A Socio-Technical Analysis of Enterprise Architecture Misalignments

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Abstract—**Modern organizations must adapt to competitive environments through the analysis of their current state and plan for a future state through the use of Enterprise Architecture (EA). EA is a management discipline to align business and IT strategies. However, many organizations face challenges in effectively implementing and using EA due to misalignments between EA parts, such as organizational support, documentation, and governance, leading to inefficiencies. Thus, this study employs the Punctuated Socio-Technical Information System Change model to examine EA misalignments through four interrelated components: structure, task, actor, and technology. It offers a comprehensive analytical lens for examining EA misalignments. This model is used to examine how EA misalignments emerge from disruptions or inconsistencies among various EA components that affect EA coherence and efficiency. Considering the purpose and nature of this research, a case study is a suitable research method. The research issue to be examined, EA misalignments, is contemporary and must be explored in its context. The findings reveal some EA misalignments that are categorized into four groups: organizational, governance, capabilities, and management, highlighting how disruptions among these components affect EA coherence and efficiency. The implications of this research are twofold: first, EA components must be aligned for optimal efficiency; second, any misalignment between these components results in EA operational inadequacies and practice failures.**

Keywords—Enterprise Architecture; EA; EA issues; EA misalignments; socio-technical systems

I. INTRODUCTION

Modern organizations operate in dynamic and intensely competitive environments. To survive, they must adapt their processes and effectively use information systems [1]. In order to deal with complexity and plan a transformation journey, organizations adopt Enterprise Architecture (EA). EA is a managerial discipline guided by strategy to facilitate the design and evolution of an organization's business and IT landscapes in order to realize its strategic objectives [2, 3].

Despite its importance, many organizations face substantial challenges to establish and use EA effectively. These challenges span various aspects of EA such as EA support, modeling, documentation, planning, use, communication, and governance [1, 4-7]. For example, manual EA processes are often time-consuming, costly, and prone to errors which lead to outdated or inaccurate representations of both business and IT [8, 9]. Further, EA issues are often analyzed independently of each other, while in reality they are interconnected and impact each other.

In addition, despite the growing interest in EA research, most of the publications are not based on solid theoretical foundations [10-12]. It is stated that most of EA research has been predominantly atheoretical [12]. In reality, EA research community has overlooked, or disregarded pertinent theoretical foundations that explain the various aspects of EA practice, which is a highly multifaceted organizational phenomenon [12].

Thus, this study aims at a deeper understanding of EA issues from a socio-technical theoretical perspective using a case study research method. It uses the Punctuated Socio-Technical Information System Change (PSIC) model [13] as an analytical lens for examining EA misalignments. The model perceives an organization as a system that consists of four interrelated components: structure, task, actor, and technology. These components interact dynamically within a socio-technical system, and influence each other [13]. This model is used to examine how EA misalignments emerge from disruptions or inconsistencies among various EA components that affect EA coherence and efficiency. The model highlights that these four components must be aligned for organizational systems to operate efficiently. On the other hand, misalignments between any of these components lead to inadequacies and failures in the system [13].

The research issue to be examined, EA misalignments, is a contemporary phenomenon that must be explored within its context. Thus, a case study research method is selected. The case study data is deductively analyzed using the PSIC's model four components to find EA misalignments.

The contributions of this study are threefold. First, certain misalignments were identified and grouped into four primary categories: organizational, governance, capabilities, and managerial misalignments. Through the use of the PSIC model, this study offers an empirically grounded taxonomy of EA misalignments that can serve as a reference for future theory development in EA research. Second, this study shows that the PSIC is applicable at a finer-grained level of analysis, specifically, the operational misalignments within an EA program. It constitutes a contextual adaptation of the PSIC model to the EA domain. Third, the study enriches the model by showing that EA misalignments frequently occur as multi-component rather than twofold misalignments. It reveals the causal interdependence among EA misalignments across four related components (structure, task, actor, and technology). For instance, the data shows that insufficient funding [structure] does not only cause a funding issue in isolation. It also influences EA team capabilities [actor], affects EA tools maintenance [technology], and interrupts EA activities [task], leading to multi-component misalignments.

