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The Role of Enterprise Architecture (EA) in Ensuring Environmental, Social, and Governance (ESG) Factors for Organisational Sustainability

Research-in-progress

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Abstract

Organisations increasingly recognise the importance of environmental, social, and governance (ESG) as contributors to organisational and global sustainability. Digital transformation is helping organisations to integrate ESG factors into their operations and leverage information technology for economic, social, and environmental benefits. Enterprise architecture (EA) is a strategic approach that integrates business objectives with information technology systems and infrastructure to align with organisational goals and enable effective management, governance, and decision-making. Despite the growing recognition of the significance of ESG factors in promoting sustainable business practices, there are still obstacles to assuring ESG for organisational sustainability. Despite limited research in the intersecting domains of EA and ESG, an integrative literature review was conducted to address this problem, using esteemed research sources. Based on the extant literature findings, this paper analyses the key issues and proposes a conceptual design to address those issues by leveraging EA to ensure ESG factors provide optimum organisational sustainability.

Keywords Enterprise Architecture, Sustainability, ESG, Digital Strategy, Governance.

1 Introduction

Contemporary organisations are increasingly integrating environmental, social and governance (ESG) factors in their business strategies to ensure organisational and global sustainability (ElMassah and Mohieldin 2020). The United Nations Global Compact in 2005 was the first to propose ESG, and the United Nations in 2015 emphasised ensuring sustainability in the Sustainable Development Goals (SDGs) of the 2030 Agenda (Bexell and Jonsson 2022; Wong et al. 2021) using digital technology. Sustainable development is the process of achieving economic growth, social equity, and environmental preservation in a balanced and integrated manner, ensuring the needs of the present generation are met without compromising the ability of future generations to meet their own needs (United Nations 2015). Organisational transformation by leveraging information technology (IT) in the current turbulent and erratic markets creates not only economic value, but also social and environmental values (Zhong et al. 2023). Through digital transformation, organisations streamline operations, reduce costs, and improve their ability to innovate and compete in the marketplace. This involves the integration of digital technologies into the architecture of an organisation's operations, including supply chain management, marketing, finance, and customer service. At the same time, it is crucial to enhance ESG practice capability to safeguard the sustainable development of organisations. Firms are relying on IT along with efficient business processes, quality products, and services to deliver competitive advantage (Van De Wetering et al. 2021). Consequently, the strategic role of enterprise architecture (EA) in the planning, design and deployment of integrated business solutions is increasingly recognised in the literature.

EA is the blueprint of a business ecosystem that integrates strategy to align the business objectives and strategic goals with the information systems, business processes and related infrastructures (Van De Wetering et al. 2021; Abunadi 2019). The strategic approach provides a bird's eye view of the organisation to achieve its goals and initiatives, leveraging IT through EA's guiding principles (Kotusev et al. 2015, Winter and Schelp 2008). EA involves defining the organisation's current and desired future state, identifying the gaps between them, and developing a roadmap for moving from the current state to the future (Sasa and Krisper 2011; Boh and Yellin 2006). Organisations progressively adopt EA to orchestrate the assets, resources, components, and capabilities in digital and organisational transformations (Van De Wetering et al. 2021). The primary goal of EA is to ensure that an organisation's IT systems and infrastructure are aligned with its business goals and objectives and that they are designed and managed to maximise efficiency, effectiveness, and agility (Espinosa et al. 2011).

Despite the growing recognition among organisations of the significance of ESG factors in promoting sustainable business practices, there remain obstacles to assuring ESG for organisational sustainability. The extant literature on ESG has explored the drivers for ESG performance (Daugaard and Ding 2022), analysed the impact of digital transformation on ESG performance (Zhao et al. 2023; Zhong et al. 2023) and framed enterprise ESG architectures (Wu et al. 2022). While previous studies unveiled ESG performance reporting, strategies and actions for organisational sustainability as an isolated approach for ensuring sustainability, there is a recognised need for a holistic approach to incorporate the ESG factors into the organisation's business strategy. The literature review revealed limited research exploring the relationship between EA and ESG for sustainability, highlighting a need for further studies on these interconnected domains. As EA provides an enterprise view of the organisation, this research-in-progress paper illustrates the role of EA in ensuring ESG factors for organisational sustainability are considered by identifying the key issues and formulating theoretical solutions. This paper investigates the following research question, *"How can EA be leveraged to achieve ESG performance goals by integrating ESG factors into an organisational strategy for sustainability?"*

2 Literature Review

To address the research question, we critically reviewed and analysed extant literature employing an integrative approach to assess, critique, and synthesise literature on this emerging topic, fostering new theoretical frameworks and perspectives by creatively combining insights from various research fields (Snyder 2019). This approach assisted in generating the new conceptual design, which involved qualitative analysis of the main concepts and relationships of the literature utilising our conceptual thinking and transparent documentation. We utilised esteemed online sources, including ACM Digital Library, AIS Electronic Library, Elsevier, IEEE Xplore, MIS Quarterly, Science Direct, Springer Link, UniMelb Library, and Google Scholar to access and select influential journals and proceeding publications from the last decade, employing search keywords related to enterprise architecture (EA), ESG, digital transformation and digital sustainability. Digital transformation entails the holistic integration of digital technologies, procedures, and approaches within a company, aiming to instigate fundamental shifts in operational procedures, customer interactions, and value generation (Westerman

et al. 2014; Tang 2021). Digital sustainability refers to the responsible use and management of digital technologies to curtail their negative impact on the environment and society while maximising their benefits (Cardinali and De Giovanni 2022).

