"EXPLORING THE IMPACT OF DECISION-VARIABLES ON DIGITAL TRANSFORMATION"

Research Paper

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"Abstract"

Every Enterprise Digital Transformation is unique and is influenced by its organizational environment. The execution and successful implementation of such a transformation depends on numerous factors that influence the desired outcomes. These decision factors or variables can have significant impact on accomplishing the overall Digital Enterprise Vision. By definition, the variables refer to any factors, such as resources, skills, enterprise digital strategy, governance, schedule and budget, which may prevent a transformation in achieving its envisioned goals. Successful execution and implementation of an Enterprise Digital Transformation relies on effective identification and management of the decision variables through strategic interventions combined with tactical interventions. While the strategic vision provides a global enterprise view and the overall execution & implementation strategy, tactical interventions will ensure timely decision making and timely risk mitigation. This research will explore and analyse the influence of 'Enterprise Architecture' on 'Digital Transformation'.

Keywords: Enterprise Digital Transformation (EDT), Enterprise Architecture (EA), Strategic, Tactical.

1   Introduction

Organizations start their Digital Transformation journey with very good intentions and goals. Some of them could be driving a seamless digital user experience, best in class & meaningful innovation, social responsibility & sustainability, improved sales, service & marketing performance, customer centric chat bots & conversational AI, data centric business operations, blockchain driven supply chain & logistics management, IoT & Connected devices and many more. While all of these are definitely relevant, somewhere along the digital transformation journey of these enterprises, there are deviations, primarily due to unstructured and uninformed decision making.

Invariably, unstructured and uninformed decision making is due to the presence of unmanaged decision factors or variables. These decision factors or variables can steer towards unfavourable outcomes even with the right Enterprise Digital Transformation Strategy in place. Hence there is the need for Enterprises to acknowledge the presence & strong impact that these decision variables can have on the Enterprise Digital Transformation Program. Only when these decision variables are identified, is it possible to proactively plan mitigation strategies and interventions.

Tabrizi *et al.*, (2019) mentioned that in a recent Harvard survey of directors, CEOs, and senior executives found that digital transformation (DT) risk is their #1 concern in 2019. Yet 70% of all DT initiatives do not reach their goals. Of the $1.3 trillion that was spent on DT in 2018, it was estimated that $900 billion went to waste.

With this history & background, this research will explore key variables from the lens of various stakeholders across enterprises and explore & understand the impact of decision making at all levels. While the CxO's are the key influencers, the role of other stakeholders cannot be ignored. We also

acknowledge that the various decision variables cannot be looked at in total isolation, however the focus of this study will be 'Enterprise Architecture' and its impact on Enterprise Digital Transformation Programs (EDTP).

Future research can focus on one or more of the below mentioned 23 decision variables listed in this research paper, that have been identified during the literature review and through prior experience.

1. Communication Management
2. Cross Functional / Departmental Collaboration
3. Enterprise Architecture Discovery
4. Ethical ESG – Environmental, Social & Corporate Governance
5. Meaningful Innovation – Strategic use of Enterprise Solutions Architecture, Generative AI, ML, NLP, Biomimicry, IoT, AR, VR, Cyber Security, Blockchain,
6. Solution Blueprint – Big Picture
7. Business Roadmap
8. Enterprise Architecture – Strategy & Governance
9. Physical Infrastructure & Work Environment
10. Cloud Infrastructure
11. Contracting and Licensing
12. Seamless Human Resources Collaboration – Employees, Contractors, Third Party Vendor and Contract/License Management
13. People Performance Management
14. Automation
15. Integration & Enterprise Data Interchange (EDI) / Exchange, Open Standards
16. Human Resource Management (Employees & Partners)
17. Circular Economy
18. Resource Planning – Onboarding and Offboarding
19. Organization Culture
20. Enterprise Change Management
21. Strategic Vision
22. Thought Leadership
23. Digital Transformation Roadmap

Zaoui and Souissi (2020) state that Strategic Digital transformation has emerged as crucial for organizations to thrive in today's dynamic business landscape.