EA elements impact one another and engage in dynamic interactions within a socio-technical system. That means any disruptions to one or some of these elements have a negative impact on EA practice as a whole. Thus, organizations have to make sure the EA elements are aligned and work in harmony to realize the promised value of EA.

This study is organized as follows: Section II reviews the literature and introduces the Punctuated Socio-Technical Information System Change (PSIC) model. Then, Section III outlines the research methodology. Section IV presents and discusses the findings. Finally, Section V concludes the study.

II. LITERATURE REVIEW

This section presents the literature review for this study, which is organized into three subsections: enterprise architecture, research problem, and theoretical foundations.

A. Enterprise Architecture

EA is a managerial discipline guided by strategy to facilitate the design and evolution of an organization's business and IT landscapes in order to realize its strategic objectives [2, 3]. It is a practice that provides a holistic view of an organization's business goals, processes, data, information systems, and technology [1, 14, 15]. It supports decision-making, improves business-IT alignment, and enhances responses to changes [5, 7, 16]. It provides methodologies and techniques for the analysis of a current state of the enterprise and planning for a future state, leading to risk mitigation, cost reduction, and operational efficiency [11, 16, 17].

EA enhances business and IT planning processes while ensuring business continuity, risk management and compliance [11, 18, 19]. A successful EA implementation necessitates incorporating diverse stakeholder perspectives, which empowers organizations to make informed decisions, optimize operations, and facilitate transformation [20].

B. Research Problem

The complexity of organizations makes EA implementation and management challenging, specifically when unplanned changes in business or technology happen [21]. In addition, stakeholders' resistance, a lack of expertise, and insufficient governance structures further complicate EA challenges, which obstruct the successful implementation of EA practices [4, 7]. EA implementation continues to be a challenging topic for organizations, despite the diversity of approaches that define EA processes, applications, and governance structures [7].

Organizations continue to encounter several problems in implementing EA, which reduce the return on substantial EA investments [9, 11]. The ambiguity in processes and procedures, together with insufficient collaboration with the EA department, leads to issues [22]. Organizations face challenges in maintaining documentation due to ambiguous responsibilities and a lack of knowledge regarding enterprise architecture and the relevant stakeholders, leading to outdated and inaccurate documentation [5, 9, 23]. The stakeholders and teams responsible for documenting EA encounter challenges related to the size and complexity of EA landscapes [5, 7, 9]. Thus, effective stakeholder management is essential for aligning the outcomes of EA with stakeholder preferences. Facilitating

participation in EA activities fosters trust and understanding [22].

Although several studies had investigated EA issues [24, 25], a comprehensive understanding of such issues remains elusive [4-6, 26]. This gap in the literature highlights the need for a wider understanding of EA issues that face organizations and the development of effective strategies to overcome them. In particular, by addressing these obstacles, organizations can realize the maximum potential of EA, enabling organizations to better navigate the complexities of both business and IT landscapes and achieve strategic objectives [10, 17, 19].

Further, the adoption of theories in EA research is notably minimal, despite the large number of EA publications [12, 16]. The absence of solid theoretical underpinnings may indicate that the EA practice is not adequately understood [12].

C. Theoretical Foundations

This study builds on previous research which explicitly considers information systems as socio-technical systems and analyzes diverse social and technological elements within them. For example, a socio-technical model is used to examine information systems change [13]. It is used to show how misalignments among social and technical components within information systems and their environments influence the system [13].

To deeply understand EA issues, this study explores key misalignments in EA practice using a socio-technical model following [13]. In particular, this study uses the Punctuated Socio-Technical Information System Change (PSIC), as shown in Fig. 1 [13]. Such a model demonstrates the attributes of a good classification. It is simple, comprehensive, and reasonably well defined [13]. It offers a comprehensive analytical lens for examining EA issues. The model perceives an organization as a multivariate system that consists of four interrelated components: structure, task, actor, and technology. These components interact dynamically within a socio-technical system and influence each other [13]. These components interact, impacting one another. Here's the details of these components:
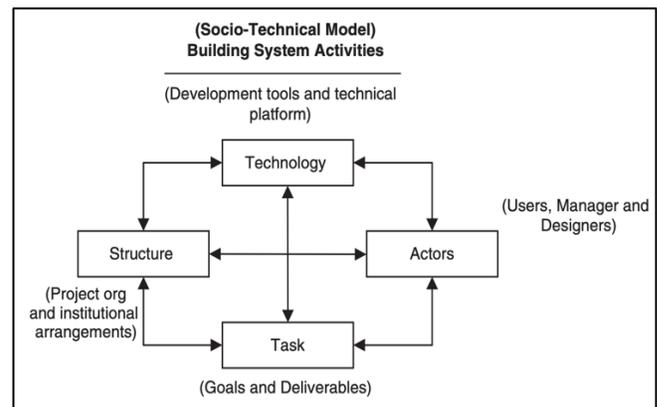

