:

- ACM Digital Library (<http://dl.acm.org>)
- Science Direct (<http://www.sciencedirect.com>)
- Springer Link (<http://link.springer.com>)
- IEEE Xplore Digital Library (<https://ieeexplore.ieee.org>)
- Taylor and Francis Group online (<https://www.tandfonline.com>)

The aforementioned online databases were chosen by authors, given that they are among the most relevant sources of articles within the broad field of computing and because they are accessible using institutional accounts.

### 2.2.2. Search strategy

When conducting a literature search, it is imperative to establish a search strategy to find relevant search results. To do so, research questions are used to derive keywords. In our case, RQ1 is aimed to identify reported benefits of IT and business alignment. RQ2 deals with the available models of IT-Business alignment and RQ3 explicitly is aimed to discuss the challenges in adopting IT-Business alignment models.

Therefore, IT-Business Alignment, benefits, challenges and models are the keywords for the search string. Final search string is as follows:

("IT-business alignment" OR "IT and Business alignment" OR "IT/business alignment") AND ("Benefits" OR "Opportunities" OR "Challenges" OR "Threats")

This search string was adapted and applied in the several databases listed in the previous section. A single keyword was chosen for all research questions. Authors tried specific search strings for each of the RQs and obtained same values. We also tried different synonyms (Disadvantages, for instance) providing same results.

### 2.2.3. Search Process

The process of selecting relevant primary studies began with the definition of the final search query which was executed in the selected academic databases. The resulting articles were then read and filtered according to the inclusion and exclusion criteria. The approved articles were checked for duplicates and their references were analysed to identify studies that could have been overlooked in the initial search.

### 2.2.4. Study selection

After initial results were retrieved, non-pertinent primary studies were exempted by applying the inclusion and exclusion criteria defined in what follows:

Inclusion criteria:

- Papers that discussed the value of IT in an organization.
- Papers that contextually handle IT-business alignment.
- Papers that are focused on the challenges of adopting IT-Business alignment models.
- Papers that are accessible.

Exclusion criteria:

- Papers that do not contextually discuss IT-Business alignment.
- Papers that do not capture relevant keywords of IT and Business alignment.
- Papers that are inaccessible.
- Papers that are published before 1990

### 2.2.5. Data extraction

Retrieved papers were collected in Endnote reference manager tool to enable screening and filtering of results. Filtering was made by means of Microsoft Excel. This tool was a valid mean to classify qualitative and quantitative data needed to answer the three research questions defined earlier.

## 3. SELECTION OF PRIMARY STUDIES

In Section II, authors explain the protocol followed to identify the relevant primary studies and extraction of the relevant data. In this section, authors present the results of the systematic literature review conducted. The search

query term was executed in the various databases and a total of 732 results were retrieved initially. In the first round after reading their titles, keywords and abstracts, a final number of 84 papers were selected. In the second round, inclusion and exclusion criteria were applied, duplicates files removed, as a result 24 full texts were selected as primary sources for the study to answer the research questions.

Table 1: paper filtering phases

Library	Number of hits	Titles, keywords and Abstracts	Full text
ACM Digital Library	31	5	2
ScienceDirect	175	10	3
Springer Link	259	28	4
IEEE Xplore	179	21	8
Taylor and Francis	88	20	7
<b>TOTAL</b>	732	84	24

#### 4. FINDINGS AND DISCUSSION

This section describes the findings and answers the research questions. The relevant literature will be discussed with respect to each research question. Firstly, Research Question 1 (RQ1) will discuss the reported benefits or advantages of IT-Business alignment in an organization. Secondly, Research Question 2 (RQ2) will explain some proposed models or methodologies that have been able to address misalignment to sustain the relationship between Chief Information Officers (CIOs) and Chief Executive Officers (CEOs). Thirdly, Research Question 3 (RQ3) will broadly discuss major challenges faced in implementing the IT-Business alignment models.

**RQ1:** What are the reported benefits of IT- Business alignment?

In what follows, the main benefits of IT-business alignment in an organization are reported.