It is but inevitable for organizations and enterprises to embark on Digital Transformation journeys with the right strategy. Having said that, it is not adequate to have just the right strategy. It needs to be backed up with the knowledge of the various decision variables that can impact digital transformation journeys.

While all the 23 variables are significant in the Digital Transformation journey of an organization, at this point in time the focus of this study will be "Enterprise Architecture" as the decision variable.

Enterprise Architecture has a huge bearing on Digital Transformation Program journeys, but very little understanding and research exists on its actual impact.

In their conceptual paper, Korhonen and Halén, (2017a) explore the implications of digital transformation on enterprise architecture.

In this research paper though, we examine whether and how Enterprise Architecture - specifically strategy, discovery, governance and change management - can have a significant impact on Enterprise Digital Transformation.

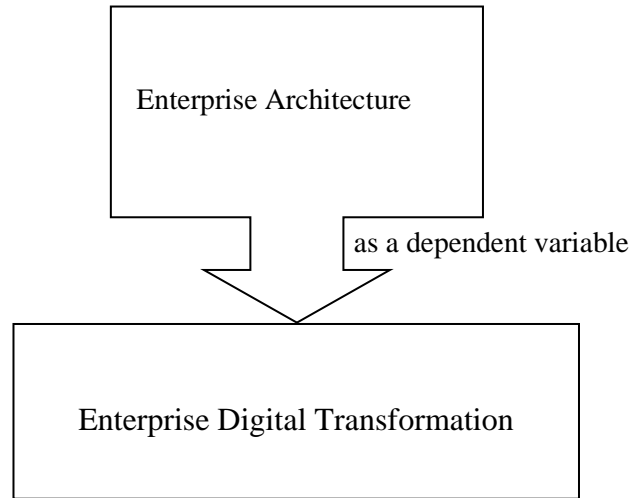## 1.1 Figure 1 - Enterprise architecture as the key driver of EDT

Figure 1.   *Enterprise Architecture as the key driver of Digital Transformation*

In Figure 1, above 'Enterprise Architecture' is indicated as a dependent variable for Enterprise Digital Transformation. In the table below we further substantiate this with an initial analysis of the responses to a key question, from survey respondents. The respondents are global stakeholders who have been part of digital transformation journeys & programs.

1.2 Challenges faced by leaders during digital transformation

The survey responses for one of the questions regarding 'Challenges faced by Leaders during digital transformation' is listed in the Table 1.

Challenges faced by Leaders during digital transformation	Count of respondents agreeing to challenges faced (n=60)	% of respondents agreeing to challenges faced (n=60)
Lack of focus on Enterprise Architecture Strategy	22	62%
Lack of focus on Enterprise Architecture Discovery	13	
Lack of focus on Enterprise Architecture Governance & Change Management	19	
Lack of Stakeholder Management (Employees, Contractors, Partners, Vendors)	29	48%
Lack of Business alignment / Business Stakeholder Management	36	59%
Skills gap and more Lead time to acquire talent;	38	62%
Integration issues between technology components / software	25	41%
More focus on Technology than Strategy as a driver for EDT	18	30%
Less focus on Environment, Social & Governance (ESG) considerations	2	3%
Less meaningful innovations and use of	5	8%

technology		
Other	4	7%

Table 1.   Challenges faced by Leaders during digital transformation

From the Table 1 it is evident that most of the respondents agreed that there were few variables that stood out as having had a major impact on Enterprise Digital Transformations.

The sample size of the respondents was 60 (n=60). The respondents were mainly senior leaders who have been part of one or more enterprise digital transformations.

62% of participants stated that "Enterprise Architecture (Strategy, Discovery and Governance & Change Management)" contributed to the outcomes of Digital Transformation.   62% of the participants also indicated that "Skills gap and more Lead time to acquire talent" as the other important factor.

