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Review article

Business-IT Alignment through Enterprise Architecture in a Strategic Alignment Dimension: A Review

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ABSTRACT

Business-IT Alignment (BITA) refers to the fit between business and IT strategy. BITA is important for realizing the achievement of organizational goals, enhancing performance, and gaining competitive advantage in an organization. BITA is a crucial concern for organizations and remains a top topic from the perspective of business executives. BITA can be realized through Enterprise Architecture (EA), which is a comprehensive and holistic instrument for managing and maintaining BITA. However, despite numerous literature studies on the BITA model or framework through EA, the research is currently more focused on technology planning than strategic planning. Meanwhile, strategic planning is the most crucial challenge of the EA framework because it is the embodiment of BITA in the strategic alignment dimension. The current study aims to conduct a literature review of BITA through EA in the strategic alignment dimension. This literature study resulted in 25 out of 100 papers and classified into five strategic alignments. The review identified 25 relevant papers out of 100 and categorized them into five strategic alignments. The study's contributions include solutions in the form of stages for developing strategic alignment through EA based on business strategy models. The five stages are as follows: 1) Identification of vision, mission, and goals; 2) SWOT-based strategy analysis; 3) BSC-based strategy mapping; 4) BPMN-based business process mapping; and 5) Determination of IS/IT. This study's impact on further research is that it can be used as a basis for developing BITA through EA, based on the five stages identified.

1. Introduction

Business-IT Alignment (BITA) refers to the compatibility an organization's business and IT strategies, as well as the alighment of business needs and IS priorities [1][2][3]. It is the conformity between technology and business elements that should support and encourage each other among business and IT strategies, business processes, and IT [2][4][5][6][7]. BITA has been shown by researchers to help organizations in various ways, such as maximizing IT investment, understanding the value of IT, and improving organizational performance [4][8][9][10]. BITA can be understood as managing and leveraging IT within an organization to achieve its goals and gain a competitive advantage [11]. Therefore, BITA is a significant issue for organizations, and it consistently ranks among the most notable topics from the viewpoint of executives [12][13][14]. BITA has two dimensions, namely the strategic and social dimensions [14]. However, strategic alignment is the most influential factor in organizational performance, surpassing even the social dimensions [14]. The better the strategic alignment, the greater the organizational performance, and vice versa [14].

BITA can be achieved through the utilization of Enterprise Architecture (EA) [15][16][17]. EA is a comprehensive and holistic tool for managing and maintaining alignment between business and IT

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[4][8][18][19][20]. It assists companies in achieving their goals by designing information technology that supports the integration of business and IT strategies [18][21][22][23][24]. BITA is crucial management attention that supports managers in achieving organizational goals, improving workflow, increasing profitability, making informed IT investment decisions, maintaining competitive advantage, and enhancing organizational performance [18][25].

Enterprise Architecture (EA) comprises three architectures: Business, Application, and IT, which can align business strategy with IT [26][27][28]. Business architecture (BA) consists of vision, goals, business strategy, organizational structure, business processes, and rules [26][29]. The application architecture (AP) consists of the components of a business information system and their interactions [26], while the IT architecture (ITA) consists of hardware, software, and networks [26]. BA is based on business strategy and serves as the basis for the next architecture [30]. Therefore, BA is a multi-view enterprise blueprint that provides a general understanding of the formulation of organizational goals from a strategy, process, and infrastructure perspective [31].

Although there are many literature studies that discuss the model or framework of BITA through EA [1][15][29], researchers conclude that the alignment of business and IT strategies is not yet fully integrated into the EA framework [18]. Current research on EA focuses on technology planning rather than strategic planning [18], which is the most important challenge of the EA framework [18]. Strategic planning is a response to the environment to achieve a better level of performance and organizational goals and objectives [2]. Strategy alignment, which is part of strategic planning, is the scope of the business architecture and the foundation for the next architecture in EA [30]. Therefore, the significance of strategic alignment in this EA prompted this literature study on BITA through EA in the strategic alignment dimension. Strategic alignment, in the EA perspective, refers to the alignment or integration between business architecture and information system architecture [31].