**Enhanced cooperation:** Cooperation refers to the shared domain knowledge and common understanding between the IT and line managers about a specific business process and how IT can be used to improve the performance of that process [9]. This Shared IT-Business Understanding is the knowledge that IT managers possess about a specific process, the knowledge the line managers possess about the potential opportunities to apply IT to improve the process, and the common understanding between IT and line managers regarding how IT can be used to improve process performance[10]. In other words, shared IT-Business understanding enables the organization to conceive, implement, and use innovative IT applications to improve process performance [11].

**Enhanced competitive advantage:** This refers to a sustain advantage or an edge a company has over its competitors. Alignment of IT and business strategy plays an important role to achieve company goals. Indeed, the business and IT performance are tightly coupled, and company cannot be competitive if their business and IT strategies are not aligned [12]. In this dimension, CIOs and CEOs today have a great role in the alignment of IT and business strategy. They are responsible for matching IT strategy to organizational orientation to achieve competitive advantage. They also play several leadership roles such as decision making, informational role, leader for change management, and provocateur for technology initiatives among others.

**Facilitates organizational processes and growth:** When alignment exists, IT delivers systems and services that are crucial to the company's strategies, operations, or user needs. As a result, executives can perceive the contributions IT makes, and users are more likely to accept and utilize IT resources. In fact, its potential does not stop there. By making plans based on the business strategy, IT can actually anticipate what the business will require in the future, and lay out a trajectory to meet those upcoming needs [13].

**Higher return on investment and performance enhancement:** Business-IT alignment has shown to improve return on investment, cost savings, time efficiency, and so on. This is because huge investments spent on IT by companies are highly managed and controlled [14]. Research has also shown that small and medium enterprises (SMEs) with high level of business- IT alignment indicate better performance and profit than SMEs with low level of business-IT alignment. This means that there is a positive relationship between business- IT alignment and organizational performance based on strategic perspective [13].

**RQ2:** What are the available models of IT- Business alignment?

Several models have been proposed to explain how alignment between IT and business can be achieved and sustained. The two main models are as follows:

I) **Strategic Alignment Model (SAM)**: The model [15] relies on four different strategic domains: the business strategy, organizational infrastructure and process, IT strategy, and IT infrastructure and process. It is also based on two building blocks: strategic fit and functional integration and within each block, there are the external and internal domains.

The concept of strategic alignment is primarily based on the notion that information technology must match business strategy in order to forge a strong competitive edge and bring powerful solutions to organisations [16]. According to [15], a company must consider both ‘strategic fit’ and ‘functional integration’ to fully develop its competitive potential and enhance alignment. Strategic fit is the extent to which infrastructure and processes support a company’s strategy while functional strategy is the extent to which information technology approaches support the business approaches[17].

In the business strategy field, the external domain is the arena in which the firm competes and is concerned with business scope decisions, distinctive competency decisions and governance decisions. This domain is termed as ‘business strategy’. On the other hand, the internal domain is concerned with choices that define the administrative structure, the design or redesign of critical business processes and the acquisition and development of human resource skills. This domain is termed as ‘organizational infrastructure and processes’. In the IT strategy field, the external domain is concerned with how the firm is positioned in the IT marketplace according to its technology scope, systemic competencies and IT governance. This domain is termed as ‘IT strategy’. On the other hand, the internal domain is concerned with how the IT infrastructure should be configured and managed in respect of its architecture, processes and skills [18]. This domain is termed ‘IT infrastructure and processes’. Research has shown [15] that effective management of IT means achieving a balance among the choices made across all four domains—business strategy, IT strategy, organizational infrastructure and processes, and IT infrastructure and processes.