Fig. 1. Socio-technical system [13].

- Task: It refers to the activities and processes that need to be accomplished.

- Structure: It refers to the organizational structure such as organizational hierarchy, support, governance and communication.

- Actor: It refers to people or roles engage or interact with a system.

- Technology includes tools and infrastructure used to complete tasks.

In a nutshell, the model highlights that these four components must be aligned for organizational systems to operate efficiently. On the other hand, misalignments between any of these components lead to inadequacies and failures in the system [13].

This model is used to examine how EA misalignments emerge from disruptions or inconsistencies among various EA components. For example, a technical change (an implementation of an EA tool) may not correspond with current organizational structures or actor capabilities, resulting in EA inefficiencies or resistance. The model is particularly valuable for the analysis of EA issues from a theoretical perspective, since it highlights the need for alignment and adaptability across all four components to ensure EA coherence and efficiency. For example, a structural misalignment can be observed when one component becomes incompatible with others as a result of increased variation (e.g., malfunctioning, replacement). This property of a system affects the system's behavior. A gap, if not unattended, will impede the system's performance and jeopardize its viability. Gaps are frequently the result of sudden events, such as the departure of critical personnel, a financial issue, or a system failure. In other instances, the system may tend to drift towards misalignment as a result of an incremental and innocent change in a single component reaching a tipping point, which forces the entire system into a misalignment [13]. Misalignments show where the components of the system are not correctly aligned, which may result in the system malfunction or decreased performance [13].

III. RESEARCH METHODOLOGY

Considering the purpose and nature of this research, a case study is a suitable research method [27] because the issue to be examined, EA misalignments, is a contemporary and must be explored in its context. The case study method enables the researcher to investigate research questions with many dimensions of interest, and it uses multiple sources of evidence [27, 28].

This study employs a case study approach where the unit of analysis is EA misalignment. The selected cases are four government agencies with established EA practices, ranging from medium to very large organizations. Their EA practices are between two and nine years old, and all cases have small EA teams. The cases have been chosen to expand what can be learned [29].

This research data was obtained using various data collection techniques to have different sources of evidence [28]. In this study, open-ended questionnaires were sent, and then it was followed by group interviews. First, as recommended in [29], an open-ended qualitative questionnaire was employed. The questionnaires were sent to the managers of EA programs to get information about the agency and its EA program.

Following that, group interviews were conducted with participants from each case. Group interviews were chosen, as suggested by [30], to elaborate and understand the topics of interest. In particular, they were used to acquire deeper insights that were not reported in the questionnaire, and to get supporting documentation to enrich each case evidence.

The collected evidence from each case (the exploratory questionnaire, the interviews and the obtained documents) was combined, as shown in Table I.

TABLE I. PARTICIPANTS AND COLLECTED EVIDENCE

Cases	Description of interviews and obtained evidence
Case 1	Group interview: 90 minutes, 2 interviewees: head of EA, and an enterprise architect. Questionnaire, and multiple documents were obtained about the enterprise and its EA
Case 2	Group interview: 90 minutes, 4 interviewees: head of EA, an enterprise architect and 2 consultants. Questionnaire and multiple documents were obtained about the enterprise and its EA.
Case 3	Group interview: 120 minutes, 3 interviewees: head of EA, and 2 enterprise architects. Questionnaire and multiple documents were obtained about the enterprise and its EA.
Case 4	Group interview: 90 minutes, two interviewees: head of EA and an EA consultant. Questionnaire and multiple documents were obtained about the enterprise and its EA.

