

Stephanie Dias Chelliah

Digital Maturity and Organizational Performance: Investigating Best Practices for Digital Transformation

Master's thesis in Engineering and ICT

Supervisor: Nora Johanne Klungseth

July 2023

Stephanie Dias Chelliah

Digital Maturity and Organizational Performance: Investigating Best Practices for Digital Transformation

Master's thesis in Engineering and ICT
Supervisor: Nora Johanne Klungseth
July 2023

Norwegian University of Science and Technology
Faculty of Engineering
Department of Mechanical and Industrial Engineering



Preface

This master thesis was written the spring of 2023 for the Norwegian University of Science and Technology (NTNU) in the course TPK4920 - Project and quality management. The conducted research is handed in as a master thesis for the study Engineering and ICT (Ingeniørvitenskap og IKT). The thesis is worth 30 credits.

Associate professor Nora Johanne Klungseth was my supervisor for both the master thesis and the specialization project written in the autumn of 2022. She has been an great support throughout my entire final year, and has my deepest gratitude for her engagement, support and knowledge. She has provided me with honest feedback throughout the process, with valuable insights to achieve better quality. I would also like to thank her for her support and always providing a safe environment to express my thoughts and ideas. She has contributed with very valuable insight on both the thesis and also the process of working with such a large project. I am glad to say that I learned lot from her, and will take her feedback and tips with me further into my career. It has been a great pleasure working with her.

Finally I would like to thank everyone who has been available for interviews and contributed with their valuable insight on the matters. I would also like to thank my friends and family for the encouragement through the entire process.

Lastly, this master thesis marks the end of my wonderful years as a student in Trondheim, with many fantastic friends, endless hours at campus and memories I will always cherish. It has been the most unforgettable time, and Trondheim will always stay close to my heart. So thank you to Trondheim and NTNU for this opportunity.

- Stephanie Dias Chelliah, 11th of July 2023.

Abstract

The rapid advancement of technology has created new opportunities and challenges for organizations in the digital age. The disruptive nature of digital technologies affects various aspects of an organization, and this requires attention and changes in order to remain competitive, drive innovation and increase their revenue. As organizations navigate the evolving landscape of digital transformation, achieving and maintaining high levels of digital maturity has become an essential objective.

The purpose of this master thesis was to shed light on the practises that organizations can implement to enhance their digital maturity, and investigate the subsequent impact on organizational performance.

An extensive literature review of more than 900 different articles were reduced to around 20, which were included in the study. Additionally, 6 interviews were conducted with professionals working in the industry in order to gain their insight on digital transformation and digital maturity and its drivers and challenges. The findings of this literature review and the interviews were then used for the arguments in the discussion section. This study therefore identifies and analyses various strategies and approaches utilized by leading organizations in order to develop and maintain digital maturity. This master thesis summarizes key findings from literature and expert interviews in order to provide a comprehensive overview of the best practises that contribute to digital maturity. Additionally, this study also explores the impact of digital maturity on organizational performance, to highlight benefits of becoming digitally mature, as well as the consequences of ignoring digital maturity.

The outcome of this master thesis demonstrates the practises that can aid in reaching a high level of digital maturity, as well as the implications of digital maturity for organizational success. High levels of digital maturity can aid organizations in improving their efficiency, their innovative ability as well as keeping a competitive edge. On the other hand, low digital maturity can have a negative effect on organizational performance by lowering efficiency, reducing the ability to adapt to market changes as well as have a negative impact on an organizations innovative ability.

Sammendrag

Den raske teknologiske utviklingen har skapt nye muligheter og utfordringer for organisasjoner i den digitale tidsalderen. Den disruptive egenskapen til digitale teknologier påvirker ulike aspekter av en organisasjon, og dette krever oppmerksomhet og endringer for å kunne forbli konkurransedyktig, drive innovasjon og øke inntektene. Mens organisasjoner forsøker å navigere seg i det stadig skiftende landskapet for digital transformasjon, har oppnåelse og opprettholdelse av digital modenhet blitt et essensielt mål.

Formålet med denne masteroppgaven er å belyse praksiser som organisasjoner kan implementere for å forbedre sin digitale modenhet, og undersøke de påfølgende virkningene på organisatorisk prestasjon.