2   Literature Review

2.1   Digital transformation

Morakanyane, Grace and O'Reilly (2017) observe that Digital Transformation has gained immense research interest in both academia and practice. While existing literature demonstrates new levels of research interest in the area and how business leaders have engaged in digital transformation journeys, there is evidence of a lack of common understanding of this concept.

The above statement indicated that there is indeed a lack of understanding on what digital transformations mean. Without adequate knowledge of EDT, it is evident that the success rate of transformations can be poor.

Verhoef *et al.* (2021) indicate that Digital transformation and resultant business model innovation have fundamentally altered consumers' expectations and behaviours, putting immense pressure on traditional firms, and disrupting numerous markets.

The digital transformation of our life changes the way we work, learn, communicate, and collaborate. Enterprises are presently transforming their strategy, culture, processes, and their information systems to become digital. The digital transformation deeply disrupts existing enterprises and economies, states Zimmermann *et al.* (2018).

Ramesh and Delen (2021) indicate that digital transformations intended to improve efficiency have a high failure rate of up to 90%, resulting in adverse impact to firms' operations and intent to further innovate.

Ramesh (2022) mentions that Digital customer experience (DCX) is one of the most important and least understood factors significantly influencing customer adoption of digital innovation.

There are numerous studies done in the domain of Digital Transformation and perhaps thousands of such Digital Transformations that have been done so far. It can be surprising to see that failure rates are indicated to be as high as 90%.

The high failure rate of Digital Transformations as shown by Harvard surveys and substantiated by fellow researchers and industry leaders, led this research study to look into various articles, research papers and literature to understand what work has been done in this area and what experts have indicated in their research studies.

Kern (2021) in his paper "People Navigating Digital Transformation, addresses organizational culture change (OCC). While this is definitely a challenge, OCC can lead to improved performance if it optimizes the way a firm's culture is aligned with its strategy. This leads to the fact that the "People" factor perhaps is one that is most neglected. While we talk of "Culture change" at a high level, I sense a deep-rooted involvement of this factor in the outcomes of Digital Transformation Programs.

A detailed literature review was conducted to gather relevant domain knowledge in the area of Digital Transformation and the work already done. This helped to gain better understanding of the various aspects of Digital Transformation, see for example states Mergel, Edelmann and Haug (2019) whose study indicates that the demands for digital transformation in public administration are mostly driven by external rather than internal demands, in particular through changes observed in other organizations' environment, technology, and requests made by stakeholders.

Every organization has its own unique organizational environment which drives the outcomes of EDT. The governance & change management has to be customized & tailored to meet the enterprise expectations. By only relying on external influence, stimulus & inputs, it may jeopardize the outcomes of EDT for the enterprise.

By focusing on specific areas of digital transformation earlier research studies have definitely addressed understanding of certain areas, of digital transformation mentions Schwertner (2017). This is indicative that there is scope for much research to be done on EDT.

Organizations understand that besides technologies implementation, organizational changes must also be adopted, notes Vukšić, Ivančić and Vugec (2018). The focus of EDT has been typically driven by technology and not strategy though it is a well-known fact that 'Strategy, not Technology, drives EDT.'

Nadkarni and Prügl (2021) in their review of the literature on digital transformation, observe that technological disruption and corporate entrepreneurship is conducted in a two-step approach. First, they review, analyse and synthesize existing articles on digital transformation. Then, in a second step they supplement these findings by simultaneously reviewing the literature stream on technological disruption and corporate entrepreneurship.

Another area that has not received due attention is that of Enterprise Architecture (EA). EA has been suggested to facilitate enterprise transformation, the focus has traditionally been on process standardization and integration rather than on continuous adaptation to the changing business and technological landscape. For EA to have a desired impact, more adaptive conceptualizations of EA that address the requirements of the new digital environment is necessary states Korhonen and Halén (2017b).

Despite the ongoing research in academia, the benefits and the role of EA management in digital context are still a topic of lively discussions, and there is a gap in research on how to leverage EA for digital transformation states Hafsi and Assar (2016).