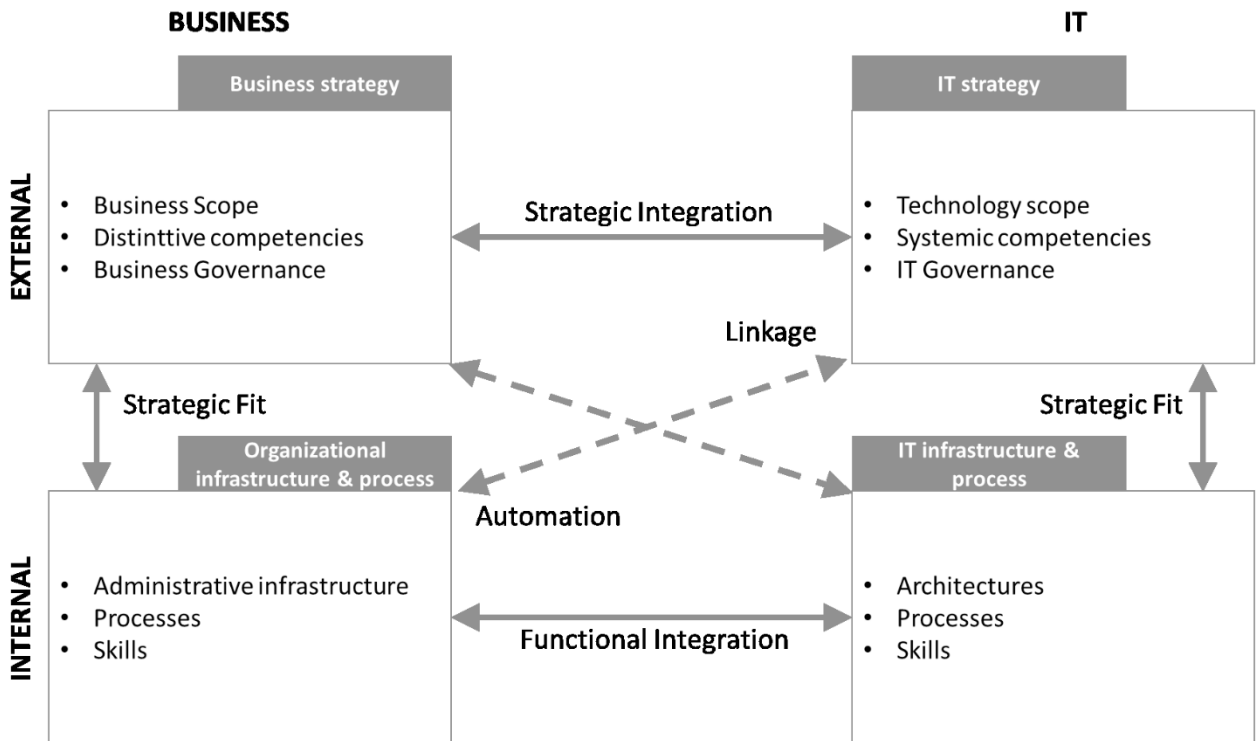


Figure 1: Strategic Alignment Model [15]

II) **Strategic Alignment Maturity Model (SAMM)**. This model was proposed by [19]. SAMM is a tool that can be used to measure alignment maturity [20]. SAMM proposes that IT-Business alignment can be captured according to six areas of maturity. Table 2 shows the areas and levels of maturity. It also shows some sample attributes of each

area that are relevant to the measurement. SAMM prescribes the following areas in order to measure organizational maturity: A) Communication; B) Competency / Value measurement; C) Governance; D) Partnership; E) Scope and architecture; and F) Skills. For each of these areas, this maturity model classifies the alignment between business and IT into five levels: **1)** Initial / Ad hoc process (where business and IT are not harmonized or aligned); **2)** Committed process (where the organization has committed to becoming aligned with IT); **3)** Established / Focused process (where the alignment is established between IT and business and focused on business objectives); **4)** Improved / Managed process (where the concept of IT as a “Value Centre” is reinforced); **5)** Optimized process (where the strategic planning of business and IT is integrated and reached a co-adaptive stage).

Table 2: SAMM and its areas, maturity levels and attributes [19].