We considered the studies on digital sustainability or ESG relating to organisational strategy, digital transformation, IT or EA. We unearthed 112 pertinent articles for title and abstract analysis. Of these, 39 papers merited thorough investigation, with 19 nominated for deeper scrutiny. All selected papers studied sustainability or ESG from a business organisation perspective; about half (47%) included IT or digital viewpoint, and only two (11%) mentioned EA's role in sustainability performance. We recognised minimal literature on the junction of EA and ESG from the qualitative analysis. While going through the different esteem sources, we needed help finding significant proof of using EA and ESG together to achieve sustainability in an organisation, emphasising a notable research gap. Engaging the integrative literature review approach, we identified ESG integration challenges in enterprise sustainability strategies, as exhibited in Table 1 (Appendix A), aligned with relevant papers.

2.1 Issues in ensuring ESG

ESG factors have become essential for organisational sustainability due to the acute need to address environmental challenges, changing societal expectations, and regulatory pressures in guiding corporations to effectively contribute to achieving SDGs (Khaled et al. 2021). Companies prioritise ESG issues due to direct connectivity with the firm's cash flow, and in combating growing operational expenses, such as raw-material costs and the actual cost of water or carbon (Koller et al. 2019), so ESG issues are better positioned to manage risks, capitalise on opportunities, and create long-term value for their stakeholders. We observed limited studies in the cross-functional fields of EA and ESG. However, several investigations in other business areas, such as finance, supply chain and operations, considered ESG and sustainability. Through an analysis of chosen research papers, specific knowledge gaps have surfaced regarding the means to secure ESG factors for organisational sustainability, even as these elements gain increasing acknowledgement in business operations. Recent literature addressing ESG's role underscores gaps in our comprehension of obstructions to the seamless integration of ESG factors from a strategic viewpoint. Adopting thematic analysis techniques (Braun and Clarke 2022), we identified eight issues in integrating ESG factors into an organisational sustainability strategy to understand how EA can be leveraged to achieve ESG performance, see Figure 1 and Appendix A.

I1: Lack of awareness and understanding of the importance of ESG factors (Morais et al. 2022; Faccia et al. 2021). Organisations need to be aware of the potential risks and opportunities associated with ESG. They may need a clearer understanding of integrating ESG considerations into their architecture that support sustainability strategies.

I2: Lack of clarity on ESG goals and objectives can lead to a lack of focus and direction in ESG initiatives (Morais et al. 2022; Jonsdottir et al. 2021). Organisations need help to define and communicate their ESG goals and objectives, which can lead to a lack of focus and direction in ESG initiatives.

I3: Limited stakeholder engagement to understand their ESG concerns and expectations, leading to a lack of alignment between organisational and stakeholder ESG goals (Jonsdottir et al. 2022; Morais et al. 2022; Dye et al. 2021; Oprean-Stan et al. 2020). Effective integration of ESG factors into organisational sustainability strategies requires engagement and collaboration with various stakeholders, including employees, customers, investors, and communities.

I4: Inadequate ESG reporting makes it difficult for stakeholders to assess ESG performance and hold them accountable (Jonsdottir et al. 2022; Morais et al. 2022; Dye et al. 2021; Oprean-Stan et al. 2020), as the organisations may not report their ESG performance in a transparent and standardised way.

I5: Lack of consistent and reliable data and metrics related to ESG performance (Jonsdottir et al. 2022; Dye et al. 2021; Oprean-Stan et al. 2020). Many organisations may need more data and metrics to track and measure their ESG performance, making it challenging to identify improvement areas and demonstrate progress to stakeholders.

I6: Limited integration of ESG into core business processes and decision-making reflects fragmented approaches to sustainability, leading to a lack of ESG-focused innovation and business model transformation (Jonsdottir et al. 2022; Khaled et al. 2021; Oprean-Stan et al. 2020). Many organisations may need more cohesive approaches to sustainability, with different departments and functions working on sustainability initiatives in isolation from each other.

I7: A focus on short-term financial performance at the expense of long-term sustainability can lead to a lack of investment in ESG-related initiatives and a lack of attention to the potential risks and opportunities associated with ESG (Morais et al. 2022; Dye et al. 2021; Oprean-Stan et al. 2020). Many

organisations may have a short-term focus, focusing on short-term financial performance at the expense of long-term sustainability.

I8: Inadequate standard information technology infrastructure to monitor, track, and report ESG performance effectively, leading to a lack of data-driven decision-making (Oprean-Stan et al. 2020). Organisations may need more technological infrastructure to properly monitor, manage, and report their ESG performance, resulting in a deficiency of information-driven choices.

We delved deeper from the organisational strategic viewpoint where EA can be climactic in addressing these issues. Consistent with thematic analysis, we characterised the identified issues to pinpoint the root causes obstructing the integration of ESG factors for a sustainable organisation. This analysis led us to discern three underlying themes hindering the seamless integration of ESG considerations which we refer to as Key Issues (KI). Figure 1 represents the linkage of the issues contributing to the strategic key issues. This paper proposes a conceptual design to eliminate these strategic problems by leveraging EA to ensure ESG performance for sustainability.

