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EXPLORING DIGITAL TRANSFORMATION THROUGH THE IKIGAI PHILOSOPHY IN THE AECO INDUSTRY

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Abstract

This paper investigates Digital Transformation (DT) in the Architecture, Engineering, Construction, and Operations (AECO) industry through the '*Ikigai'* philosophy, which is a Japanese concept representing passion, profession, mission, and vocation to define one's purpose in life. The study aimed to understand the rationale behind DT initiatives and how they can be linked with organisational goals. The research adopts an abductive, exploratory, mixed-methods approach through 4 semi-structured interviews and 29 surveys. Findings indicate that vocation (e.g. sustainable practices) is a gap in DT strategies, and a careful systemic combination of digital interest, digital proficiency, digital trade-off and digitalisation for social good is needed to determine a unison of purpose for DT.

Introduction

Technological innovation has significantly impacted the pace and trend of Digital Transformation (DT) in the Architecture, Engineering, Construction and Operations (AECO) industry. The adoption of new technologies, processes, and enabling behaviours enables project teams to access and share data in real-time in order to engender collaboration across diverse stakeholder groups. For example, the utilisation of Building Information Modelling (BIM) provides enhanced productivity and efficiency, enabling stakeholders to make better-informed decisions during the project lifecycle. Similarly, other technologies, such as cloud computing, drones, and the Internet of Things (IoT), enable efficient and effective data management together with artificial intelligence (AI), which builds on data to help generate better insights and knowledge within a system. The purpose of DT within organisations in the AECO industry is to help advance current approaches to better streamline processes, reduce errors, improve efficiency and enhance productivity. However, DT has been particularly challenging for AECO organisations due to a number of factors, such as fragmentation, cultural resistance, poor change management, skills gap, and regulatory barriers. In addition, organisations in the AECO industry have invested heavily in the adoption of technological solutions through software licenses, staff training, data governance strategies, and connectivity infrastructure but have ended up with mixed results. Many organisations struggle to integrate new technologies into existing workflows and align them with strategic business goals. Another challenge is the unbalanced focus of the AECO industry on tools and technologies with minimal emphasis on the people-related factors of DT. As such, to achieve a holistic vision of a transformed AECO industry, significant considerations have to be made regarding current approaches and practices. Therefore, this paper argues that AECO organisations lack the ability to actualise the potential availed by technological innovation through effective DT strategies to achieve a state of integral fulfilment for progressive growth and development across all stakeholder groups in the AECO industry. Currently, the AECO industry is trying to find solutions to these complex problems. However, the contention is not whether DT is going to happen but how it can be realised in a meaningful way through purposeful business practices that are value-driven and linked to the organisational vision and mission. In order to investigate this phenomenon further, the study suggests the utilisation of the Japanese philosophical concept of '*Ikigai'* to enable a systematic exploration of the purpose of technological innovation and DT in the AECO industry. The philosophy of '*Ikigai'* encourages an individual to discover an intersection between their passion, profession, mission and vocation, thereby guiding them towards a more intentional and fulfilling existence. This can be particularly applied to AECO organisations within the context of DT, as they struggle to balance the opportunities of cost and value within their business processes and stakeholder interactions. The concept of '*Ikigai*' can be especially valuable in examining how to balance economic demands with personal fulfilment, build resilience, and ensure alignment of daily business processes with purpose. Hence, the aim of the paper is to explore the purpose of DT within AECO organisations.

Literature Review

The Ikigai Philosophy

'*Ikigai'* is a Japanese philosophy that resonates with a reason for being for every person. That is, a place where

one loves what they do, excels at it, earns a living from it, and fulfils a need in the world. The '*Ikigai*' philosophy suggests the harmonisation of personal desires with external realities, creating a sustainable and meaningful life. The '*Ikigai'* framework also aligns with the concepts of legibility, agency, and negotiability in socio-technical frameworks through the intersection of the key components of passion, profession, mission and vocation (Figure 1). The themes identified in this section from the '*Ikigai'* framework served as the foundation for both the semi-structured interviews, surveys and data analysis.