En omfattende litteraturgjennomgang av over 900 ulike artikler ble redusert til omtrent 20 som ble inkludert i studiet. I tillegg ble det gjennomført 6 intervjuer med fagfolk som arbeider i bransjen for å få deres innsikt i digital transformasjon, digital modenhet, samt dets drivere og utfordringer. Funnene fra denne litteraturgjennomgangen og intervjuene ble deretter brukt som argumenter i diskusjonsdelen. Dette studiet identifiserer og analyserer ulike strategier og tilnærminger som ledende organisasjoner bruker for å utvikle og opprettholde digital modenhet. Videre oppsummerer denne masteroppgaven sentrale funn fra litteraturen og ekspertintervjuene for å gi en omfattende oversikt over de beste praksisene som bidrar til digital modenhet. I tillegg utforsker dette studiet også virkningene av digital modenhet på organisatorisk prestasjon for å belyse fordelene med å oppnå digital modenhet, samt konsekvensene av å ignorere det.

Resultatene av denne masteroppgaven demonstrerer praksiser som kan bidra til å oppnå høye nivåer av digital modenhet, samt konsekvensene av digital modenhet for organisatorisk suksess. Høye nivåer av digital modenhet kan hjelpe organisasjoner med å forbedre effektiviteten, innovasjonsevnen og opprettholde en konkurransefordel. På den andre siden kan lav digital modenhet ha en negativ effekt på organisatorisk prestasjon ved å redusere effektiviteten, begrense evnen til å tilpasse seg markedsendringer og ha en negativ innvirkning på organisasjonens innovasjonsevne.

Table of Contents

List of Figures	vii
List of Tables	viii
1 Introduction	1
1.1 Background	1
1.2 Aim	2
1.3 Research questions	2
1.4 Structure of the study	4
2 Methodology	6
2.1 Literature Review	6
2.2 Database Search	7
2.3 Snowballing	8
2.4 Selection Process and Selection Criteria	8
2.5 Results of Database Search	11
2.6 Interview Guide and Process	12
2.7 Structure of the Interviews	13
2.8 Interview Objects	14
2.9 Validity and Reliability	15
3 Theory	16
3.1 Defintion of a Project	16
3.2 Project Management	16

3.3	Project Risk Management	17
3.4	Project Flexibility	17
3.4.1	Uncertainty	18
3.4.2	External and Internal Flexibility	18
3.5	Resistance to Change	18
3.6	Digitization vs Digitalization	19
3.7	Digitalization	20
3.8	Digital Transformation	20
3.9	Digital Capabilities	21
3.10	Change Management	23
3.10.1	Kotters 8-Step Change Model	23
3.10.2	Lewin’s Change Management Model	25
3.11	Pre Study: Specialization Project: Leading Digital Transformation Through Data Governance	27
3.11.1	Data Governance Definition	27
4	Results of the Literature Review	30
4.1	Definition and Dimensions of Digital Maturity	30
4.2	Transitioning to Digital Maturity	32
4.3	Drivers for Digital Transformation	37
4.4	Barriers for Digital Transformation	38
4.5	Benefits	40
4.6	Stages of Digital Maturity	40

4.6.1	Early Stages:	40
4.6.2	Transitional Stages	41
4.6.3	Mature Stages	41
4.7	Evaluating Digital Maturity Models	42
5	Results of Interviews	51
5.1	The Interview Objects	51
5.2	Digital Investments	51
5.3	Value Creation - What Value Does The Interview Objects See?	52
5.4	Digital Abilities	52
5.5	Ambitions	53
5.6	Measuring Development	53
5.7	Digital Transformation Barriers	54
5.8	Measuring Success	56
5.9	Sustainability	57
5.10	Data Governance Practises, Advantages and Disadvantages	57
5.11	Leadership and Culture	58
5.12	Resistance to Change - Experiences, and How They Handled It	59
5.13	Indicators for Measuring Organizational Digital Maturity	61
5.14	High vs Low Digital Maturity	62
6	Discussion	63
6.1	RQ1 - What Practices Can Organizations Implement in Order to Become More Digitally Mature?	63

6.2	RQ2: How Does High and Low Levels of Digital Maturity Affect Organizational Performance?	75
7	Conclusion	78
7.1	RQ1: What Practices Can Organizations Implement in Order To Become More Digitally Mature?	78
7.2	RQ2: How Does High and Low Levels of Digital Maturity Affect Organizational Performance ?	80
	Bibliography	82