Before conducting this literature study, a review of previous research was carried out on BITA and EA. The first study discusses how EA can be used to solve BITA problems by introducing various methods and explaining the relationship between the two [1]. The second study focuses on the alignment of business and IT factors within the context of EA [15]. Meanwhile, the third study dicusses the relationship between BITA and EA, how EA can help achieve BITA, maintain it, create it, and why it is used to solve BITA problems [29]. Despite these studies, there has been no specific exploration of BITA through EA in the dimension of strategic alignment. This research aims to provide solutions for developing BITA through EA by outlining the stages involved in achieving strategic alignment.

2. Materials and Methods

2.1. State of the Art

This study reviews literature on Business-IT Alignment Through EA, including the relevant journals for the period 2017-2022. This literature study [1] consists of three main objectives: 1) to describe the significant flow of knowledge from BITA research; 2) to map the influential countries, institutions, and Business-IT Alignment research journals; and 3) to describe the four research themes of Business-IT Alignment. The "Why" dimension examines two aspects, namely why EA is used to solve the BITA problem and how various methods can be used to achieve BITA and their relationship.

This literature study is also [15] discusses the elements of business and IT alignment in EA, which include five factors: 1) Methodology, 2) Modeling, 3) Business Processes, 4) Network, and 5) Technology. The explanations for each factor are as follows: 1) Methodology refers to how to effectively use the EA framework; 2) Modeling is related to changing the modeling perspective; 3) Business Processes are interpreted by analyzing and managing business processes; 4) Networking refers to the ability to share resources through the network; and 5) Technology refers to the ability of technology to support application objectives. And this literature study [29] conducted a literature review by analyzing the 5W+1H. These questions aim to gain a comprehensive understanding of BITA from an EA viewpoint. The results are as follows: 1) The "When" dimension examines the study trends of BITA through EA from 2002 to 2016; 2) The "Who" dimension explores co-authorship relationships from 111 studies linking BITA with EA; 3) The "What" dimension examines four aspects, namely the relationship between BITA and EA, how EA achieves BITA, how EA helps BITA, and how EA maintains BITA. 4) The "Why" dimension examines two aspects: why EA is used to solve BITA problems and why the paper

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introduces numerous methods to realize BITA; 5) The "Where" dimension explores various research areas and their number; and 6) The study also examines existing research models and methods.

What makes the current study different from previous studies is that it focuses on the study of BITA through the EA study, with an emphasis on the dimensions of strategic alignment. Strategic alignment is a crucial concern for managers because it supports the achievement of business goals, enhances work process flow, increases profitability, improves IT investment decisions, maintains competitive advantage, and enhances organizational performance [18][25][32]. Current research on EA predominantly focuses on technology planning rather than strategic planning and business processes. However, strategic planning and business processes are the most significant challenges of the EA framework [18]. Thus, the goal of this research is to conduct a review of BITA through EA in the dimension of strategic alignment.

2.2. Method

To achieve the research objectives, it is necessary to conduct a literature review on Business-IT Alignment through EA in the dimension of strategic alignment. The steps involved in this process include identifying the study needs, developing search strategies, conducting documentation searches, and extracting relevant data [15], as shown in Figure 1. This method is suitable for the research needs of this literature review, which is a narrative review.