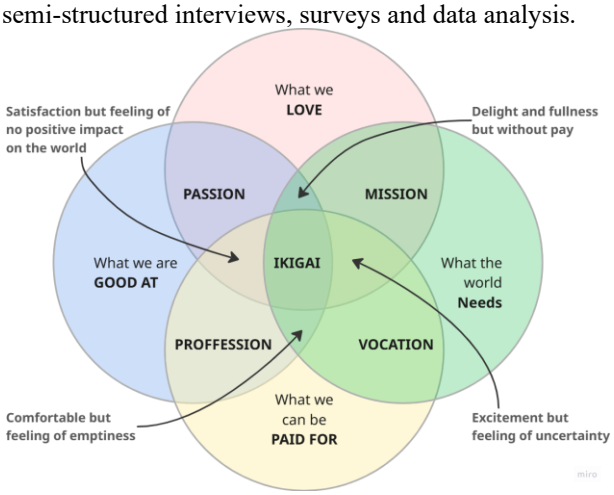

Figure 1: Ikigai–A reason for being (García & Miralles, 2017)

Passion:

Within the '*Ikigai'* framework, 'Passion' represents what one loves and what one excels at (García & Miralles, 2017). It reflects activities that bring people immense joy and fulfilment, often leaving them feeling happy and enthusiastic. However, within the context of this study, 'Passion' has been interpreted as the intersection of 'Digital Interest' and 'Digital Proficiency'. 'Passion' has been interpreted as a key aspect of the AECO industry that is relevant to effective DT by providing opportunities for organisations to achieve greater 'Inspired Mastery' of digital tools for improved efficiency (Farmer, 2016; WEF, 2016).

Mission:

The '*Ikigai'* philosophy suggests that 'Mission' emerges between the intersection of what one loves and what the world needs (García & Miralles, 2017). This signifies one's ability to use one's passions and talents to make meaningful contributions to society that extend beyond self-interest. However, from the perspective of the AECO industry, 'Mission' has been construed as the intersection of 'Digital Interest' and 'Digitalisation for Social Good'. The 'Mission' of AECO organisations plays a crucial role in DT strategies, as it is central to achieving 'Better Outcomes' (WEF, 2016; CDBB, 2018).

Profession:

The intersection with which 'Profession' emerges in the '*Ikigai*' concept relies on what one is good at and what one can be paid for (García & Miralles, 2017). This aspect concerns the use of one's knowledge and skills to earn a livelihood. However, within the context of this study, 'Profession' has been understood as the intersection between 'Digital Proficiency' and 'Digital Trade-off' (opportunity cost of services). 'Profession' is another aspect where effective DT could enable project teams to establish 'Productive Expertise' through DT in the AECO industry (HM Government, 2013; WEF, 2016).

Vocation:

The '*Ikigai'* principle of 'Vocation' develops between the intersection of what the world needs and what one can be paid for (García & Miralles, 2017). This aspect requires the application of one's knowledge and skills in a way that meets societal demands while providing financial viability. However, from the perspective of the AECO industry, 'Vocation' has been interpreted as the intersection of 'Digitalisation for Social Good' and 'Digital Trade-off' (opportunity cost of services). 'Vocation' has been highlighted as a key aspect of the AECO industry to achieve 'Sustainable Resilience' in society through DT (NIC, 2016; CDBB, 2018).

Systems Thinking and Ikigai in the AECO Industry

Systems thinking is a way of understanding a phenomenon by considering it as a whole rather than breaking it down into many independent parts. Systems thinking provides a holistic approach that takes into account the interdependencies and interactions between the different systemic parts and how they generate value. DT in the AECO industry create shifts not just within a single project phase or organisation but right through the entire lifecycle and supply chain. The adoption of a systems thinking perspective would reveal how decisions have an impact across project phases and stakeholders and how they depend on the outcomes of other phases or stakeholders. The systems thinking approach has been utilised in the AECO industry to understand and manage uncertainty and complexity, as well as to provide frameworks for collaboration (Sujan et al., 2020).