Area	Level	Attributes
<b>Communication maturity:</b> Liaison Effectiveness, Understanding of Business by IT, Understanding of IT Inter/Intra-organizational Learning/Education, Protocol Rigidity, Knowledge Sharing	1	Business/IT lack understanding
	2	Limited business/it understanding
	3	Good understanding; relaxed communications, emerging
	4	Bonding, unified
	5	Informal, pervasive
<b>IT Value measurement/competency maturity:</b> IT Metrics, Business Metrics, Balanced, Metrics, Service Level, Agreements, Benchmarking, Formal, Assessments/Reviews, and Continuous Improvement	1	Some technical measurements
	2	Measures functional cost efficiency
	3	Measures some cost effectiveness; dashboard established
	4	Measures cost effectiveness; some partner value; dashboard managed
	5	Measures extended to external partners
<b>Governance maturity:</b> Business Strategic Planning, IT Strategic Planning, Budgetary Control, Steering Committee(s), Prioritization Process.	1	No formal process, cost centre, reactive priorities
	2	Tactical at functional level, occasionally responsive
	3	Relevant process across the organization
	4	Managed across the organization
	5	Integrated across the firm and partners
<b>Partnership maturity:</b> Business Perception of IT Value, Role of IT in Strategic Business Planning, Shared Goals, Risk, Rewards/Penalties, IT Program Management, Relationship/Trust Style, Business Sponsor/Champion.	1	Conflict; IT is a cost of doing business
	2	IT emerging as an asset; process enabler
	3	IT is as an asset; process driver; conflict seen as creative
	4	IT enables/drives business strategy
	5	IT-business adaptive and improvise together
<b>Scope and architecture maturity:</b> Traditional, Enabler/Driver, External, Standards Articulation, Architectural Integration, Architectural Transparency, Agility, Flexibility, Manage Emerging Technology.	1	Traditional (e.g., accounting, email)
	2	Transactional (e.g., ESS, DSS)
	3	Integrated across the organization
	4	Integrated with partners
	5	Evolve with partners
<b>Skills maturity:</b> Cultural Locus of Power, Change Readiness, Innovation, Entrepreneurship, Management Style, Career Crossover, Training/Education, Hiring and Retaining.	1	IT takes risk, little reward; technical training only
	2	Differs across functional organizations
	3	Emerging value service provider; balanced technical and business hiring
	4	Shared risks and rewards
	5	Education/careers/rewards across the organization

### RQ3: What are the challenges in adopting IT-Business alignment models?

Despite the benefits of IT-Business alignment, there are still some challenges that appear as evils that hinder the harmony between information technology and business organization;

**The failure of IT to provide benefits to the organization:** In every success story about IT, one can find a counterexample. Despite its critical role, to many companies, IT is still a necessary evil [21]. While consultants and visionaries alike make claims that IT is an indispensable strategic resource, the large investments required for IT projects often raise questions regarding their business justification. Some companies, for instance, poured millions of dollars into it, only to find ineffective operations, work disruption, or even lost revenues. The difficulty in managing and getting value out of IT grew so intensively that it started more than a decade ago a heated debate on whether “IT matters” to companies anymore [22].

**The difficulties of sustaining IT and business alignment in the long run:** Experience has shown that integrating IT and business in a specially designed process may be sufficient in the short term and unlikely to be unsustainable in the long run [23]. This “soft” side of alignment, indeed, has been recognized as an important but a

difficult-to-achieve factor. Therefore, to achieve sustainable alignment between IT and business, a holistic approach; one that combines and balances both the short and the long term perspective, is necessary [24].

**Lack of communication:** Communication between business and IT leaders is challenging in developing effective IT-Business strategy. One of the reasons for the miscommunication lies in the difficulties both of them face in understanding what business wants from IT and vice versa. IT managers suffer from ambiguous and unclear business requirements, thereby it is difficult for them to deliver business issues that are understandable in IT perspective [25].

**Poor governance:** IT managers are frequently out of the decision-making processes related to IT [25]. Consequently, CIOs feel frustrated for this lack of visibility. In addition, allocation of budget for IT project is a tedious process and demands a lot of negotiation between IT managers and business executives.

**Inadequate skills:** IT competence needed in organizations is changing rapidly. In this perspective, IT professionals need to develop their skills to meet continuously changing IT world. In this environment, IT managers and business leaders need to enhance their skills and abilities in order to strategize. However, it is quite challenging for them choosing which technology is the most appropriate for the organization, given the wide spectrum of IT solutions. Proper training and education is needed for business leaders in order to help them understand one another [26].

Other challenges for low success rates in business/IT alignment are lack of a uniform definition of business/IT alignment, pursuit of a unilateral strategy for alignment, and lack of an appropriate tool to measure success of business/IT alignment [27].

## 5. CONCLUSION AND FURTHER RESEARCH

In today's complex business environment, business leaders have to involve IT solutions and projects to get a unique value in a competitive market. Moreover, business and IT professionals have to collaborate in defining problem, setting goals, vision, and mission. Although business and IT have different views to a strategy, they have to align it to improve the organization as a whole. Meanwhile, they may face many challenges and issues. Future research will be focussed on the development of empirical studies and mappings on the integration of IT Governance with IT-business alignment.

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