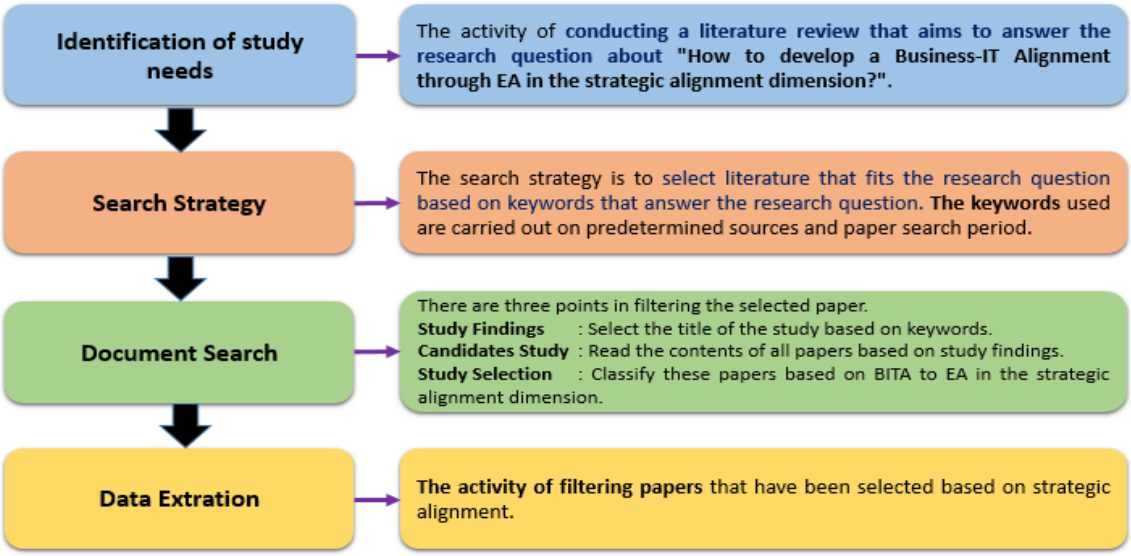

Fig. 1. Research Method

The following flowchart represents the research activities developed based on the chosen research methods, as shown in Figure 2. The flowchart explains the steps involved in conducting a literature study on Business-IT Alignment through EA in the dimension of strategic alignment.

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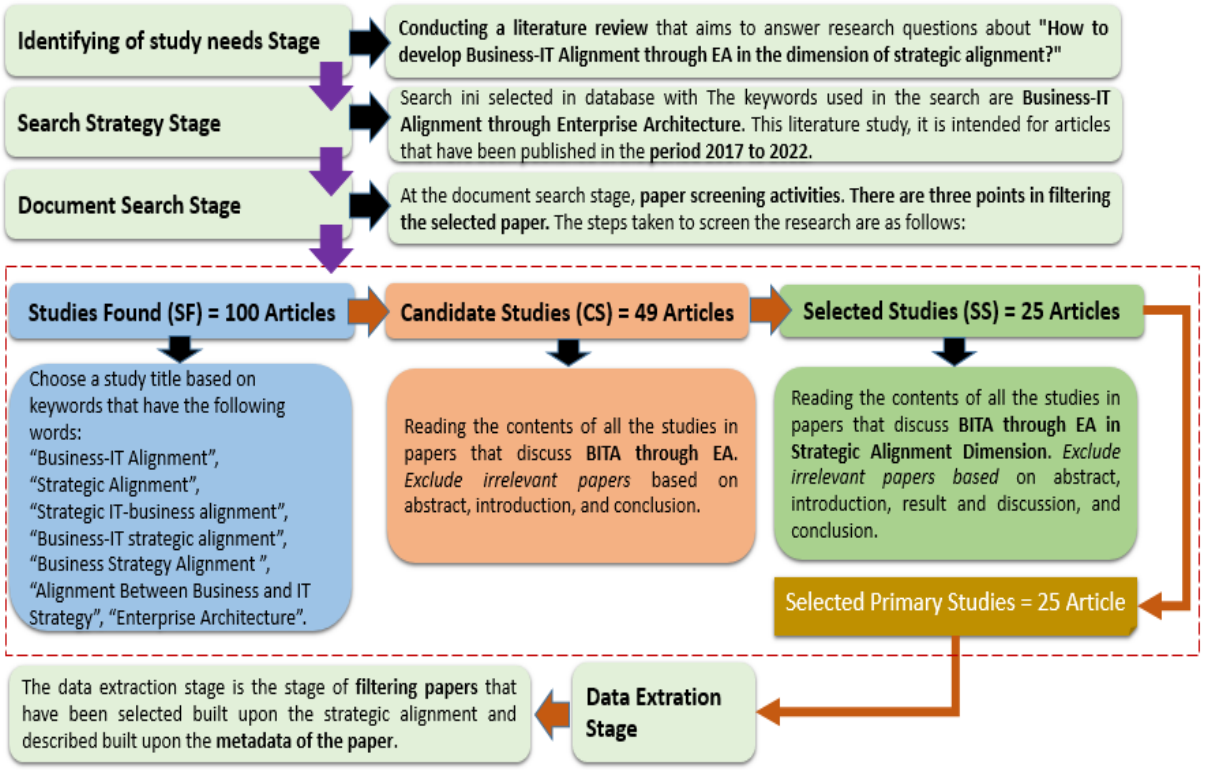

Fig. 2. Flowchart Research Activity

2.2.1. Identifying of study needs Stage

During the stage of identifying the needs of the study, the activity involves conducting a literature review with the aim of answering research questions related to "How to develop Business-IT Alignment through EA in the dimension of strategic alignment?"