The data were analyzed to find EA misalignments using the adopted PSIC theoretical model. A deductive analysis based on the four PSIC components (structure, task, actor, and technology) was used [30]. The model offers a distinct unit of analysis as it facilitates a deeper examination of misalignments across EA components. EA misalignments emerge from disruptions or inconsistencies among various EA components that affect EA coherence and efficiency. Thus, the model highlights that these four components must be aligned for an effective operation of EA programs [13].

IV. FINDINGS AND DISCUSSION

Following the data analysis, some misalignments were identified. The following sub-sections present and discuss the findings which are organized into four main groups. They are EA organizational misalignments, EA governance misalignments, EA capabilities misalignments, and EA management misalignments.

A. EA Organizational Misalignments

Based on the data analysis, this section presents EA organizational related misalignments. These misalignments are related to themes such as communication, organizational acceptance and support, stakeholders' cooperation and EA-orientation, as shown in Table II.

TABLE II.   EA ORGANIZATIONAL MISALIGNMENTS

Data evidence	Misalignment
"Some departments do not embrace open communication and thus create a barrier to hinder any progress" – Case 3.	Lack of communication [structure] hinders EA progress [task]
"Besides senior management, other people are also very important when it comes to quality data gathering" – Case 1.	Lack of senior management support [structure] leads to poor EA data collection [task]
"There is limited involvement [of senior management". – Case 1	Senior management [Actor] is not involved with EA [task]
"EA is quite a new concept ….so, getting people on board is challenging" – Case 1	Organizational members [actors] are not accepting and supporting EA [task]
"We have been facing some difficulties in obtaining accurate and up-to-date data from some stakeholders"- Case 1	EA documentations [task] can't be completed due to uncooperative stakeholders [actors]
"Without being driven by business, EA risks being IT driven [IT-oriented] which yields [IT] projects and investments that do not provide business value thereby causing management to look at EA as wasted cost" – Case 2	IT-driven EA [structure] is not supporting EA value delivery [task] resulting in the neglect of EA by [actors]

First, a key gap pertains to the lack of communication. The data shows that some departments do not embrace open communication [Structure] and thus create a barrier that hinders EA progress [Task]. Ineffective communication [Structure] impedes EA activities [Task] by hindering collaboration and knowledge sharing. This indicates that a non-supporting structure within an organization can significantly disturb the effectiveness of EA practice [13]. Poor communication limits the ability of stakeholders to work together towards common goals, which puts EA at risk of failure and leads to non-value-adding outcomes [14, 31]. To ensure a successful implementation of EA and the adoption of EA by stakeholders, it is essential to have an effective EA communication and support [5].

Second, organizational acceptance and support, particularly from senior management and other key stakeholders, are fundamental for an effective Enterprise Architecture (EA). A Lack of organizational support [Structure] results in misaligned EA activities [Task]. According to [13], that is a structure-task gap where the existing structure (organizational support) is not appropriate or well-defined for EA activities. Further, the data shows an actor-task misalignment example, where senior management [Actors] did not accept EA and did not provide the required involvement [Task] that are essential for EA.

Third, there was a cooperation gap where getting data [Task] is hindered by uncooperative stakeholders [Actors]. It is stated that organizational politics result in diminished cooperation, particularly among business units, IT departments, and stakeholders [32]. Challenges in coordination and collaboration concerning EA initiatives are recognized issues within the public sector [4, 32], and that may be due to the increasing autonomy of sub-organizations which affects the execution of

EA work; therefore, addressing autonomy is crucial for maintaining organizational coherence [4].

The lack of organizational support, acceptance, and limited involvement are examples of structure-task and actor-task misalignments, which have a negative impact on EA projects. Previous research shows that the lack of management support or approval leads to EA project issues [5, 14, 31]. This demonstrates a traditional structure–task misalignment, where inadequate structural support hinders EA from delivering its value [13].