A number of systemic approaches have been suggested to address DT in the AECO industry. One is Rogers' Diffusion of Innovations (DoI) Theory, which suggests that the implementation of new ideas and technologies spread through social systems at varying speeds and degrees of acceptance (Rogers, 1962). The framework posits five stages of innovation adoption: knowledge (awareness), persuasion (understanding of benefits), decision (choice), implementation (transitory change), and confirmation (formal change). It also suggests five categories of adopters based on their innovativeness: innovators, early adopters, early majority, late majority, and laggards (Rogers, 1962). However, this theory has limited organisational focus, and although it provides a conceptual lens to understand how innovations grow, it does not provide the '*why*' guidance for DT. Another systemic approach is the Technology Acceptance Model (TAM), which suggests the Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) of innovation (Davis,

1989). However, this approach mainly focuses on the '*what*' factors that affect technology adoption, which can overlook broader systemic or organisational factors in DT. While TAM provides guidance for understanding the factors of technology acceptance within a system, it does not provide guidance on the '*how*' or '*why*' of DT. Third is the Integrated Design and Delivery Solutions (IDDS) framework of people, processes, and technology that is essential for achieving integration in project delivery systems (Owen et al., 2009). IDDS highlights the need to consider the '*what*' social and technical factors prior to DT. However, it does not provide guidance on the '*how*' or '*why*' of DT. Another is the BIM maturity models presented in the international BIM standards from the business, information, technology and standards implementation layers (ISO 19650, 2018). This provides a conceptual perspective on implementation within organisations seeking to implement BIM. It highlights the progressive stages of BIM adoption and the '*what*' factors but does not provide the '*how*' or '*why*' guidance. Fifth is Virtual Design and Construction (VDC), which seeks to align the interests of key stakeholders through a lifecycle perspective, performance metric, and collaborative structure (Fischer et al., 2018). It also suggests that the Visualisation, Information Integration, and Automation (VIA) framework is crucial to understanding DT through purposeful use cases. Whilst VDC emphasises the need for stakeholders to have open communication and cooperative decision-making through a comprehensive guide, it does not address the '*why*' guidance for DT. In addition, the Centre for Digital Built Britain (CDBB) has developed some frameworks to address the complex nature of DT, such as the Gemini principles (CDBB, 2018), information management framework (CDBB, 2020), and pathway to the national digital twin (CDBB, 2021), which have all embedded systems thinking in the exploration of DT. However, these studies are primarily at the macro level and do not consider organisational aspects when dealing with the '*why*' factors for DT.

Most of the systemic approaches in the AECO industry are focused on addressing the '*how*' or '*what*' and not the '*why*' of DT. As such, the '*Ikigai*' philosophy suggests a framework for discovering meaning and purpose in any endeavour, promoting sustainability and resilience and providing a balanced approach to implementation. With the '*Ikigai*' approach, AECO organisations could explore and identify the deeper justifications behind DT initiatives so that new technologies and processes can achieve holistic objectives. Even though the '*Ikigai'* philosophy is often applied at an individual level, it offers the potential as a metaphor and conceptual framework for use within organisations and industries. This can be achieved by translating the '*Ikigai'* principles at the organisational and project levels to understand the '*why*' of DT strategies.

In addition, identifying the purpose of implementation is crucial to the success of any DT initiative. Munir et al. (2019) suggest that asset owners need a robust rationale for BIM-based processes in order to derive business value. Therefore, an alternate approach to the exploration of DT in the AECO industry through systems thinking would support purposeful decision-making that aligns with the core purpose of organisations (*Ikigai*) in DT.

Challenges to Implementing Systems Thinking in the AECO Industry

Implementing systems thinking in the AECO industry is complex and challenging due to its unique structural, cultural, and operational characteristics. One major challenge is the fragmentation of organisational and project structures. This problem is two-fold: construction typically involves multiple stakeholders, each with their own goals and contractual obligations, which makes it challenging to create a common ground for all; and the fragmentation between organisational goals and project objectives, which creates competing interests within organisations (Sujan et al., 2020). Another challenge is the traditional contractual and procurement models that dominate the AECO industry. These forms of contract promote adversarial relationships by placing risk on one party or rewarding the lowest bidder. This system is at odds with the collaborative ethos behind systems thinking (Latham, 1994). In addition, cultural and behavioural barriers also impede the adoption of systems thinking in the AECO industry (Owen et al., 20011). The industry is dominated by a culture of risk aversion, combined with limited trust among fragmented stakeholders that hinders open communication and shared accountability (Sujan et al., 2020). A lack of competency and skill is another challenge for DT in the AECO industry. There exists a shortage of skilled labour and a growing need for digital competencies in order to adopt a systems mindset in organisational and project structures (Arkyazi et al., 2020). Also, there is a lack of universal adoption of protocols, standards and guidelines for data creation, sharing and management. These gaps have created an imbalance between organisational and project systems, and even if companies are willing to share information, inconsistent data formats or proprietary software systems can lead to interoperability issues. Consequently, AECO organisations struggle to implement purpose-driven DT, as they are primarily driven by market trends, including current products and services, rather than a thorough understanding of the benefits of DT (Munir et al., 2024). Hence, exploring DT in the AECO industry from the lens of '*Ikigai*', a commonly known philosophy of finding purpose, forms the point of departure for this paper.