2.2.2. Search Strategy Stage

The next stage is the search strategy, which involves selecting literature that addresses the research question by searching in predetermined sources. The selected sources are Sciencedirect (www.sciencedirect.com), Emerald (www.emerald.com/insight), IEEE Xplore (http://ieeexplore.ieee.org), Springer Link (https://link.springer.com), Google Scholar (https://scholar.google.com). The search is conducted using the keywords "Business-IT Alignment through Enterprise Architecture." The literature selected for this study includes articles published between 2017 and 2022.

2.2.3. Document Search Stage

During the document search stage, paper screening activities are conducted, which involve filtering the selected papers based on three points. The first steps followed to screen the research papers is Studies Found (SF). This steps is generated by selecting study titles and keywords containing the terms "Business-IT Alignment," "Strategic Alignment," "Strategic IT-business alignment," "Business-IT strategic alignment," "Business Strategy Alignment," "Alignment Between Business and IT Strategy," and "Enterprise Architecture." The results of this process can be viewed in Tables 1 and 2.

Table 1. Papers published based on the year of publication

Year of Publication	Sciencedirect	Emerald	IEEE Xplore	Springer Link	Google Scholar	Total
2017	7	2	5	3	4	21
2018	6	2	4	1	4	17
2019	5	3	3	1	3	15
2020	7	2	2	1	7	19
2021	4	10	4	2	1	21
2022	4	1	0	2	0	7
Total	33	20	18	10	19	100

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The second steps is Candidate Studies (CS). This step includes the papers selected after reading the contents of all the studies that discuss Business-IT Alignment (BITA) through Enterprise Architecture (EA). The list of these papers can be found in Table 2. And the third step is Selected Studies (SS): These step are the papers classified based on the dimension of strategic alignment in BITA through EA. The papers in this category are presented in Table 2.

Table 2. Details of Selected Paper

Resource of study	SF	CS	SS
Sciencedirect	33	12	6
Emerald	20	11	7
IEEE Xplore	18	10	6
Springer Link	10	4	1
Google Scholar	19	12	5
Total	100	49	25

2.2.4. Data Extraction Stage

The data extraction stage involves filtering the selected papers based on strategic alignment and extracting relevant information from the metadata of each paper. The extracted information can be found in Table 3-1 and continued on Table 3-2.

Table 3-1. Metadata of Selected Studies

No.	Reference	Year	Type	Alignment Descriptions
1	[33]	2017	Journal Elsevier	Integration of IT resources with business processes in an effort to improve IT capabilities in responding quickly to market opportunities and threats and to gain an advantage over competitors.
2	[34]	2017	Conference Elsevier	Presenting BITA model by adding Archimate and BMM modeling notations.
3	[35]	2018	Conference Elsevier	Developing a more comprehensive approach for achieving BITA through EA based on the SAM (Strategic Alignment Model) proposed by Henderson and Venkatraman. This model employs alignment strategies to establish strategic alignment within the TOGAF EA framework.
4	[36]	2018	Conference Elsevier	Integrating digital business and business models into the enterprise architecture.
5	[27]	2019	Conference Elsevier	Alignment of cloud computing technology into EA planning by combining the ROCCA model and the TOGAF 9.2 framework.
6	[16]	2022	Conference Elsevier	Integrating BC-CBR (Blockchain and Case-based Reasoning) to share knowledge in corporate alliances in order to make EA transformation plans quickly and efficiently.
7	[37]	2017	Journal Emerald	Alignment or mapping of organizational activities by implementing EA based on the Zachman framework.
8	[38]	2018	Journal Emerald	BITA based on business process agility and market-responsive agility.
9	[26]	2018	Journal Emerald	Study of literature on business strategy models on Enterprise Architecture.
10	[39]	2021	Journal Emerald	City digital transformation based on system alignment and data integration.
11	[18]	2021	Journal Emerald	The strategic planning concept used in business to visualize a company's business strategy using ArchiMate.
12	[40]	2021	Journal Emerald	Providing digital services as a smart urban transformation with an EA framework to support the integration of various platforms as needed.
13	[41]	2022	Journal Emerald	Presenting the relationship between capacity in the application of EA tools and the effectiveness of digitizing business models at companies.
14	[42]	2018	Conference IEEE	Exploring how the strategic planning process can be modeled with the ArchiMate EA modeling language.