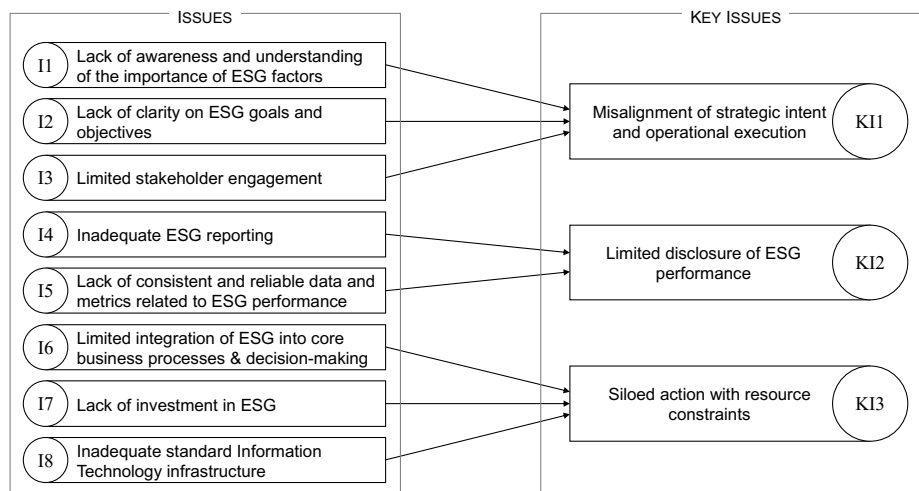


Figure 1: Characterising the key issues from the identified issues in extant literature

KI1: *Misalignment of strategic intent and operational execution*, which fails to connect the dots among business, information and ESG. I1, I2 and I3 signify the need for clarity, understanding and awareness of ESG goals and objectives by engaging concerned stakeholders.

KI2: *Limited disclosure of performance*. Insufficient ESG reporting occurs due to inconsistent and unreliable data and metrics of ESG performance. I4 and I5 imply a demand for more data and metrics to track ESG performance often leaves organisations needing help identifying improvement areas and showing progress to stakeholders. Nevertheless, inadequate ESG reporting that lacks transparency and standardisation makes it challenging to hold organisations accountable for their ESG performance.

KI3: *Siloed action with resource constraints*. I6, I7 and I8 indicate that a lack of integration of ESG into core business processes, fragmented approaches to sustainability, a short-term focus on financial performance, inadequate technology infrastructure, and a lack of data-driven decision-making can lead to a lack of innovation, business transformation, and attention to potential ESG risks and opportunities.

2.2 The role of EA in ensuring ESG

EA can play a strategic role in ensuring that ESG factors are incorporated into the sustainability strategies of organisations operating in the digital economy (Chaerudin and Suriانشa 2022; Simon et al. 2014) and can support organisations in achieving ESG goals and improving sustainability performance (Liao and Wang 2021). EA provides a holistic approach to integrating ESG into sustainability strategies by aligning IT systems with ESG goals, supporting sustainable supply chain management, and encouraging innovation (Van De Wetering et al. 2021).

EA can assure environmental sustainability by offering a framework for creating and maintaining an organisation's technological infrastructure and business operations in an environmentally friendly manner (Chavarria-Barrientos et al. 2018). EA facilitates the implementation of sustainable IT practices like energy-efficient technology, virtualisation, and cloud computing, thereby optimising IT resource utilisation to minimise carbon footprint and energy costs (Raj and Periasamy 2011). EA aids in the

identification and redesign of processes to reduce waste and energy consumption and promote sustainability (Vasauskaite and Gill 2015). Moreover, through scenario modelling and data analysis, EA empowers organisations to assess environmental impacts, identify improvement areas, and chart a sustainable course of action (Liao and Wang 2021). By involving stakeholders in design and execution, EA enhances stakeholder engagement for environmental sustainability (Korhonen et al. 2016).

EA strategically advances social sustainability by aligning business, technology infrastructure, and operations with ethical and social objectives (Sutherland and Hovorka 2014; Pankowska 2013). Effective stakeholder engagement is facilitated by EA, enabling organisations to create products and services that cater to social needs (Anthony Jnr et al. 2021). Collaborations with governmental and non-governmental entities can address social issues through resource and data sharing, ensuring equitable outcomes (Sutherland and Hovorka 2014). By adhering to ethical and sustainable standards, organisations demonstrate commitment to social sustainability (Sutherland and Hovorka 2014). Transparent mechanisms, including metrics and reporting on social impact, are established by EA to monitor social sustainability goals (Zhong et al. 2023) while also promoting digital inclusion through accessible technology solutions (Anthony Jnr et al. 2021).

EA optimises interdependencies between business operations and IT infrastructure, offering insights into current and future organisational states through visual models and enhancing corporate governance (Enagi and Ochoche 2013). EA simplifies organisational structures and interactions, reduces complexity, enhances transparency, and optimises operations, reducing costs (Jonagaddala et al. 2020). Moreover, by providing well-defined process models, EA enhances decision-making by offering structured direction and governance (Tamm et al. 2022; Barateiro et al. 2012).