List of Figures

1	Scope, own production	9
2	Used articles based on scope and method, own production	12
3	Sources of resistance, sourced from Pardo del Val and Fuentes (2003,p.152)	19
4	Differentiation of terms, (Savic et al., 2019)	21
5	Lewin’s three stages change model sourced from , (Tang, 2019)	26
6	The five dimensions in the digital maturity model and their sub-dimensions (Anderson and Ellerby, 2018, p.11)	42
7	Four dimensions determine digital maturity in forresters mode (Gill and VanBoskirk, 2016, p.3)	44
8	Forresters four levels of digital maturity (Gill and VanBoskirk, 2016, p.5)	45
9	Four types of digital maturity (Westerman et al., 2012, p.4)	49

10	Summary of success criterias for digital maturity in the literature, own production	50
11	Summary of what the interview objects viewed as charateristic for low digital maturity vs high digital maturity, own production	62
12	Summary of what the interview objects highlighted as important	62

List of Tables

1	Categories and Sets of Search Words	7
2	Example of categorization after the first screening round	10
3	Example of categorization after the second screening round	10
4	Example of selection after the third screening round	11
5	Enterprises by number of employees. Source: (OECD, 2017)	14
6	Enterprises by number of employees. Source: (OECD, 2017)	14
7	Kotters 8-step model, sourced from (Tang,2019,p.146)	24
8	Qualitative indicators (Dai et al.,2016,p.445)	28
9	Metrics for data quality (Dai et al.,2016,p.446)	28

1 Introduction

1.1 Background

Digital transformation has become a crucial factor for the success in many modern businesses, as various organizations seek to utilize digital technologies to be able to drive innovation, agility as well as keep their competitive advantage. (Pramanik et al., 2019). However, contrary to popular belief, simply investing in digital technologies is not enough to achieve success. It is also crucial that organizations develop a high level of digital maturity, which refers to their ability to effectively and efficiently leverage digital technologies to achieve their goals. (Goumeh et al., 2021)

There lies a significant challenge in having a successful digital transformation, as well as the transition to achieve digital maturity. This is a result of the fact that the impact of a digital transformation on various parts of an organization is extensive. Therefore, its vital to access how different organizations operate and what processes they have for their employees, customers and stakeholders. Furthermore it is often necessary to access the organizational culture in a organization, and make sure that this is also prepared for a change. (Goumeh et al., 2021) (Westerman et al., 2012) Digital maturity has therefore become the key difference between the organizations that succeed in digital transformation, and those who struggle to keep up with the technological advances. As mentioned in Chelliah (2022), The world of digital transformation is characterized by a high pace in the technological advancements, therefore agility and being able to respond to changes in the market is important. To summarize, the challenges connected to transforming an organization in order to become more digitally mature are often complex and composed by many different factors. Therefore there is a need to map the concept of digital maturity as well as how to best navigate around these challenges.

1.2 Aim

This master thesis aims to explore the definition and concept of digital maturity, as well as its effect on a digital transformation, and how these two correlate. Further, this thesis will examine various frameworks and models used to assess digital maturity, and then identify key factors that contribute to a high level of digital maturity, as well as investigate how high and low digital maturity can impact organizational performance.

Digital transformation has become a critical aspect of organizational success today. As organizations strive to leverage the potential of digital technologies, the concept of digital maturity emerges as a crucial factor in their ability to innovate, adapt and navigate the digital world. This master thesis wishes to explore the definition and concept of digital maturity, as well as its correlation to digital transformation. Furthermore, we wish to explore the practises that organizations can implement in order to enhance their digital maturity, as well as the impact of high and low levels of digital maturity on organizational performance. This leads us to our research questions.

1.3 Research questions

RQ1: What practices can organizations implement in order to become more digitally mature?

As organizations face the challenges and opportunities presented by the disruptive nature of digital technologies, understanding the practises that contribute to digital maturity becomes essential for their success. By exploring this research question, we aim to provide valuable insights and recommendations for organizations seeking to improve their digital maturity.

RQ2: How does high and low levels of digital maturity affect organizational performance?