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Table 3-2. Metadata of Selected Studies (continued)

No.	Reference	Year	Type	Alignment Descriptions
15	[43]	2018	Conference IEEE	Presenting metrics to assess the conformity between business process architecture with information architecture.
16	[44]	2019	Conference IEEE	Discussing three studies: (1) conceptualizing business processes and implementation guidelines; (2) point of view on BITA and (3) elements of contingency on business processes in the public sector.
17	[45]	2019	Conference IEEE	Discussing EA Management opportunities to support the strategic alignment process.
18	[46]	2020	Conference IEEE	Presenting the alignment method between IoT and is built upon the TOGAF framework, which can be used to ensure alignment and adoption.
19	[8]	2021	Conference IEEE	Developing a framework for alignment between Business and IT strategies through EA with organizational performance.
20	[31]	2017	Journal Springer	Discussing strategic alignment in the organization's business architecture by visualizing organizational performance mapping and strategic management framework.
21	[47]	2017	Conference AISeL	Outlining a framework to support alignment between companies and stakeholders in EA development.
22	[48]	2017	Conference AISeL	Consolidating and expanding the IS literature on strategic alignment in SMEs.
23	[49]	2018	AMCIS	Developing a conceptual model of investment in EAM which is built on a dynamic capability view and is based on IT strategy alignment.
24	[50]	2019	IJITEB	Proposing a TOGAF model in manufacturing companies, conformity business strategies and IS/IT, and integrating stakeholders' needs to support business goals so that they are more optimal, effective, and efficient.
25	[51]	2020	Journal of Systems Engineering and Electronics	Proposing a framework for understanding strategic alignment in organizations led by business hierarchies.

3. Results and Discussion

3.1. Experimental Results

After the data extraction stage, the next step is the analysis stage. This stage provides a more detailed explanation of the data extracted from the papers based on the strategic planning process [18]. The strategic planning process is a crucial part of the business strategy model, which includes five steps: 1) Identification of vision, mission, and goals; 2) strategy analysis; 3) strategy map; 4) business processes, and 5) IS/IT Determination [10][18]. The first process is identification of vision, mission, goals. This step involves formulating the vision, mission, and goals of the organization. Vision describes the expected future situation of an organization in improving its strategic performance. The vision describes the expected future situation of the organization in improving its strategic performance, while the mission determines the business activities necessary to make the vision a reality [26][52][53].

The second process is strategy analysis. The process of strategy analysis involves formulating internal and external analysis to determine the right business strategy for the organization. This includes the use of tools such as SWOT analysis [54][55][56][57]. This process was conducted to define a business strategy based on where the business is and where in the future the business is expected to be and how it integrates with its vision [26]. The next process is strategy map. The strategy map is a process of determining key performance indicators (KPIs) in four perspectives as indicators of organizational performance, which are then mapped into business objectives [58][59]. KPIs are used to evaluate organizational performance in achieving organizational goals [60][61]. A strategy map balanced scorecard is a template that shows how to align the vision, mission, and business strategy and work together to improve organizational performance [26][62][63][64].

The fifth process is business process. This step involves aligning business processes with the business strategy that has been mapped through a strategy map so that the organization can improve

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its performance, competitiveness, and achieve organizational goals [64][65]. Business processes can be modeled using the business process modeling notation (BPMN). And the nest process is IS/IT determination. The process of IS/IT determination involves ensuring that the information system architecture is aligned with the business processes to support the business strategy. Therefore, BITA is a crucial process that supports business value by ensuring alignment between an organization's vision, mission, objectives, business strategy, business processes, and IS/IT plans. The first four processes of the EA perspective fall under the Business Architecture domain, while the fifth process falls under the Information System Architecture domain [26]. Maintaining alignment across these domains is essential for achieving organizational goals and optimizing performance.