2.3 Theoretical Perspectives

The foundation of ESG research primarily rests on institutional theory and stakeholder theory (Helfaya 2023; Daugaard and Ding 2022; Eliwa et al. 2021; Li et al. 2021). Following stakeholder theory, ESG studies propose that companies that effectively address the ESG expectations of stakeholders will outperform those that disregard their responsibilities (Li et al. 2021). ESG performance underscores stakeholder theory and the significance of defining the boundary between stakeholders and the broader community (Daugaard and Ding 2022). As per institutional theory, ESG research also explores how a company's legitimacy behaviour contributes to its sustainable development (Eliwa et al. 2021; Li et al. 2021). Likewise, stakeholder theories are intricately linked with the fundamental aspects of EA practices, encompassing the formation and application of EA artefacts to aid communication and decision-making (Kotusev and Kurnia 2021). This theory facilitates understanding how different stakeholder groups are interconnected and clarifies the necessity of EA artefacts. However, it also highlights their limitations in achieving this goal. This theory clarifies the extent of stakeholder engagement in the EA practice, illuminates communication strategy choices, and offers insights into their participation in shaping future-oriented EA artefacts (Kotusev and Kurnia 2021). The identified key issues and our conceptual solution design will be investigated based on these theoretical foundations of EA and ESG.

3 EA for Ensuring ESG into Organisational Sustainability Strategy

3.1 Proposed Conceptual Design

Drawing from the insights garnered through the literature review, and Figure 2 proposes a conceptual design to address the strategic key issues that elucidate how EA can be leveraged to ensure ESG performance by integrating these factors into the sustainable organisational strategy. The organisational strategy (Thompson and Martin 2010) directs operational functions, influencing the arrangement and synchronisation of tasks to achieve overarching objectives. EA serves as a critical enabler in formulating organisational strategies, aiding in aligning business objectives with technology capabilities (Ross et al. 2006). EA enables a business to formulate the organisational strategy which directs the functional operations of the organisation. We propose that EA provides effective governance over environmental and social considerations and directs ESG initiatives by integrating governance, environment and social aspects into an organisational strategy to execute functional operations. EA can define the governance and direct ESG initiatives and projects to be delivered in collaboration with functional teams. This governance will formulate key performance indicators (KPIs) for environmental and social considerations and monitor the operational KPIs. The dotted segment in Figure 2 shows how organisations can enhance ESG performance by leveraging EA.

The concept is based on the role of EA in ensuring the three factors of ESG, where governance provides requisite control over the environmental and social considerations over organisational strategy and actions for sustainability. Hence, we propose the sequenced resolution for testing our conceptual

solution structure. First, EA defines the governance structures and communications across the functions of an organisation. Second, the governance monitors and controls the inclusive execution of environmental and social factors considered in the organisation's enterprise-level strategy for sustainability. Third, EA ensures the standard operating procedures (SOP) aligning with the organisational sustainability strategy at the functional level.

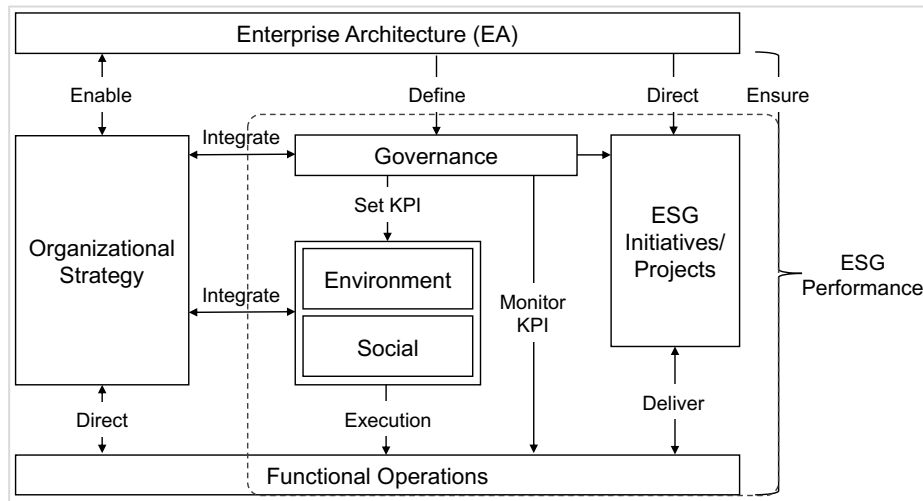


Figure 2: Conceptual Design – The role of EA in ensuring ESG for Sustainability

3.2 Addressing the Key Issues by Leveraging EA

We conceptualised EA adoption as the coordinated approach to address the key issues to ensure the effective integration of ESG for organisational sustainability. The proposed conceptual design can eliminate the identified critical issues by leveraging EA, urging organisations to prioritise long-term sustainability over immediate financial gains and employ a cohesive strategy to respond to ESG gaps.