In relation to the '*Ikigai'* framework, AECO organisations would find it particularly challenging to seamlessly integrate passion, profession, mission and vocation. This is because organisations usually need to find a balance between profits, technology, sustainability, society and employees. These sustainability demands and client-driven requirements clash with internal objectives focused on cost savings or immediate returns on investment. As such, they find it difficult to establish business processes through strategic alignment that are able to connect what the organisation is good at, what society needs, and what

generates income. For example, financial indicators like revenue and profit or other project key performance indicators (KPIs), such as time, cost, and quality, are relatively straightforward to measure, but the business value of digital tools in relation to sustainability outcomes is more challenging to appraise.

In addition, implementing the '*Ikigai'* framework would require introspection. That is, to effectively understand the drive, values, strengths and weaknesses at the organisational level. However, this would require a holistic review of the core values, long-term goals and stakeholder interests of the organisation, which can be challenging. Therefore, establishing organisational introspective clarity would be crucial to avoid false starts on DT initiatives and to establish resilient business models that are mainly profit-value driven through DT. Hence, the exploration of the '*Ikigai'* framework based on systems thinking would enable AECO organisations to highlight interdependencies in organisations, projects and assets with a purposeful focus that enables viable DT strategies in the AECO industry.

Systems Thinking in the AECO Industry through VIA

The VDC framework enables practitioners to link digital technologies to measurable outcomes in project delivery. As part of the VDC process and to simplify the process of DT through BIM, the VIA framework was introduced (Hjelseth & Fischer, 2024). VIA helps clarify the prevalent misunderstanding that BIM is only a 3D tool, and also encourages organisations to align their digital initiatives with strategic objectives. This approach helps clarify the purpose-driven elements that influence BIM implementation in AECO organisations. VIA implies that the real value of DT stems from the effective implementation of use cases associated with visualisation, information integration, and automation. Thus, examining DT from the VIA viewpoint may offer alternative insights into how organisations perceive DT.

Methodology

This study seeks to answer the following questions:

- What are the stakeholder perspectives on purpose-driven digital transformation in the AECO industry?
- What are the perspectives of stakeholders on the factors, efforts, challenges and benefits of digital transformation in the AECO industry?

Research Methods

The study adopts an abductive, exploratory, concurrent mixed methods approach, which is suitable for addressing '*what*' or '*why*' questions. Exploratory methods are effective for uncovering new insights and examining phenomena from fresh perspectives, while abductive methods are valuable for accurately representing the characteristics of events or situations (Saunders et al., 2023). The study consists of three phases: First, the literature review examines existing research on DT and the '*Ikigai*' framework, identifying relevant studies, approaches, and methodologies. The '*Ikigai*' framework was applied in the AECO industry and induced to generate themes that informed the design of interview questions. This helped shape data classification into codes, categories, and notations during the analysis.

Second, qualitative interviews were carried out to understand stakeholder perspectives on the nature, challenges, efforts and benefits of purpose-driven digital transformations through the '*Ikigai*' lens. This approach enabled an in-depth exploration of the research questions by utilising a combination of existing knowledge and empirical data to generate understanding through abduction (Saunders et al., 2023). Interview data was transcribed and analysed using thematic analysis to identify, examine, and report patterns or themes within the data. Initial themes drawn from the literature included passion, profession, mission and vocation as outlined by the '*Ikigai*' framework, which was contextualised in the AECO setting and guided the development of interview questions. Coding as a method for indexing data to facilitate retrieval and analysis was utilised during data analysis to align responses with developed themes. Furthermore, operational construct sampling, a form of purposive sampling, was used to identify cases and select participants for data collection because it is ideal for studying real-world examples of specific events or phenomena (Patton, 2015). The participants were all in the project management profession. 3 of 4 worked for client organisations, and 1 of 4 was a client representative. All participants had more than 15 years of experience.