Table 4. The output of the analysis paper based on the strategic planning process

		Business Architecture				Information System Architecture
No	Reference	Vision, Mission, Goals	Strategy Analysis	Strategy Map	Business Process	IS/IT Determination
1	[33]	-	-	-	√	√
2	[34]	√	√	-	√	√
3	[35]	√	√	-	√	√
4	[36]	√	√	-	√	√
5	[27]	-	√	-	√	√
6	[16]	-	-	-	√	√
7	[37]	√	√	-	√	√
8	[38]	-	√	-	√	√
9	[26]	√	√	√	√	√
10	[39]	√	-	-	√	√
11	[18]	√	√	√	√	√
12	[40]	√	-	-	√	√
13	[41]	√	√	-	√	√
14	[42]	√	√	√	√	√
15	[43]	-	-	-	√	√
16	[44]	-	-	-	√	√
17	[45]	-	√	-	√	√
18	[46]	√	√	-	√	√
19	[8]	√	√	√	√	√
20	[31]	√	-	-	√	√
21	[47]	√	-	-	√	√
22	[48]	-	√	-	√	√
23	[49]	-	√	-	√	√
24	[50]	√	-	-	√	√
25	[51]	-	√	-	√	√

From the results of the analysis there are a number of 25 papers as shown in Table 3, then explained as in Table 5 and Figure 3.

Table 5. The output of this paper builds on the strategic planning process

No.	**Alignment**	**Number of papers**
1	Alignment of vision, mission, goals, strategy analysis, strategy map, business processes and IS/IT.	16% [8][18][26][42]
2	Alignment of vision, mission, goals, strategy analysis, business process and IS/IT.	28% [34][35][36][37][41][46][50]
3	Alignment of vision, mission, goals, business process and IS/IT.	16% [31][39][40][47]
4	Alignment of strategy analysis, business process and IS/IT.	24% [27][38][45][48][49][51]
5	Alignment of business process and IS/IT.	16% [16][25][33][44]

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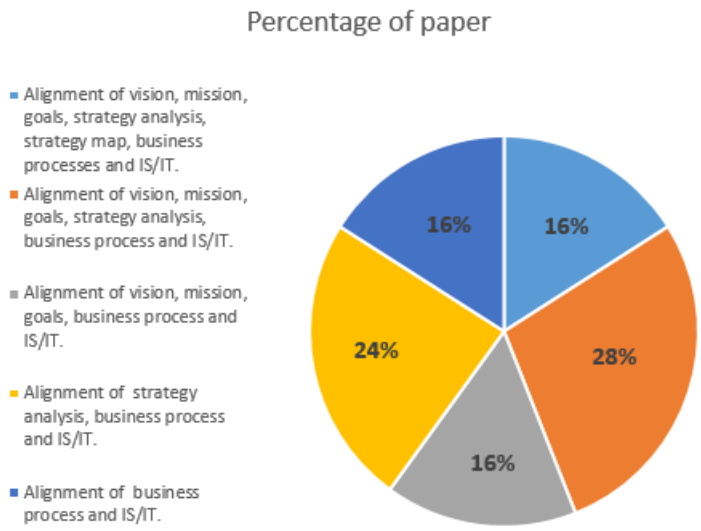

Fig. 3. Strategy Alignment Analysis

The explanation of the alignment shown in Table 5 is based on the strategic planning process [10][18][26]. Alignment of vision, mission, goals, strategy analysis, strategy map, business processes, and IS/IT is detailed and includes strategy analysis and strategy maps. Strategy analysis can help determine business strategy more precisely, allowing for better alignment of business processes and IS/IT, while the existence of a strategy map can help determine and measure organizational performance. In the alignment of vision, mission, goals, strategy analysis, business process, and IS/IT, there is a strategy analysis but there is no strategy map, while the impact cannot determine and measure organizational performance. Alignment of vision, mission, goals, business process, and IS/IT does not include either a strategy analysis or a strategy map, which means it cannot determine or measure organizational performance. The alignment can be done only through organizational goals with business processes and IS/IT. In the alignment of strategy analysis, business process, and IS/IT, there is no vision, mission, goals, and strategy map. The absence of a vision, mission and goals has an impact on the inconsistency of business strategy, which further affects the alignment of business processes and IS/IT. Due to the absence of a strategy map, organizational performance cannot be determined and measured. And on alignment of business process, and IS/IT, this alignment focuses solely on the alignment of business processes and IS/IT, without considering business strategy, business processes, and a strategy map. Without alignment with these two factors, it is difficult to determine the right IS/IT and measure organizational performance accurately.