Chen and Tian (2022) in their paper, state that a successful transformation depends on interactions between environmental uncertainty and resource orchestration.

In other words, Digital Transformation is about orchestrating the decision variables and managing their optimization. These decision variables cannot be considered in isolation but are known to have an impact on each other. However, we will have to gather inputs from various industry experts that have been part of EDT and have possibly seen and acknowledge factors that impacted their ETD outcomes.

This study aims to tap into that rich knowledge bases and experience to explore the impact of various decision variables. It is impossible to do full justice to this research, if all the variables identified were considered for study. Hence, this research study looks at only the Enterprise Architecture dimension and its impact on EDT outcomes.

2.2   Enterprise architecture

Enterprise Architecture is again a vast field of study with various bodies of knowledge that exist, like the Open Group TOGAF, which is a widely recognized and used framework for Enterprise Architecture (EA). It is known to provide a comprehensive approach for designing, planning, implementing, and governing enterprise information architecture. TOGAF also helps organizations align their business strategy with IT and offers a structured method for managing enterprise architectures to ensure efficiency, consistency, and alignment with organizational goals.

The Key components of TOGAF include:

- Architecture Development Method (ADM), which is a step-by-step process for developing and managing enterprise architecture, which includes phases such as, Preliminary Phase, Architecture Vision, Business, Information Systems & Technology Architecture, Opportunities & Solutions, Implementation & Governance and Architecture Change Management.

- Enterprise Continuum, which is a classification system that helps categorize the different artifacts and models used in EA, facilitating reuse and standardization.

- Architecture Content Framework which provides guidance on structuring architecture outputs, including catalogues, matrices, and diagrams that represent different perspectives of the architecture.

- TOGAF Reference Models which are Standard models used for typical enterprise architecture components, such as the Technical Reference Model (TRM) and the Integrated Information Infrastructure Reference Model (III-RM).

- Architecture Capability Framework that focuses on the skills, roles, and organizational structures required to support and manage EA.

Other related areas and frameworks related Enterprise Architecture include:

- Zachman Framework which is a foundational framework for enterprise architecture that defines a set of perspectives and focuses on aligning business and IT through a matrix approach.

- ArchiMate which is a modelling language that complements TOGAF, providing a visual representation of enterprise architectures. It is also maintained by The Open Group and is often used in tandem with TOGAF.

- ITIL (Information Technology Infrastructure Library) which is a framework for IT service management and which can work alongside TOGAF by aligning IT services with business needs and ensuring continuous improvement.

- COBIT (Control Objectives for Information and Related Technologies) which is a framework for IT governance and management, which focuses on integrating IT with enterprise goals and optimizing business performance.

- PRINCE2 / PMI's PMBOK which are project management methodologies that can be integrated with TOGAF during the implementation and governance phases of enterprise architecture projects.

- Business Process Management (BPM) which are techniques for improving and optimizing business processes, often aligned with EA efforts to enhance organizational efficiency.

- ISO/IEC 42010 which is a standard for describing the architecture of systems, which provides guidelines for creating architecture descriptions, aligning with TOGAF's modelling practices.

TOGAF is often a preferred choice for organizations due to its flexibility and scalability in guiding complex enterprise digital transformations across industries.

It is evident from the above that there are numerous frameworks and practices that help manage Enterprise Architecture, but is often not considered a priority or is considered an overhead until it is too late. In the pursuit of a quick ROI, enterprises fail to recognize the impact it can have on EDT. This research aims to explore such potential pitfalls and gain additional insights on the high rate of EDT failures.

Additionally, Ngcetane-Vika (2023) states that Digital transformation has far reaching implications on commercial contracts. Legislative frameworks are needed to regulate online business which

culminates into standardisation of commercial contracts, on areas like Block Chain and Artificial intelligence.