Fourth, EA-orientation and value delivery are key themes that affect EA practice. The data shows that they were misalignment between EA-orientation [Structure] and EA value delivery [Task]. In particular, it appears that an IT-driven EA [Structure] is not capable of supporting EA value delivery [Task]. Such an orientation [Structure] resulted in another misalignment where management's [Actors] perceives EA operations [Task] as an unnecessary burden rather than a strategic enabler.

Organizations have encountered difficulty in justifying their EA initiatives as a result of a lack of understanding of EA [10]. The IT orientation of EA frequently results in a restricted mandate, thereby constraining EA's potential influence and impact. For instance, when EA is predominantly IT-focused, it leads to the exclusion of various relevant stakeholders [33]. EA implementation is sometimes motivated by concepts that may not align with practical realities [34]. In order to realize the promises of EA initiatives and comprehend their risk, organizations must have a comprehensive understanding of EA value, which is necessary to align various stakeholders with varying value expectations [34].

B. EA Governance Misalignments

Based on the data analysis, this section presents EA governance-related misalignments. These misalignments are related to themes such as governance establishment, governance committee, compliance and coordination, as shown in Table III.

TABLE III.   EA GOVERNANCE MISALIGNMENTS

Data evidence (Examples)	Actual Misalignment
"Governance is essential to make sure EA is actually delivering value. Without it, people will treat it as just documents, especially as in our case when the maturity level is low"- Case 2.	lack of governance [structure] affects EA operations and EA value delivery [task]
"Members of the senior management have to be part of EA Governance Committee in order to be able to set direction for EA activities"- Case 1	EA governance committee [structure] has to guide EA activities [task]
"Controlling project compliance with EA's TRM (Technical Reference Model) is still to-date a quite challenging task" as "projects and teams want to utilize their own products and standards"- Case 3.	compliance [task] is not supported by project teams [actor]
"Some projects were initiated [task] during the roadmap development … [which] might deliver incompatible deliverables that were not defined in the to-be architecture"- Case 4	Uncoordinated projects [task] lead to incompatible architectural deliverables [technology]

The data shows a governance misalignment which is related to the lack of governance [Structure] which affects EA operations [Task] and EA value delivery [Task]. Governance as a structure is crucial for EA activities and value delivery. Establishing clear governance practices ensures that EA activities are aligned with organizational objectives and deliver the anticipated value.

In addition, the data shows a governance committee misalignment. The EA governance committee [Structure] directs EA operations [Task], and a misalignment occurs if the committee is weak or non-existent. By offering supervision, establishing guidelines, and guaranteeing adherence to policies and standards, the EA governance committee [Structure] directs EA operations [Task]. It makes it easier for stakeholders to coordinate, improves decision-making, and keeps EA operations consistent, which reflects a structure-task alignment [13].

Thus, an adequate level of EA governance, through formal evaluations and approval procedures, is essential for successful EA implementation [14]. Additional governance elements include the explicit mandate of EA and centralized governance mechanisms for EA-related decision-making [35]. Additionally, organizations frequently face a lack of EA governance structure, which may result in ambiguous responsibilities [5, 25].

Further, other misalignments are also reported on compliance and coordination dimensions. Compliance as a [Task] is not supported by project teams [Actors], which results in inconsistent and inefficient EA implementations. In addition, lack of coordination [Task] can result in fragmented and inefficient EA deliverables and a useless repository [Technology]. Uncoordinated project initiation leads to incompatible architectural deliverables, resulting in integration and interoperability issues. Thus, Coordination, uniformity, and alignment with the overarching EA plan are guaranteed by the establishment and adherence to a robust governance structure. Organizations face challenges in enforcing EA governance regulations as a result of inadequate resources [5, 25]. The external contractual work and the use of legacy systems make it even more challenging to comply with EA governance rules and principles [5, 15].

C. EA Capabilities Misalignment

Based on the data analysis, this section presents EA capabilities related misalignments. These misalignments are related to themes such as funding, skills and tools, as shown in Table IV.