This research question wishes to examine the relationship between an organizations

digital maturity and its overall performance. The question seeks to explore the impact of digital maturity on various aspects of organizational performance, such as efficiency, innovation, competitiveness, and flexibility. Furthermore, understanding the relationship between digital maturity and organizational performance is crucial for decision makers, and the research findings can help organizations identify the benefits and advantages of achieving higher levels of digital maturity, and the potential risks or drawbacks of having lower levels.

1.4 Structure of the study

This master thesis will consist of seven parts; Introduction, methodology, theory, results, discussion and finally conclusion. This current chapter, the introduction will provide an overview of the concepts digital transformation, digital maturity as well as the organizational transition.

The second chapter is about the methodology used in this thesis. It begins with a short overview of different types of literature review techniques, as well as the research approach and data collection methods. This thesis will be based on a qualitative method by using a literature review and interviews in collaboration with experts from both private and public organizations.

The third chapter will be the theory chapter of the thesis. It will present the theoretical base that is required in order to research the necessary scope of the study. This includes providing an overview of project management, project flexibility theory as well as some well known models within change management theory. It will also include a brief overview of digital transformation and its definition, as well as theory about dynamic capabilities which are essential capabilities for a digital transformation. It will also include some results from my specialization project on "Leading Digital Transformation Through Data Governance"

The fourth chapter will present the results of the literature review, and will focus on the concept of digital maturity, transitioning to digital maturity, as well as drivers and barriers for digital transformation and digital maturity. We will also examine and evaluate some known digital maturity models in order to explore the relationship between digital maturity and organizational performance, including its impact on innovation, agility and customer experience. The chapter will begin by presenting the quantitative data on digital maturity levels and factors contributing to digital maturity.

In chapter five, the results from the interviews will be compiled, summarized, and examined in order to best support the thesis. The chapter will then present the qualitative insights gathered from the interviews. These results will then further

be analyzed to identify the key factors that contribute to a high level of digital maturity, as well as the impact of digital maturity on organizational performance

The sixth chapter of the thesis will discuss the findings from the fourth chapter and fifth, whilst angling it towards our research questions. The discussion will start by addressing our first research question: "What practices can organizations implement in order to become more digitally mature?" And then proceed to moving on to our second research question, which is: How does high and low levels of digital maturity affect organizational performance?

The seventh and final chapter is the conclusion, which will summarize the discussion in the fifth chapter and generate the outcome of this thesis, as well as present recommendations for the field of digital maturity and digital transformation.

2 Methodology

This section will describe the methodology used for research during the development of this thesis. The following chapter will describe the conducted research methods as well as elaborate why these methods were selected. This thesis consists of a literature review and interviews from various people in the industry.

2.1 Literature Review

A literature review is a technique for researching and learning more about a specific topic. The goal of a literature review is to review previously published research, and utilize this to obtain insight on a topic. The phrase research methodology refers to a systematic approach to a subject that includes the mapping of techniques and processes used in a research (Rajasekar et al., 2006).

We can differentiate between two approaches to a literature review; a quantitative approach or a qualitative approach (Rajasekar et al,2006).

A qualitative systematic review is characterized by its attention to detail and explicit methods. The goal is to select research that will adequately address a topic that has been chosen. This enables the researcher to create a criteria for selecting publications for for inclusion or exclusion from their review (Green et al., 2006).

When conducting a quantitative systematic literature review, the author closely assesses each article and puts together the most essential components of the research. The goal of such a review is to provide an end product that is as objective as possible. They utilize all of the thorough techniques found in a qualitative systematic review. The collection of data between studies is a significant advantage of a quantitative review. This enables the author to develop conclusions that can be projected to the general population (Green et al., 2006). Additionally, this aids in creating more powerful conclusions, especially if several studies are built similarly. However, there could be a disadvantage of collection large amounts of data, as it could be difficult to discover research that is comparable enough to one another to allow for meaningful comparisons (Green et al., 2006).