The conceptual design can ensure strategic alignment of business objectives, ESG goals and IT systems through the EA approach. EA aligns an organisation's IT systems and infrastructure with ESG goals, promoting social responsibility by reducing energy consumption and waste and ensuring that ESG goals are integrated into the business strategy and objectives (Liao and Wang 2021). It can involve mapping ESG goals to specific business processes and systems and developing a roadmap for achieving ESG targets. By incorporating ESG considerations into EA frameworks, organisations can identify technology-enabled sustainability opportunities and align business goals and objectives with ESG factors such as energy efficiency, resource conservation, and social impact (Zhong et al. 2023). It will bridge the dots by ensuring a transparent flow of information across all business functions and stakeholders for improved awareness of ESG goals and objectives, hence address the first key issue of misalignment of strategic directions and operational execution.

The proposed concept can resolve the next critical problem of limited disclosure of ESG performance by developing and establishing ESG reporting mechanisms and governance to achieve ESG performance. EA can assist organisations in developing ESG-focused metrics and reporting mechanisms that allow them to monitor and evaluate their performance in areas like carbon emissions, energy consumption, waste reduction, employee diversity, and societal impact (Zhong et al. 2023). By utilising the proposed design for ESG reporting, organisations can communicate their sustainability progress to stakeholders.

The proposed design can eradicate siloed action and mitigate resource constraints by integrating ESG into organisational governance strategy. It supports tech-enabled sustainability actions during innovation and transformation and supports sustainable supply chains. EA can ensure that an organisation's IT governance and management processes incorporate ESG considerations, including IT investment decision-making and project prioritisation (Van Der Hoogen 2013). EA can also help organisations identify technology-enabled opportunities to achieve their ESG goals, such as using IoT sensors to optimise energy usage or implementing digital platforms for sustainable supply chain management (Zhong et al. 2023). Additionally, EA can foster innovation and transformation by identifying ways to leverage technology to address ESG challenges, such as developing sustainable products or implementing business models aligned with ESG goals (Korhonen et al. 2016). Finally, EA can support sustainable supply chain management by identifying opportunities to reduce waste, improve efficiency, and minimise environmental impact (Liao and Wang 2021).

3.3 Proposed Method

This research explores a real-world social occurrence involving utilising EA to facilitate ESG integration with enterprise strategy for the organisation's sustainability. Given the nature of this study, it aligns with the interpretivism paradigm, as advocated by Goldkuhl (2012). Within this context, a qualitative research approach is more suitable than a quantitative one for several reasons: firstly, this research is still in its exploratory stage; secondly, a comprehensive investigation of the role of EA in ensuring ESG and sustainability is required; and thirdly, there is a lack of established quantitative measures for all the involved concepts. To address the mentioned considerations, the intention is to employ a multiple case study design, a widely accepted methodology in EA literature (e.g., Cammin et al. 2021).

This research-in-progress paper conducted a preliminary review of the extant literature to investigate how EA can be leveraged to achieve ESG performance goals by integrating ESG factors into an organisational strategy for sustainability. The next phase of the research is proposed as follows: 1) an extensive literature review will iterate the preliminary conceptual design. 2) following the guidance of this design, multiple case studies encompassing 3-4 organisations (Schoch 2020) will be undertaken to deeply explore the strategic key issues and how EA contributes to the achievement of ESG performance within each case organisation. Large multinational corporations across industries, such as technology, consumer goods, and energy, will be suitable candidates as case organisations due to their significant environmental and social impacts, diverse stakeholder expectations, and regulatory exposures. The exact number of cases will be determined upon achieving data saturation. Data will be sourced from various avenues to ensure triangulation. 3) the findings from each case will be contrasted to identify recurring patterns among the variables, shedding light on the role of EA in ensuring ESG and sustainability with a framework accompanied by a set of propositions.

4 Conclusion

Integrating ESG factors into organisational sustainability strategies is crucial to support sustainability goals and objectives, as digital technologies can have significant environmental and societal impacts. Organisations can incorporate ESG factors utilising institutional and stakeholder theories by developing metrics, engaging with stakeholders, and prioritising sustainable supply chain management. At the same time, EA plays a critical role in assisting decision-makers to navigate the rapidly changing business and IT landscape during digital transformation. With EA providing the reference points for design activities, the extant studies recognised related issues in achieving ESG performance (Appendix A), fortifying our ongoing research, based on limited extant literature, with identified three fundamental problems – misalignment of strategic intent and operational execution, limited disclosure of performance, and siloed action with resource constraints, hindering organisational sustainability. EA can play an essential role in addressing these root issues in achieving ESG performance by integrating ESG factors into an organisation's sustainability strategy utilising the theoretical design. The concept proposes EA as an effective tool and emphasises EA's role in defining governance structures, monitoring ESG factors in enterprise-level strategy, and aligning standard operating procedures with the sustainability strategy at the functional level. This role of EA is critical in safeguarding environmental and social considerations in organisational strategy and actions towards sustainability.

This research holds significant implications for both the field of EA research and its practical application. First, our continuing study contributes to expanding limited research on sustainability and ESG from an EA perspective. Second, the paper supports and extends previous literature (Zhong et al. 2023; Liao and Wang 2021; Van der Hoogen 2013) by characterising the fundamental issues in realising ESG outcomes for organisational sustainability. Third, the conceptual solution design can assist scholars in conducting empirical studies on how EA can be beneficial in achieving sustainable goals with ESG considerations by testing in different contexts, such as industry, culture, and demography. From the empirical viewpoint, our proposed concept indicates that organisations can leverage EA in formulating organisational sustainability strategies by integrating ESG factors, where EA can assist organisations in the governance and direction of ESG initiatives for enhancing sustainability performance.