TABLE IV. EA CAPABILITIES MISALIGNMENT

Data evidence (Examples)	Actual Misalignment
"No funding is reserved and no enough support to build a capable EA team with the right size and mix of skills"- Case 2	lack of funding and support [structure] affects team capabilities [actors]
In case 1, it is reported that the lack of sufficient financial support had led to some issues in maintaining EA tools and artefacts.	Lack of funding [Structure] causes maintenance [task] and tools [technology] update issues
"Without proper [EA] skills, knowledge, and required experience it would be difficult [for EA team] to establish an effective EA practice" – Case 1.	Lack of capable EA team [actors] hinders establishing an effective EA practice [task]

Building successful EA teams requires a robust support structure. The data shows there is a structure - actor misalignment. Insufficient funding and support as a [structure] affects the EA team [actor] capabilities because it restricts access to resources, training, and tools needed for an effective EA operation. Without sufficient organizational and financial support, EA teams find it difficult to complete their tasks. The ability of the team to create strategic value and uphold architectural coherence is improved by ensuring consistent investment and leadership support. It is stated that when financial support is not provided for EA, the lack of economic incentives is a major reason for organizational interoperability challenges [4].

Further, it is reported that the lack of satisfactory financial support [structure] caused issues such as EA maintenance [Task] and tools upgrade [Technology]. Inadequate financial resources [Structure] influence both EA maintenance activities [Task] and EA tools maintenance [Technology]. Insufficient resources and expertise profoundly affect EA implementation and have a negative impact on EA value [4, 5].

In addition, it is reported that there is a gap between EA team [Actor] capabilities and required EA activities [Task]. It means an EA team without a suitable set of skills and proficiency will not be able to launch and sustain a successful EA practice. Thus, organizations need an EA team that is skillful, motivated and experienced to establish and operate an EA program [4-6]. That exemplifies an actor-task misalignment where actors are not capable of executing EA activities [13]. The lack of capable enterprise architects is a serious issue for EA development [6, 25], and it might be due to the broad and complex nature of the EA field [25].

D. EA Management Misalignments

Based on the data analysis, this section presents EA management-related misalignments. These misalignments are related to themes such as strategy, requirements, processes and data, as shown in Table V.

TABLE V. EA MANAGEMENT MISALIGNMENTS

Data evidence (Examples)	Actual Misalignment
"Due to the merger, we are now still unaware of the new strategy and thus the new EA cycle depends on this" –Case 2	lack of strategy [structure] affects EA activities [task]
"Maintenance of the EA tool due to changes in stakeholders' requirements is creating some challenges"- Case 1	Vague requirements caused unnecessary extra work [task] on EA tool [technology] which is occupying EA team [actors]
"Lack of proper documentation process requires more efforts recollecting EA information "- Case 4.	Ineffective processes (task) lead to more work from EA teams [actor]
"Updates to the [EA] repository is very important …. because that [organization] cannot afford to make decisions based on outdated [EA] data"- Case1	Informal EA data update [task] leads to outdated and useless repository [technology]
"If quality information [data] is not shared, then EA artifacts [models] will not depict the true picture… These problems occur when the agency was establishing baseline architecture and collecting the existing IT assets."- Case 3.	Low quality data sharing [task] leads to low quality EA repository [technology]

First, the data shows there is a misalignment between strategy [Structure] and EA planning [Task]. It shows that such a misalignment between the strategic structure and the EA development cycle is due to a recent merger, which resulted in the absence of a cohesive business strategy, which caused some uncertainty into EA planning and operations. Since EA activities rely on proper alignment with organizational strategy, any lack of strategic direction leads to disconnects between strategic goals and the execution of architectural activities. As a practice, EA focuses on defining the future architecture based on clear strategic objectives [5, 14]. Consequently, when organizational strategies are unclear, the effectiveness of EA practices is compromised [6]. The challenge of defining the target state does not stem from difficulties in obtaining relevant information. Instead, the issue lies in the organization's inability to reach a consensus on the desired strategic direction [33].

Second, another misalignment pertains to vague requirements and EA's irrelevant extra-work. In particular, frequent changes in stakeholder requirements [Actors] require ongoing maintenance [Task] of the EA tool [Technology], which has resulted in unnecessary additional efforts. This actor-task-technology gap causes the EA team [Actors] to spend too much time modifying EA tools rather than focusing on value-adding EA operations. In such misalignment, EA resources are diverted away from value-adding activities. Thus, in order to avoid such a misalignment, organizations need to have effective change management and well-defined requirements from stakeholders. It is stated that when there is a lack of specific objectives and proof of added value, it is not likely to make efficient use of EA [22]. If EA projects proceed on inaccurate assumptions, it will lead to higher costs as all tasks need re-execution. Consequently, the EA development will require significantly more time than anticipated [36].