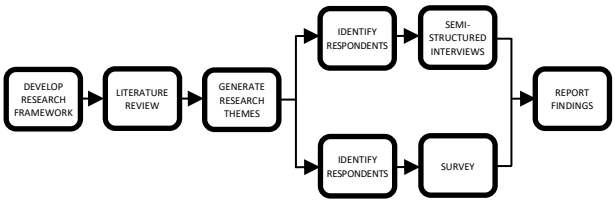

Figure 2: Research Methodology

Third, a concurrent questionnaire survey was conducted to further explore the phenomenon using VIA as a tool to extricate the purposes of BIM. The survey gathered insights on stakeholder perceptions regarding the benefits versus the efforts related to BIM implementation in order to explore how participants interpreted the trade-offs involved in DT. Purposive sampling was used through a structured questionnaire distributed online to experienced project managers who were undertaking the VDC professional training programme in Norway and were focused on industry-wide implementation. A total of 193 professionals were enrolled in the training programme, and the survey was distributed during an online session where 53 professionals attended and 29 professionals responded. Therefore, the response rate was approximately 55%. Triangulation between the methods enabled data validity by incorporating multiple sources of data (Patton, 2015). All aspects of the research methodology are detailed in Figure 2.

Data Analysis and Discussion

The semi-structured interview results are presented based on the themes established through the literature review:

Passion:

The data analysis also shows that the participants acknowledge the significance of digital tools in their business processes. P2 highlights this by stating that DT through: "*AI and ML could increase efficiency through automation, reduce errors and noise in decisions*". It also highlights the positive perception of the adoption of digital tools in the AECO industry. As P3 suggests, a rationale for DT is to: "*Avoid the 'Kodak' moment*". That is, to stay ahead of the innovation curve. The data analysis also suggests that AECO professionals understand the potential of DT, as noted by P4: "*helping reduce time and cost*" in processes. However, there is a lack of understanding within AECO organisations in terms of understanding the potential of technological solutions prior to adoption. P1 asserts that: "*adopting new technology is a difficult process to acquire because of the fear of acquiring the wrong digital tools*". This is because many AECO organisations acquire new tools without a clear vision or framework for evaluating their usefulness and alignment with business goals, which is a significant bottleneck. As a result, gaps often emerge in business processes due to poor implementation, and these DT initiatives fail to deliver the anticipated efficiencies and long-term benefits. The above analysis shows a relationship between 'Digital Proficiency' and 'Digital Interest' in AECO organisations.

Mission:

The participants have a good understanding of the role of DT for societal good. As noted by P2: "*In order to ensure innovation, sustainable solutions and possibly a more holistic strategy should be established that can safeguard sustainable values and to safeguard the customer's needs*". This is further highlighted by P3: "*to provide data insights, new, improved work processes, better digital interaction, positive attitude towards work tasks and create competitive advantage*". On the other hand, P4 asserts the need to better align the technologies to enhance sustainability outcomes: "*AI tools could improve work processes*". However, there are challenges in this process, as pointed out by P1: "*to be able to describe digital tools in the life cycle of products and services*". Achieving this aspect is particularly challenging for AECO organisations due to fragmentation and interoperability challenges, keeping them in a perpetual learning phase as they try to understand the capabilities, functionalities, and implications of different digital tools. The above analysis shows a relationship between 'Digital Proficiency' and 'Digitalisation for Social Good' in the AECO industry.