A limitation of this study lies in the dispersion of sources that underpin the three key issues addressed in this paper, spanning a range of ESG and related literature, which may have resulted in the authors overlooking additional potential challenges related to ESG factors for organisational sustainability. This study is exclusively theoretical and needs to incorporate firsthand empirical data for further exploration. Nevertheless, we argue that this paper highlights an important phenomenon likely to inspire further research and contribute to the progression of the EA field for sustainability.

5 References

- Abunadi, I. 2019. "Enterprise Architecture Best Practices in Large Corporations," *Information*, 10(10), 293. (<https://doi.org/10.3390/info10100293>).
- Anthony Jnr, B., Abbas Petersen, S., Helfert, M., Ahlers, D. and Krogstie, J. 2021. "Modeling pervasive platforms and digital services for smart urban transformation using an enterprise architecture framework," *Information Technology and People*, Vol. 34 No. 4, (pp. 1285-1312). (<https://doi.org/10.1108/ITP-07-2020-0511>).
- Barateiro, J., Antunes, G., and Borbinha, J. 2012. "Manage risks through the enterprise architecture," In *2012 45th Hawaii International Conference on System Sciences*, (pp. 3297-3306). IEEE. (<https://doi.org/10.1109/HICSS.2012.419>).
- Bexell, M.; Jonsson, K. 2022. "Realizing the 2030 Agenda for sustainable development—Engaging national parliaments?" *Policy Stud*, 43, (pp. 621–639). (<https://doi.org/10.1080/01442872.2020.1803255>).
- Boh, W.F., and Yellin, D. 2006. "Using enterprise architecture standards in managing information technology," *J. Manag. Inf. Syst.*, 23, (pp. 163–207). (<https://doi.org/10.2753/MIS0742-1222230307>).
- Braun, V. and Clarke, V. 2022. *Thematic Analysis: A Practical Guide to Understanding and Doing*. Sage. London.
- Cammin, P., Heilig, L., and Voß, S. 2021. "Assessing requirements for agile enterprise architecture management: a multiple-case study," in *Proceedings of the 54th Hawaii International Conference on System Sciences (HICSS)*. 1792.
- Cardinali, P. G., and De Giovanni, P. 2022. "Responsible digitalization through digital technologies and green practices," *Corporate Social Responsibility and Environmental Management*, 29(4), (pp. 984-995). (<https://doi.org/10.1002/csr.2249>).
- Chaerudin, I., and Suriانشa, R. 2022. "Enterprise Architecture Management and its Role in Corporate Strategic Management," *Journal of Economics and Business UBS*, 11(1), (pp. 72-78). (<https://doi.org/10.52644/joeb.v11i1.83>).
- Chavarria-Barrientos, D., Batres, R., Wright, P. K., and Molina, A. 2018. "A methodology to create a sensing, smart and sustainable manufacturing enterprise," *International Journal of Production Research*, 56(1-2), 584-603. (<https://doi.org/10.1080/00207543.2017.1386333>).
- Daugaard, D., and Ding, A. 2022. "Global drivers for ESG performance: The body of knowledge," *Sustainability*, 14(4), 2322. (<https://doi.org/10.3390/su14042322>).
- Dye, J., McKinnon, M., and Van der Byl, C. 2021. "Green gaps: Firm ESG disclosure and financial institutions' reporting Requirements," *Journal of Sustainability Research*, 3(1). (<https://doi.org/10.20900/jsr20210006>).
- Eliwa, Y., Aboud, A., and Saleh, A. 2021. "ESG practices and the cost of debt: Evidence from EU countries," *Critical Perspectives on Accounting*, 79, 102097. (<https://doi.org/10.1016/j.cpa.2019.102097>).
- ElMassah, S., and Mohieldin, M. 2020. "Digital transformation and localizing the Sustainable Development Goals (SDGs)," *Ecol. Econ.*, 169, 106490. (<https://doi.org/10.1016/j.ecolecon.2019.106490>).
- Enagi, M. A., and Ochoche, A. 2013. "The role of enterprise architecture in aligning business and information technology in organisations: Nigerian government investment on information technology," *International Journal of Engineering and Technology*, 3(1), 59-65. (<https://www.researchgate.net/publication/279421203>).
- Espinosa, J. A., Boh, W. F., and DeLone, W. 2011. "The organisational impact of enterprise architecture: a research framework," In *2011 44th Hawaii international conference on system sciences* (pp. 1-10). IEEE. (<https://doi.org/10.1109/HICSS.2011.425>).
- Faccia, A., Manni, F., and Capitanio, F. 2021. "Mandatory ESG reporting and XBRL taxonomies combination: ESG ratings and income statement, a sustainable value-added disclosure," *Sustainability*, 13(16), 8876. (<https://doi.org/10.3390/su13168876>).