2.2 Database Search

A commonly used method for literature searches are by using databases (Green et al., 2006). When using databases its vital to keep track of the terms and databases used, to be able to reference them to anyone who reads the study. As stated by Green et al. (2006, p.109): "Can the reader replicate the search what was done based upon what I have written in the methods section"

In this master thesis, the primary search method will be through database searches. To structure the search and ensure that the desired scopes will be covered, I decided to split the search into three different categories with a set of search words each. This can be seen in Table 1. The purpose of the categories is to use them as keywords first, to create an overview. Further, the categories will be combined with the first set of key words, this will serve the purpose of filtering out excess literature. Similarly, the categories will again be combined with the next set of key words, until we reach the last category. This will aid in minimizing our scope. The use of the operators "AND", "OR" and "NOT" aids us in the database search, as it allows us to include multiple keywords into the search, meaning that we are able to search more efficiently. Table 1 exemplifies this.

Category	Search word set
Digital maturity	Digital maturity definition
Digital transformation	Digital maturity and Digital transformation
Change management	Digital maturity and Change management

Table 1: Categories and Sets of Search Words

In addition to this, we will also use roadmaps that have been retrieved by snowballing, and through other courses. The results part of this thesis will consist of two chapters; theory based on a literature review and results from interviews. The literature review will help us gather an insight to what digital maturity means, define different levels of digital maturity as well as what is needed to be able to become more digitally mature.

From the interviews it is wanted to gather an insight on digital maturity in different Norwegian consulting firms, as well as what their insight on what practises are

essential for digital maturity as well as what impact low and high levels of digital maturity has on organizational performance.

Additionally, In the specialization project we researched the topic of leading a digital transformation through data governance, the results of this research will also be included in our theory chapter, as it was discovered that data governance could have a correlation with digital maturity.

2.3 Snowballing

Snowballing refers to a search strategy. The essence of this approach is using an article's reference list to find new articles related to a theme (Wohlin, 2014). We can differentiate between backward and forward snowballing. Backward snowballing refers to using an article's reference list to find additional articles to include. Forward snowballing is the practice of selecting new articles based on who has cited previous publications (Wohlin, 2014). In this thesis, we have used backward snowballing

2.4 Selection Process and Selection Criteria

The purpose of this master thesis is to map what practises that are essential for organizations to become more digital mature, as well as an overall view of digital transformation and digital maturity.

To be able to maintain a context throughout the selection of literature, it is important to formulate a selection criteria. The purpose of doing so is to ensure that the studies are included in the review because of their relevance.

The literature review in this master thesis is inspired by Klungseth et al. (2021), who split their systematic literature review into the following steps:

- 1) Identifying the purpose of the literature review.
- 2) Deciding what databases and keywords to use
- 3) First screening round - Evaluating relevance based on the titles and keywords
- 4) Second screening round - Evaluating the relevance based on the abstracts

5) Data extraction and analysis

To decide the scope, we chose to further research change management, project management and flexibility, digital transformation and digital maturity.

The figure below is to illustrate the scope.

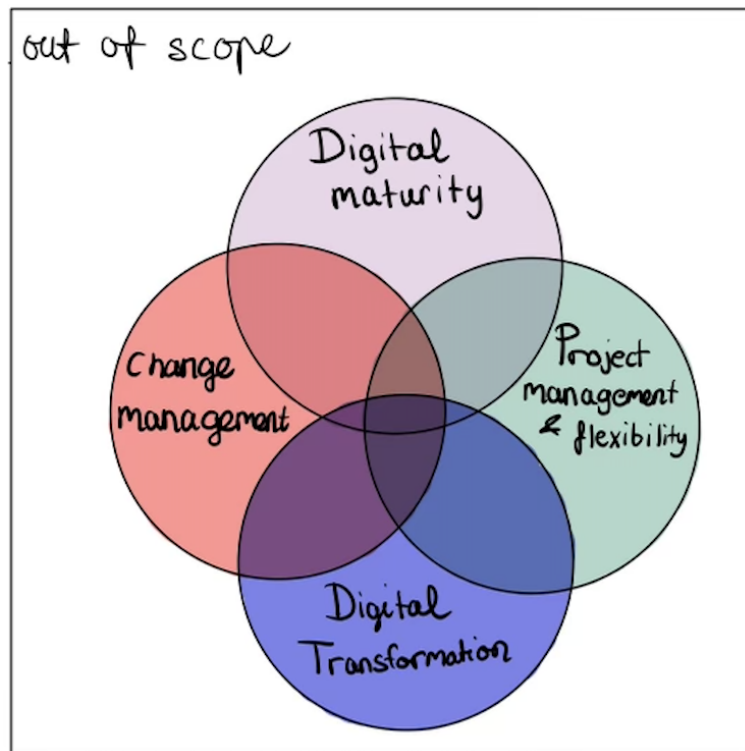


Figure 1: Scope, own production

For the second step of the literature review, I decided to limit the searches to the engines google scholar, and scopus, together with the following selection criteria:

- a) Keywords in the publications sections for: Title and keyword
- b) Document type: Article and review
- c) Citation count: at least 2

In the first screening round, the results were inspected firstly by their titles and keywords. The purpose of doing so was to identify the relevance of the article. After this, the articles were highlighted in either green (highly relevant), yellow (might be relevant), and lastly in red (not relevant/out of scope).

Through this process the results were narrowed down from 964 til 250.

Article	Status	Reason for status
Velasquez et al (2021) Knowledge management in two universities before and during the COVID-19 effect in Peru.	Red	Did not contain any of the keywords
Wernicke et al (2023) Introduction of a digital maturity assessment framework for construction site operations	Green	About digital maturity in the construction field
Luna-Reyes et al (2022) A Systems View of Enterprise Data Governance for Artificial Intelligence Applications in Government.	Yellow	focus on data governance but mostly on artificial intelligence – could be useful

Table 2: Example of categorization after the first screening round

Then the articles from the first screening round were assessed by their abstracts in the second screening round. Further the relevance was decided after reading through, and then again highlighted in either green, yellow or red. Through this filtering process, the articles were yet again reduced to 250 to 54 papers.

Article	Status	Reason for status
Zhu et al (2021) The Third International Workshop on Smart Data for Blockchain and Distributed Ledger (SDBD2021)	Red	Little to no focus on digital maturity nor change management
Souza et al (2021) Data management unit and critical indicators for institutional performance evaluation [Unidade de gestão de dados e de indicadores críticos para avaliação de desempenho institucional]	Yellow	Main focus to define quality in higher education, uses data to try and define this – could be interesting
Pramanik et al. (2023) Essence of digital transformation—Manifestations at large financial institutions from North America	Green	Main focus digital maturity in financial institutions

Table 3: Example of categorization after the second screening round

The final screening round was by reading the summary of the article from the second

round, and then proceeding to decide whether or not the papers were relevant enough for the literature review. The articles were then marked in either green - relevant and included, or red - not relevant and excluded.

Article	Selected ?	Reason for status
Goumeh et al. (2021) A Digital Maturity Model for digital banking revolution for Iranian banks	Yes	Focus on digital maturity
Merkus et al (2020) Data governance and information governance: Set of definitions in relation to data and information as part of DIKW.	No	Not relevant, too little focus on data governance
Priebe et al (2015) Business information modeling: A methodology for data-intensive projects, data science and big data governance.	No	No access.

Table 4: Example of selection after the third screening round

2.5 Results of Database Search

When doing the database search and retrieving the articles, I found that there were many articles that were specific to an industry and not as general as I would have preferred. Even though these articles were useful, I also ended up adding some digital maturity models which were retrieved through course literature as well as through snowballing.

Below is a figure showing the used articles, which scope they belong to as well as how they were retrieved, which was either through course literature, search string or snowballing

No.	Article author	Year	Scope	Method	Type
1	Krane et al.	2012	Project management and flexibility	Search	Article
2	Olsson, N.	2005	Project management and flexibility	Course literature	Article
3	Olsson, N.	2008	Project management and flexibility	Course literature	Article
4	Pardo del Val, M. and Fuentes C.M.	2003	Change management	Search string	Article
5	Savic, D.	2019	Digital transformation	Course literature	Article
6	Helfat et al.	2007	Digital transformation	Search string	Article
7	Weritz et al.	2020	Digital transformation	Search string	Article
8	Tang K.N.	2019	Change management	Search string	Book
9	Westerman et al.	2012	Digital maturity	Search string	Article
10	Wernicke et al.	2023	Digital maturity	Search string	Article
11	Perera et al.	2023	Digital maturity	Search string	Article
12	Goumeh et al.	2021	Digital maturity	Search string	Article
13	Pramanik et al.	2021	Digital maturity	Search string	Article
14	Kane et al.	2017	Digital maturity	Course literature	Article
15	Pinto et al.	2023	Digital maturity	Search string	Article
16	Vial, G.	2017	Digital maturity	Snowballing	Article
17	Shahi, C. and Sinha, M.	2020	Digital maturity	Search string	Article
18	Anderson and Ellerby.	2018	Digital maturity	Search string	Model
19	Gill and VanBoskirk.	2016	Digital maturity	Search string	Model
20	Schwalbe K.	2015	Project management and flexibility	Course literature	Article