Profession:

The data analysis suggests an acknowledgement from the participants on why DT initiatives are critical to meeting broader organisational business goals. As noted by P1: "*to be able to manage the portfolio of projects and maintenance*". P3 also stated: "*the potential for efficiency, better information flow*". The participants recognise that moving towards digital solutions can help them improve efficiencies, reduce waste, and achieve better outcomes. However, P1 suggests that "*there needs to be a balance*" based on process and cost-based implications for the organisation. This implies that some organisations could be uncertain about the correct practical steps needed to implement digital tools in relation to cost-effective decisions and considerations. Also, participants face challenges in demonstrating an understanding of how to adopt digital tools due to organisational actions typically being afterthoughts in adopting digital tools, as suggested by P1: "*aquire then skillsets*". Similarly, adoption challenge has emerged as a factor in the previous analysis of the 'Passion*'* section, further indicating the reason why gaps emerge in business processes due to poor implementation. It still remains a challenge for AECO organisations to correctly appraise which technologies to invest in and how to measure progress. Hence, the analysis shows that there is a relationship between the 'Digital Trade-Off' (cost of services) and 'Digital Proficiency' in AECO organisations.

Vocation:

The participants demonstrate some awareness of the need to align DT strategies with societal good. P3 suggests: "*compliance with society and employee expectations and connection to the big picture, for example, the UN's sustainability goals*". AECO organisations recognise that through the use of digital technologies, they could turn sustainability into their competitive advantage. However, they often lack the expertise and skills to evaluate and justify the choice of digital tools effectively, which affects the success of their DT strategies. Also, there is an industry limitation in perspectives where choices of specific sustainability products are possibly '*value-engineered*' out of projects or processes due to costs, as noted by P2: "*likely as everything is managed based on costs and funds*". As such, the AECO industry needs to move from a cost to a value management perspective.

Furthermore, none of the participants was able to answer the question regarding the linkage of cost-effective solutions and sustainability outcomes (societal needs). This underscores the difficulties faced by AECO organisations in aligning organisational-level economic viability and profitability with the broader environmental and social needs and outcomes. Since there is a lack of strategies to harmonise these aspects, many organisations feel unfulfilled despite commercial success. Therefore, the above analysis shows no relationship between 'Digital Trade-Off' (opportunity cost of services) and 'Digitalisation for Social Good'. This underscores a key finding: there is a lack of development of the 'Vocation*'* aspect of the '*Ikigai'* framework in the AECO industry.

Current State of Digital Transformation in the AECO Industry

From the analysed data and based on the *'Ikigai'* framework, the current state of DT in the AECO industry can be understood as a set of limited intersections of key areas to establish a clear purpose of technological adoption and implementation. DT in the AECO industry has been able to achieve intersections in three areas (Figure 3).

Figure 3: Current state of digital transformation in the AECO industry

First, there is some gradual accumulation of digital know-how, suggesting that DT is not just a passing interest but is a growing strength within the AECO industry. The adoption of digital tools offers the potential to streamline processes, enhance efficiency and improve traditional organisational and project workflows. That is, the intersection between what we love (digital interest) and what we are good at (digital proficiency), suggesting competence in implementing and leveraging technology. Secondly, the AECO industry recognises the potential uses of digital tools in various applications, and clients are showing a growing demand for these technologies. Clients are ready to invest in advanced digital services, understanding that enhanced efficiency, reduced errors, and improved predictability can lead to improved profits. That is, the alignment between what we love (digital interest) and what we can be paid for (digital trade-off). Third, the AECO industry is passionate about digital tools and adoption, and clients are becoming increasingly aware of sustainability outcomes. They are progressively demanding economic, environmental and social goals in their projects. That is, the alignment between what we love (digital interest) and what we can be paid for (digitalisation for social good). Fourth, there is a growing need for sustainable construction practices, environmentally responsible building methodologies, and strategies tailored to sustainable outcomes. However, current DT initiatives fail to effectively align the cost of adopting technological innovation with societal needs. That is, the absence of intersections between what the world needs (digitalisation for social good) and what we can be paid for (digital trade-off). This isolation suggests that while the industry is advancing technologically and economically, it is failing to align its efforts with pressing global challenges and adopt solutions to meet societal demands. In terms of DT, the AECO industry mainly concentrates on the interests of internal stakeholders, prioritising efficiency, cost savings, and profit margins over meaningful social impact.