While the Digital Transformation has expanded to all sectors of activity there are some areas with more prospects of being developed in the future than others mentions Reis *et al.* (2018), which is indicative of the potential to do more research on this topic.

Hence, it is fair to say that no amount of research can entirely help identify the best approach to Digital Transformation. However, in this study we will consider a subset of the 23 decision variables that have been identified as having an immense impact on the success of Digital Transformations, especially in recent times. This exhaustive list of decision variables can have varied levels of impact on different organizations but it is important to recognize, manage and control them throughout all the stages of the Digital Transformation. None of these variables can be considered in isolation, but for the purpose of this study, we will study and focus on one set of variables related to 'Enterprise Architecture'.

In support of the above statements, one of the studies considers the concept of action fields. By considering the action fields (customer, value proposition, operations, data, organization, and transformation management) organizations will ensure they develop a holistic yet concrete perspective on digital transformation, which will reduce the risk that they will experience silo thinking with individual departments' striving for partial solutions observes Gimpel *et al.* (2018). This clearly indicated that researchers acknowledge that no amount of research can fully qualify the best approach to a successful digital transformation across organizations.

Another study done by Zaoui and Souissi (2020) has developed the digital reflection from a strategic and above all multidimensional perspective. It goes on to propose a framework of digital transformation based on strategic guidelines and making all the dimensions that must be involved in a transformative process interact with each other.

Schwertner (2017) mentions that the ability to digitally reimagine the business is determined largely by a clear digital strategy supported by leaders who foster a culture of new innovations. What remains unique to digital transformation is that risk taking is becoming a cultural norm as more digitally advanced companies seek new levels of competitive advantage.

Also, Gebayew *et al.* (2018) mentions that Digital transformation is the integration of digital technology into all sectors of a business, fundamentally altering how you perform and bring value to customers. It has an impact and benefits on the business models, the operational processes and the customer experience.

In a study by Straub *et al.* (2021) they indicate that Research on digital transformation is limited by two perceptions, i.e. the definition is unclear and it specifically affects organizations. They conducted five levels of analysis for digital transformation, i.e. individual, community, organization, industry, and economy, and their underlying characteristics, i.e. resources, processes, and values.

Thus, aligning to the research community, we can state that the decision variables play an important role in enabling a successful enterprise digital transformation (EDT).

Strategic Digital transformation, as we know, has emerged as crucial for organizations to thrive in today's dynamic business landscape observe Zaoui and Souissi (2020).

Kraus *et al.* (2021) in their paper qualitatively classifies the literature on digital business transformation into three different clusters based on technological, business, and societal impacts. Earlier research also indicate that while digital transformation and digital technologies are well established research areas, the implications of digital transformation on IT are rarely in focus observes Gerster (2017).

Through this literature review we can conclude that there are quite a lot of dependent decision variables. They are often ignored or not prioritized or not considered critical. The focus is primarily on the strategic vision or just driven by technology. Rarely is it complimented by tactical and operational interventions. This results in Digital Transformation programs not being successful. Research studies

have indicated this strongly and have tried to identify factors or decision variables that can help improve Enterprise Digital Transformation (EDT) outcomes.

3 Methodology

3.1 Research design

The research design follows a qualitative and quantitative design approach, incorporating a literature review and questionnaire survey to add to the understanding of the impact of lesser focused decision variables.

The primary research method for this study is literature review, leadership stakeholder surveys and statistical analysis.

3.2 Participants

The participants include leaders and stakeholders who have contributed to one or more digital transformation programs. The sample size is 60 (n=60), between the ages of 25-75 years old.

3.3 Data collection

The data collected will be analysed using Mixed Methods - Qualitative & Quantitative Methods (but not constrained to):

1. Literature Review
2. Surveys, Interviews, Questionnaires and a website (http://perim.digital)
3. Grounded theory (GT)
4. Trend Analysis of Decision Factors / Variables.
5. Correlational Quantitative Research

This study will be conducted between September 2022 and Sept 2024.