Third, there was a misalignment between ineffective EA processes [task] and EA team workload [actor]. In particular, the lack of EA documentation processes imposes some challenges on EA team. This inefficiency amplifies EA documentation workload, delays the decision-making process, and reduces the overall value of EA. Consequently, the team is engaged in repetitive tasks rather than concentrating on strategic initiatives. Thus, the use and adherence to a structured EA process have the potential to improve EA content and reduce EA team efforts. It is stated that issues occur due to unclear processes and procedures, a lack of coordination with the EA department, and incorrect project plans [22]. In particular, the documentation process, which involves the manual gathering and maintenance of EA content, is susceptible to errors, labor-intensive, and expensive [5].

Fourth, there was a misalignment related to ineffective EA data management, which results in useless EA insights. It is a task technology misalignment where EA data update [task] is not maintained to keep EA repository [technology] up to date and relevant. Updates to the EA repository are informal and are not carried out systematically. This results in an outdated and useless repository, ultimately leading to inaccurate decisions. EA architects find it difficult to keep up with quick changes and documentation of such changes [23]. It is reported that the delivery of EA deliverables are often delayed, inappropriate, inefficient, or unclear [32]. EA artefacts must be stored to enable

stakeholder use and reuse. Additionally, any changes must be accurately documented to avoid a mismatch between documentation and reality [22].

Fifth, there was a task-technology gap related to a low-quality data. Low quality data sharing [Task] leads to low quality EA repository [Technology]. EA effectiveness is undermined when quality data are not shared [Task] and populated into EA repository [Technology]. Such a misalignment is considered a systematic that needs organized actions [13]. To realign the socio-technical system and ensure that EA artifacts depict the real picture of the enterprise, the enterprise has to use data quality governance, conduct training programs, use automation for data sharing, and use accountability policies. The documentation of EA is frequently performed manually [23]. Yet, manual collection of EA information and its maintenance is susceptible to errors, labor-intensive, and expensive [5, 8, 9].

E. Overall Discussion

This section discusses EA misalignments based on the PSIC model. Table VI shows that EA issues manifest as misalignments among the core PSIC components: structure, task, actor, and technology, rather than as isolated challenges.

TABLE VI.   EA MISALIGNMENTS

Socio-Technical elements	EA Misalignments
Structure – Task	• Ineffective communication [structure] hinders EA progress [task] • Weak senior management support [structure] leads to poor EA data collection [task] • Lack of governance [structure] affects EA operations and EA value delivery [task] • EA Governance Committee [structure] has to guide EA activities [task] • Lack of strategy [structure] affects EA activities [task]
Structure-Task -Actor	• IT-driven EA [structure] is not supporting EA value delivery [task] resulting in the neglect of EA by [actor]
Actor -Task	• Senior management [actor] are not involved with EA [task] • Incapable EA team [actors] can't establish an effective EA practice [task] • Organizational members [actor] are not accepting and supporting EA [task]
Task - Actor	• EA documentations [task] can't be completed due to uncooperative stakeholders [actor] • Compliance [task] is not supported by project teams [actor] • Ineffective processes (task) lead to more work for EA teams [actor]
Task - Technology	• Uncoordinated projects initiation [task] leads to incompatible architectural deliverables [technology] • Informal EA data update [task] leads to outdated and useless repository [technology] • Low quality data sharing [task] leads to low quality EA repository [technology]
Structure-Actor	• Lack of funding [structure] affects team capabilities [actor]
Structure - Task - Technology	• Lack of funding [structure] prohibits EA maintenance [task] which causes tools [technology] issues
Task - Technology -Actor	• Vague requirements cause unnecessary extra work [task] on EA tools [technology] which occupies EA team [actor]

First, structure–task misalignments such as ineffective communication, poor governance, weak senior management support, and absence of clear strategy, clearly undermine EA tasks. Structure–task misalignments suggest that the organizational arrangements designed to facilitate EA do not adequately enable EA activities that are necessary for the delivery of EA value. Consequently, EA is undermined due to poorly or fragmentally executed EA tasks, such as data collection, coordination, and governance enforcement.