Perception of Digital Transformation in the AECO Industry

Surveys were conducted concurrently with the semi-structured interviews. The surveys aimed to explore the understanding of DT, which is BIM adoption in this context. This was done through the VIA framework. They were first asked to indicate on a scale within the graph the effort they would put in at the organisational level to utilise BIM and the benefit they would get from it (Figure 4.1). The results show a random dispersion from participants. Next, they were asked to identify their understanding of utilising visualisation, information integration, and automation on a scale within the graph while also assessing the level of effort required (Figures 4.2, 4.3, and 4.4). The VIA framework helped to extricate BIM into use-case applications for the participants. However, the results show a similar dispersion. Therefore, the survey highlights that the AECO industry lacks an integrated and holistic understanding of DT. This could be due to varying levels of digital knowledge, capability and maturity in AECO organisations.

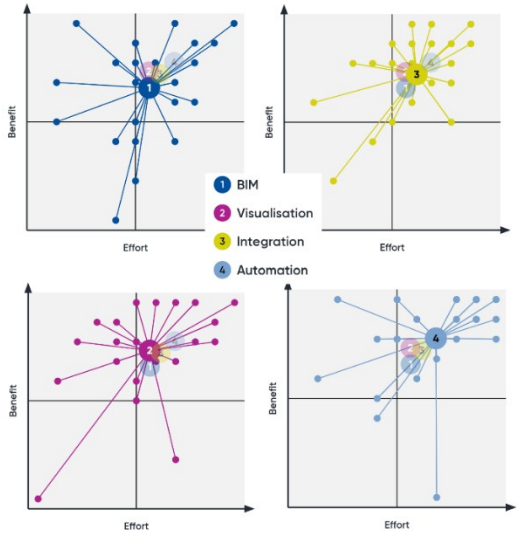

Figure 4: Dispersion or responses indicating benefit vs effort of specific DT strategies (BIM through VIA)

The survey results can be contextualised through several theoretical and empirical lenses. One perspective is Rogers' DoI Theory, which suggests that DT strategies are implemented at different speeds and degrees of acceptance (Rogers, 1962). This is true from the survey results that the random dispersion of results could be explained from the perspective that individuals and organisations adopt innovation at different stages (five categories of innovativeness). Some could be early

adopters, late majority or laggards, leading to inconsistent and fragmented understanding across the AECO industry.

In addition, the varying levels of understanding, capability, and maturity observed in the survey responses could also be explored from the perspective of the TAM (Davis, 1989). The diverse outcomes in the survey results may have emerged from differing levels of PU and PEOU among AECO industry stakeholders. Some organisations recognise that BIM, visualisation tools, integrated information, and automated workflows can minimise errors, streamline operations and reduce costs. However, they struggle with implementation due to a steep learning curve, lack of standardisation, insufficient training or ability to evaluate the benefits due to the lack of business value realisation methods (Munir et al., 2019).

Furthermore, the results could be interpreted from the IDDS framework of people, process and technology (Owen et al., 2009). That is, some organisations may have the necessary technological infrastructure (e.g., integrated BIM systems) but encounter people-related barriers such as insufficient training or leadership support. Others may operate in a process-based environment that either accelerates or hinders their DT initiative. For example, government mandates can encourage BIM use, while outdated contracts or a lack of stakeholder support can hinder adoption. If the components of people, process and technology are not well defined across project systems, DT initiatives such as BIM, visualisation, integrated information and automation tend to remain isolated solutions rather than part of a holistic system.

Moreover, the data could be analysed through the lens of Virtual Design and Construction (VDC), which advocates for integrating project delivery (Fischer et al., 2018). The random dispersion of survey responses indicates that AECO organisations have progressive levels of capability and maturity that range from 3D visualisation models to integrated information management approaches and automated workflows. Some organisations may excel in data visualisation and information integration but lag in automation. In contrast, others may show sophistication in visualisation tools yet lack enterprise-wide information integration strategies. This analysis highlights a lack of industry-wide, collaborative frameworks that emphasise a shared understanding of the value of DT, resulting in significant gaps in capability, maturity, implementation and adoption of digital tools in the AECO.

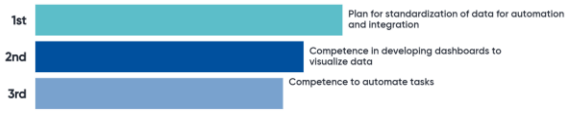

Figure 5: Top three priorities of AECO organisations in their DT journey

Furthermore, the respondents were asked to rank the activities on which they focus organisational resources in implementing DT initiatives to further explore their priorities (Figure 5). The three main activities were: standardising data, developing competence for visualising data, and developing competence for automation.