3.4 Data analysis

Data was gathered through surveys using Google Forms. The response was received from 61 participants most of whom were reached out over LinkedIn and other Leadership contacts from across the globe. The data was then analysed for this research study. For the purpose of this research paper, a subset of the data was analysed to ascertain that the direction of the research study was indeed valid and could be taken forward for detailed research. Data was collected from Literature review of various other research papers, articles, whitepapers, blogs, websites, stakeholders, leadership from across the globe, LinkedIn and other social media channels.

Through the initial data analysis pertaining to one key question in the survey, it was evident that most of the respondents agreed that there were few variables that stood out as having had a major impact on Enterprise Digital Transformations.

The sample size of the respondents was 60 (n=60). The respondents were mainly senior leaders who have been part of one or more enterprise digital transformations. The analysis resulted in 62% of participants stating that "Enterprise Architecture (Strategy, Discovery and Governance & Change Management)" contributed to the outcomes of Digital Transformation. 62% of the participants also indicated that "Skills gap and more Lead time to acquire talent" as the other important factor.

Thus, through the initial data analysis the purpose of this study has been focused on 'Enterprise Architecture' related decision variables.

3.5 Results

The results expected of this study include a detailed understanding of 'Enterprise Architecture' decision variable and other related variables and the impact it has on enterprise digital transformation journeys and programs.

Enterprise Architecture as the key decision variable	Count of valid respondents agreeing to challenges faced (n=60)	% of valid respondents agreeing to challenges faced (n=60)
Lack of focus on Enterprise Architecture Strategy	22	62
Lack of focus on Enterprise Architecture Discovery	13	
Lack of focus on Enterprise Architecture Governance & Change Management	19	

Table 2.   Enterprise Architecture related challenges of digital transformation

From the Table 2 it is evident that most of the respondents agreed that there was a lack of focus on Enterprise Architecture and potentially was a major driving factor in Digital Transformations.

4   Discussion

Contrary to our focus and understanding, a large percentage of the sample population of the survey, indicated that 'Enterprise Architecture' is indeed a key driver of successful digital transformation journeys. The interventions start right from defining the enterprise architecture strategy, to discovery to governance & change management. Strategy is successful only to the extent of Governance & Change Management maturity of the enterprise. The research study will further delve into the intricate details of each of the targeted aspects of Enterprise Architecture and provide a detailed analysis of the primary reasons for EDT failure rate and the potential interventions that can help counter this pattern in EDT programs and initiatives.

5   Limitations

The case study has a sample size of 60 participants, which could limit the accuracy of the results. The 23 decision variables are an exhaustive list of decision variables that have impact on EDT, but for the purpose of this research study, only Enterprise Architecture related variables have been considered. The survey has tried to include a Global audience to respond to the survey, but there could be a slight impact on accuracy considering the sample size.

6   Ethical considerations

Ethical considerations were adhered to during this research study. The participant's overall security and rights to data privacy was as per compliance. Consent was requested from participants with information about the study. Participants were guaranteed that the data collected, would be confidential and anonymous and that their participation was purely voluntary, allowing them to withdraw at any stage of the study.

7   Further research

The research findings would benefit from further research, to gain a deeper understanding of other decision variables that impact digital transformation. The 23 decision variables are listed earlier in this document. This will allow the researcher to determine more in-depth understanding of the factors that can lead to successful digital transformation outcomes.

8   Conclusion

This research study was initiated with the question on why enterprise digital transformations had a high rate of failure. During the course of the literature study, 23 key factors or variables were identified as primary decision variables that have the most impact on the EDT outcomes. The scope of this study was limited to understanding the impact of variables related to 'Enterprise Architecture'. The primary focus was on enterprise strategy, discovery, governance & change management. The finding was further validated by the survey results. The respondents were asked about their view of the challenges that impacted EDT initiative the most. To avoid any bias, the respondents were presented with various options. The results highlighted that Enterprise Architecture variables and Skills gap & availability of talent were major factors that impacted EDT outcomes.

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