Second, the data presents multiple misalignments, which involve structure, task, and actor, specifically when EA is framed as an IT-driven program. When EA is structurally embedded within IT, EA tasks fail to align with business goals, resulting in inadequate engagement from important actors. This misalignment explains why top management and some organizational members are not engaged with EA activities. Such a misalignment deteriorates the socio-technical balance of EA. It leads to EA resistance and reduces the possibility that EA practices are accepted across the organization.

Third, actor–task misalignments are also noticeable, which signify gaps in team capabilities, actors' commitment, and collaboration. Incapable EA teams, uncommitted and uncooperative stakeholders impede essential EA tasks such as documentation and compliance. In PSIC terms, well-defined tasks cannot be successfully executed when actors are not capable, or lack the authority, or are not motivated. Over time, these misalignments intensify workload on EA teams and lack of trust in EA outcomes, highlighting an example of disengagement and inefficiency within the system.

Fourth, task–technology and other related multi-component misalignments degrade EA models and tools. Poorly coordinated tasks, insufficient funding, ad-hoc data management and unclear requirements lead to an outdated EA repository, incompatible EA deliverables, and ineffective EA tools. When technology is misaligned with tasks and actors, EA tools become a liability rather than an enabler, overwhelming actors without providing value.

V. CONCLUSION

Despite EA's relevance, EA establishment and operations are still challenging for many organizations. Furthermore, although interest in EA research is expanding, the majority of articles lack strong theoretical underpinnings. Further, EA issues are often analyzed independently of each other, while in reality, they are interconnected and impact each other. Thus, this study aims at a deeper understanding of EA issues using the Punctuated Socio-Technical Information System Change (PSIC) model.

EA misalignments, as a contemporary phenomenon, must be explored in its context. Therefore, a case study method is used. The case study data were deductively analyzed based on the four components of the PSIC's model to identify EA misalignments. These components impact one another and engage in dynamic interactions within a socio-technical system.

The contributions of this study are threefold. First, certain misalignments were identified and grouped into four primary categories: organizational, governance, capabilities, and managerial misalignments. EA misalignments originate from disruptions or inconsistencies across EA components, such as ineffective communication, a lack of organizational support, weak processes, and ineffective governance. By mapping these misalignments using the PSIC model, this study offers an empirically grounded analysis that can serve as a reference for future theory development in EA research. Second, this study shows that the PSIC is applicable at a finer-grained level of analysis, specifically, the operational misalignments within an EA program. It constitutes a contextual adaptation of the PSIC model to the EA domain. Third, the study enriches the model by showing that EA misalignments often manifest as multicomponent rather than dual misalignments. It uncovers the causal interdependence among EA issues across four related components (structure, task, actor, and technology). For instance, the data shows that insufficient funding [structure] does not only cause a funding issue in isolation. It concurrently reduces EA team capabilities [actor], impacts EA tools maintenance [technology], and disrupts EA activities [task], leading to multicomponent misalignments.

Consistent with the PSIC model, these misalignments exemplify how changes such as reduced funding or weakened data governance can drive an EA program toward a critical point, where accumulated gaps impede the overall coherence of EA and threaten its sustainability. EA elements impact one another and engage in dynamic interactions within a socio-technical system. That means any disruptions to one or some of these elements have a negative impact on EA practice as a whole. Thus, organizations must ensure that EA elements are aligned and work in harmony to realize the promised value of EA.

Future research should examine EA misalignments to understand their emergence and evolution across various organizational contexts. Moreover, studies are needed to examine the techniques that organizations use to maintain alignment and coordination of EA elements. This research would facilitate the identification of optimal practices and contextual elements that enable sustainable EA coherence and the realization of long-term EA benefits.

This research has its limitations. The use of a qualitative case study design and the small number of cases limit the generalizability of the findings across different organizational settings. Although the results provide in-depth insights, they should be viewed as exploratory rather than conclusive.

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