From the study analysis, the '*Ikigai*' framework could be useful for the AECO industry in exploring the '*why*' questions for DT. That is the rationale responsible for stimulating investment and effective implementation. Other frameworks, such as DoI, TAM, IDDS, and VDC, implicitly assume that organisations may not need to know the '*why*', if they know the '*what*' or '*how*' to do it. This study suggests the '*why*' of DT is equally important in change management frameworks. Thus, the *'Ikigai*' framework could play a unique role in enabling organisations to pragmatically balance the trade-offs necessary for DT. However, it is imperative for the AECO industry to undertake a comprehensive evaluation of factors pertaining to 'Vocation'. Also, an improved understanding of organisational capability and maturity of visualisation, information integration, and automation, which is evaluated through the lens of benefit versus effort, could contribute to addressing these critical aspects. In doing so, and by better aligning the aspects of passion (inspired mastery), profession (productive expertise), mission (better outcomes), and vocation (sustainable resilience), the industry could effectively achieve the '*Ikigai*' framework (Figure 6). This will unify the 'Purpose' of adopting BIM, visualisation, information integration, and automation in the AECO industry.

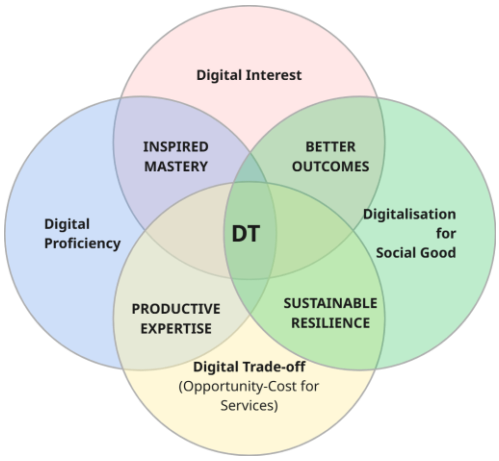

Figure 6: Digital Transformation proposed through the 'Ikigai' philosophy

Conclusion and Recommendations

The paper aimed to explore the purpose of DT within AECO organisations through the '*Ikigai'* framework. This was executed through a concurrent mixed-methods approach of interviews and surveys to explore DT in AECO organisations. The semi-structured interviews highlighted a lack of understanding of the AECO industry and the need for further development of the 'Vocation' (Sustainable Resilience) part of the '*Ikigai'* framework because stakeholders find it difficult to align economic needs with societal needs. Current DT in the AECO industry show linkages between what is loved (digital interest) and what the industry does well (digital proficiency), as well as the alignment of what is loved (digital interest) and what the society needs (digitalisation

for social good), alongside the what the industry does well (digital proficiency), and what can be monetised (digital trade-off). By adopting a systems thinking perspective consistent with the '*Ikigai'* philosophy, DT initiatives can be developed as interdependent elements that can create pathways to achieving meaningful outcomes. This helps to align digital strategies not only with economic objectives but also with wider environmental and social goals, which are examples of the core dimensions of the '*Ikigai'* philosophy. One advantage of the Ikigai framework is that it can be applied at both the personal and organsiational levels. It is essential to establish strategies that align motivation with the adoption of technological solutions while ensuring their commercial viability to implement the '*Ikigai*' framework effectively. Following this, fostering a balanced integration of passion, profession, mission, and vocation within AECO organisations will create a meaningful sense of purpose in DT. Lastly, an original contribution of this study is the expansion of the theoretical framing of DT by introducing the '*Ikigai'* philosophy and broadening the discourse and perspectives on technology adoption. Also, it provides an AECO industry-specific philosophical exploration through which organisations can better understand and implement DT strategies through a purpose-centred viewpoint.

Future Recommendations and Study Limitations

The study explored the impact of purpose on DT strategies using the '*Ikigai*' framework and DT implementation through the VIA framework. However, further investigation into the impact of these applications in AECO organisations, including their implementation, needs to be conducted. Also, the generalisability of the study could be explored in future studies.

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