Based on the analysis of strategic alignment from previous studies, this literature study focuses on achieving BITA through EA in the dimension of strategic alignment, based on the strategic planning process. Therefore, the contribution of this research is to provide a framework consisting of five stages that can be used as a guideline in developing BITA through EA. These stages include: 1) Identification of vision, mission, and goals; 2) Strategy analysis based on SWOT; 3) Strategy map based on Balanced Scorecard (BSC); 4) Business processes based on Business Process Model and Notation (BPMN); and 5) IS/IT determination, as depicted in Figure 4.

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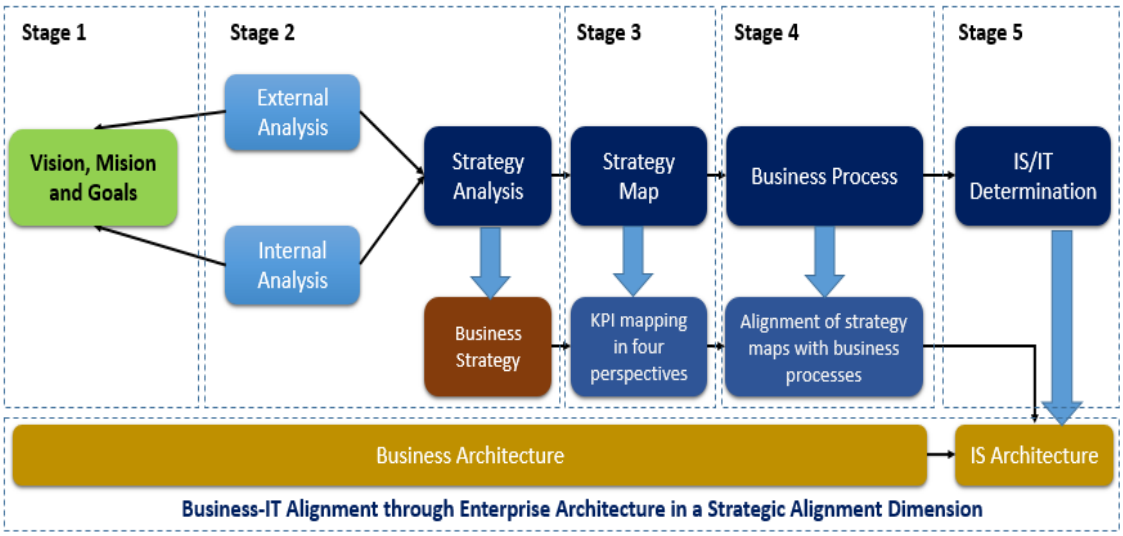

Fig. 4. BITA through EA in a Strategic Alignment Dimension

Based on the research contribution of this literature study, the position of this research in relation to previous studies is illustrated in Table 6.

Table 6. BITA research contribution through EA

No.	Year and References	Author	Contributions
1	2018 [1]	Y. Jia et al	The research contribution is to demonstrate the use of EA in resolving BITA issues and achieving BITA relationship with EA.
2	2018 [15]	E. Putro et al	The research contribution is the identification of BITA factors through EA, including 1) Methodology; 2) Modeling; 3) Business Process; 4) Network; 5) Technology.
3	2018 [29]	M. Zhang et al	The research contribution is to examine the relationship between BITA and EA, specifically how EA can facilitate, maintain, create, and solve BITA problems.
4	2023	Y.M. Maulana et al	The research contribution is the five stages of strategic alignment that can be used as a guideline in the development of BITA through EA in the strategic alignment dimension.

4. Conclusion

After conducting a literature review on BITA through Enterprise Architecture in the strategic alignment dimension, two conclusions can be drawn. First, researchers have focused on integrating vision, mission, business strategy, and business processes with IS/IT, but there is a lack of detailed explanation on how to develop a business strategy during the strategy analysis stage. Researchers have not widely implemented strategic maps, which are essential in linking alignment between business strategy, business processes, and IS/IT.

As a result, this literature study research has made a valuable contribution by producing literacy guidelines for the development of Business-IT Alignment through EA in the strategic alignment dimension, based on five stages. These stages are: 1) identifying vision, mission, and goals; 2) conducting strategy analysis based on SWOT Analysis; 3) creating a strategy map based on balanced scorecard and KPI; 4) modeling business processes using BPMN; and 5) determining IS/IT. Future research can build upon these five stages to further develop Business-IT Alignment through EA, thereby achieving alignment between business strategy, business processes, and IS/IT.

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