- Goldkuhl, G. 2012. "Pragmatism Vs Interpretivism in Qualitative Information Systems Research," *European Journal of Information Systems* (21:2), pp. 135-146. (<https://doi.org/10.1057/ejis.2011.54>).
- Helfaya, A., Morris, R., and Aboud, A. 2023. "Investigating the Factors That Determine the ESG Disclosure Practices in Europe," *Sustainability*, 15(6), 5508. (<https://doi.org/10.3390/su15065508>).
- Jonnagaddala, J., Guo, G. N., Batongbacal, S., Marcelo, A., and Liaw, S. T. 2020. "Adoption of enterprise architecture for healthcare in AeHIN member countries," *BMJ health and care informatics*, 27(1), e100136. (<https://doi.org/10.1136/bmjhci-2020-100136>).
- Jonsdottir, B., Sigurjonsson, T. O., Johannsdottir, L., and Wendt, S. 2022. "Barriers to using ESG data for investment decisions," *Sustainability*, 14(9), 5157. (<https://doi.org/10.3390/su14095157>).
- Jonsdottir, G. E., Sigurjonsson, T. O., Alavi, A. R., and Mitchell, J. 2021. "Applying responsible ownership to advance SDGs and the ESG framework, resulting in the issuance of green bonds," *Sustainability*, 13(13), 7331. (<https://doi.org/10.3390/su13137331>).
- Khaled, R., Ali, H., and Mohamed, E. K. 2021. "The Sustainable Development Goals and corporate sustainability performance: Mapping, extent and determinants," *Journal of Cleaner Production*, 311, 127599. (<https://doi.org/10.1016/j.jclepro.2021.127599>).
- Koller, T., Nuttall, R., and Henisz, W. 2019. "Five ways that ESG creates value," *The McKinsey Quarterly*. (<https://www.proquest.com/scholarly-journals/five-ways-that-esg-creates-value/docview/2371931251/se-2>, accessed April 17, 2023).
- Kotusev, S., and Kurnia, S. 2021. "The theoretical basis of enterprise architecture: A critical review and taxonomy of relevant theories," *Journal of Information Technology*, 36(3), 275-315. (<https://doi.org/10.1177/0268396220977873>).
- Kotusev, S., Singh, M., and Storey, I. 2015. "Investigating the usage of enterprise architecture artifacts," *ECIS 2015 Research-in-Progress Papers*. Paper 15. (http://aisel.aisnet.org/ecis2015_rip/15).
- Korhonen, J. J., Lapalme, J., McDavid, D., and Gill, A. Q. 2016. "Adaptive enterprise architecture for the future: Towards a reconceptualization of EA," In *2016 IEEE 18th Conference on Business Informatics (CBI)* (Vol. 1, pp. 272-281). IEEE. (<https://doi.org/10.1109/CBI.2016.38>).
- Li, T. T., Wang, K., Sueyoshi, T., and Wang, D. D. 2021. "ESG: Research progress and future prospects," *Sustainability*, 13(21), 11663. (<https://doi.org/10.3390/su132111663>).
- Liao, M. H., and Wang, C. T. 2021. "Using enterprise architecture to integrate lean manufacturing, digitalization, and sustainability: A lean enterprise case study in the chemical industry," *Sustainability*, 13(9), 4851. (<https://doi.org/10.3390/su13094851>).
- Morais, F., Simnett, J., Kakabadse, A., Kakabadse, N., Myers, A., and Ward, T. 2022. "ESG in Growth Listed Companies: Closing the Gaps," In *The Palgrave Handbook of ESG and Corporate Governance* (pp. 359-374). Cham: Springer International Publishing. (https://doi.org/10.1007/978-3-030-99468-6_18).
- Oprean-Stan, C., Oncioiu, I., Iuga, I. C., and Stan, S. 2020. "Impact of sustainability reporting and inadequate management of ESG factors on corporate performance and sustainable growth," *Sustainability*, 12(20), 8536. (<https://doi.org/10.3390/su12208536>).
- Pankowska, M. 2013. "Enterprise Architecture Modelling for Corporate Sustainability," In *Building Sustainable Information Systems: Proceedings of the 2012 International Conference on Information Systems Development* (pp. 365-376). Boston, MA: Springer US. (https://doi.org/10.1007/978-1-4614-7540-8_28).
- Raj, P., and Periasamy, M. 2011. "The convergence of enterprise architecture (EA) and cloud computing," In *Cloud Computing for Enterprise Architectures* (pp. 61-87). London: Springer London. (https://doi.org/10.1007/978-1-4471-2236-4_4).
- Ross, J. W., Weill, P., and Robertson, D. C. 2006. *Enterprise architecture as strategy: Creating a foundation for business execution*. Harvard Business Press.
- Sasa, A. and Krisper, M. 2011. "Enterprise architecture patterns for business process support analysis," *J. Syst. Softw.*, 84, (pp. 1480-1506). (<https://doi.org/10.1016/j.jss.2011.02.043>).

- Schoch, K. 2020. "Case Study Research," in *Research Design and Methods: An Applied Guide for the Scholar-Practitioner*. SAGE Publications, pp. 245-258.
- Simon, D., Fischbach, K., and Schoder, D. 2014. "Enterprise architecture management and its role in corporate strategic management," *Information Systems and e-Business Management*, 12, (pp. 5-42). (<https://doi.org/10.1007/s10257-013-0213-4>).
- Sutherland, D., and Hovorka, D. S. 2014. "Enterprise Architecture as a Contributor to Sustainability Objectives," *Proceedings of the European Conference on Information Systems (ECIS)*, Tel Aviv, Israel, ISBN 978-0-9915567-0-0. (<http://aisel.aisnet.org/ecis2014/proceedings/track22/10>).
- Snyder, H. 2019. "Literature review as a research methodology: An overview and guidelines," *Journal of business research*, 104, 333-339. (<https://doi.org/10.1016/j.jbusres.2019.07.039>).
- Tamm, T., Seddon, P. B., and Shanks, G. 2022. "How enterprise architecture leads to organisational benefits," *International Journal of Information Management*, 67, 102554. (<https://doi.org/10.1016/j.ijinfomgt.2022.102554>).
- Tang, D. (2021). "What is digital transformation?". *EDPACS*, 64(1), 9-13. (<https://doi.org/10.1080/07366981.2020.1847813>).
- Thompson, J., and Martin, F. 2010. *Strategic Management: Awareness and Change (6th ed.)*. South Western, Australia.
- United Nations. 2015. "Sustainability." (www.un.org/en/academic-impact/sustainability, accessed July 22, 2023).
- Vasauskaite, J., and Gill, A. Q. 2015. "Rethinking Enterprise Architecture for Sustainable Energy System Development," *Journal of Electronic Science and Technology*, 13(3), (pp. 212-220). (<https://doi.org/10.11989/JEST.1674-862X.505151>).
- Van De Wetering, R., Kurnia, S., and Kotusev, S. 2021. "The role of enterprise architecture for digital transformations," *Sustainability*, 13(4), 2237. (<https://doi.org/10.1016/j.heliyon.2022.e11484>).
- Van Der Hoogen, A. 2013. *An Enterprise Architecture for Environmental Information Management and Reporting*. (<https://core.ac.uk/download/pdf/145049258.pdf>, accessed April 16, 2023).
- Westerman, G., Bonnet, D., and McAfee, A. 2014. The Nine Elements of Digital Transformation. *MIT Sloan Management Review*, 55(3), 1-11. (<https://mitsmr.com/2pds0BH>).
- Winter, R., and Schelp, J. 2008. "Enterprise architecture governance: the need for a business-to-IT approach," In *Proceedings of the 2008 ACM symposium on Applied computing* (pp. 548-552). (<https://doi.org/10.1145/1363686.1363820>).
- Wong, W. C., Batten, J. A., Mohamed-Arshad, S. B., Nordin, S., and Adzis, A. A. 2021. "Does ESG certification add firm value?" *Finance Research Letters*, 39, 101593. (<https://doi.org/10.1016/j.frl.2020.101593>).
- Wu, W., Fu, Y., Wang, Z., Liu, X., Niu, Y., Li, B., and Huang, G. Q. 2022. "Consortium blockchain-enabled smart ESG reporting platform with token-based incentives for corporate crowdsensing," *Computers and Industrial Engineering*, 172, 108456. (<https://doi.org/10.1016/j.cie.2022.108456>).
- Zhao, Q., Li, X., and Li, S. 2023. "Analyzing the Relationship between Digital Transformation Strategy and ESG Performance in Large Manufacturing Enterprises: The Mediating Role of Green Innovation," *Sustainability*, 15(13), 9998. (<https://doi.org/10.3390/su15139998>).
- Zhong, Y., Zhao, H., and Yin, T. 2023. "Resource Bundling: How Does Enterprise Digital Transformation Affect Enterprise ESG Development?" *Sustainability*, 15(2), 1319. (<https://doi.org/10.3390/su15021319>).

Appendix A

| Literature | Identified Issues | | | | | | | |
|---------------------------------|-------------------|-----------------|--------------------------------|--------------------------|-----------------------|----------------------------|---------------------------|---------------------------------------|
| | Lack of awareness | Lack of clarity | Limited stakeholder engagement | Inadequate ESG reporting | Lack of reliable data | Limited integration of ESG | Lack of investment in ESG | Inadequate standard IT infrastructure |
| Cardinali and De Giovanni, 2022 | x | | | | | x | x | x |
| Jonsdottir et al., 2022 | | | x | x | x | x | | |
| Morais et al., 2022 | x | x | x | x | | | x | |
| Tamm et al., 2022 | | | | x | | x | | |
| Anthony Jnr et al., 2021 | | x | x | | x | | | |
| Dye et al., 2021 | | | x | x | x | | x | |
| Faccia et al., 2021 | x | | | | | | | |
| Jonsdottir et al., 2021 | | x | | | | | | |
| Khaled et al., 2021 | x | | | x | x | x | x | |
| Liao and Wang, 2021 | x | x | x | | | x | | |
| ElMassah and Mohieldin, 2020 | x | x | x | | | | | x |
| Jonnagaddala et al., 2020 | x | x | x | | | | | x |
| Oprean-Stan et al., 2020 | | | x | x | x | x | x | x |
| Abunadi, 2019 | x | | | | | | | x |
| Korhonen et al., 2016 | | x | | | x | | | |
| Sutherland and Hovorka, 2014 | x | | x | x | | | | x |
| Van der Hoogen, 2013 | x | | x | | x | x | | x |
| Enagi and Ochoche, 2013 | x | | | | x | | | x |
| Raj and Periasamy, 2011 | | | x | | | | | x |
| Total No. of Ref. | 11 | 7 | 11 | 7 | 8 | 7 | 5 | 9 |

Table 1. Compilation of issues based on related literature

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