Figure 2: Used articles based on scope and method, own production

2.6 Interview Guide and Process

An important part of the gathering of relevant data for this master thesis is through conducting interviews. The process for this began by applying for the appropriate permissions from the NSD - Norsk senter for forskningsdata (Norwegian Centre for Research Data). An information letter was written and sent to people that we thought could have useful insights on the research.

The interview process was initiated by acquiring the approval from the Norwegian centre for research data (NSD)/ SIKT - the norwegian agency for shared services in education and research. This meant notifying SIKT about the research as well as the objectives of collecting personal data. In this thesis, the data collected consisted of recordings and transcriptions of digital interviews conducted on teams. The purpose of recording the data in such a way, was to enable the thorough analysis of the data, in order to use the gained information to answer the research questions as well as present the findings in the result section. To obtain approval, all relevant material concerning this research study, including the interview guide and information leaflet, was provided to SIKT. Following this, I began searching for and contacting potential interview objects. Here my own network was thoroughly used.

2.7 Structure of the Interviews

In this thesis, the interviews were conducted as semi-structured interviews, as described by DiCicco-Bloom and Crabtree (2006): While an unstructured interview occurs together with the collection of data from observations, semi-structured interviews are frequently used as the main source of data for a qualitative research project. It is usually organized in advance. They are typically structured around a set of predefined open-ended questions, which opens for additional questions arising during the actual interview. (DiCicco-Bloom and Crabtree, 2006). Additionally, according to DiCicco-Bloom and Crabtree (2006), semi-structured in-depth interviews are the most common interviewing methods for qualitative research.

As briefly mentioned, the interviews were conducted through Microsoft teams, and by doing so all the personal data was saved securely on NTNU's servers. The interviews all lasted for about one hour, with the exception of two who lasted 45 minutes and 35 minutes. After the interview had taken place, the outcomes were transcribed through the transcription and recording feature which exists in Microsoft Teams, however it was still necessary to go through the transcription and the recording thoroughly to ensure that all the essential information was required. This process took on average around 5-6 hours per interview, and with 6 interviews it came up to a total of around 30 hours. This was however necessary to guarantee the quality and reliability of the interview results. After the transcriptions were completed, they were sent back to the interview objects for them to verify what had been spoken about during the interview.

2.8 Interview Objects

According to the OECD(2017), we can classify enterprises by the number of employees.

Organization size	Number of employees
Micro	1-9
Small	10 - 49
Medium	50 - 249
Large	250 or more.

Table 5: Enterprises by number of employees. Source: (OECD, 2017)

Interview object	Role description	Organization size
1	Security Lead	Large
2	Project manager	Small
3	Advanced PLM engineer	Small
4	Cloud lead	Large
5	CHRO/COO	Large
6	IT consultant	Large

Table 6: Enterprises by number of employees. Source: (OECD, 2017)

The interview objects will hereby be referred to as "[]", with their corresponding number as shown in table 6. For example, interview object 1: Security Lead will be referred to as "[1]" or interview object [1].

2.9 Validity and Reliability

Evaluating the quality of research involves assessing its validity and reliability. The main objective is to determine how effectively a method, technique, or test measures a specific aspect. We differentiate between consistency and accuracy in this context.

Validity refers to the extent to which a researcher has successfully measured what they intended to measure (Kumar, 2016). Put simply, validity is about how well the collected data reflects the main focus of the study and highlights the key issues (Olsson, 2014).

On the other hand, reliability focuses on consistency and indicates the degree to which results can be replicated when the research is repeated under the same conditions (Kumar, 2016). To achieve high reliability, it is crucial to have a clear understanding of what will be measured and how it will be measured. Reliability ensures that the measurement is conducted accurately and consistently (Olsson, 2014).

To ensure reliability in this study, the process of literature selection has been thoroughly explained, including the search words used, databases accessed, and selection criteria employed. The goal is to provide such detailed explanations that readers can replicate the same literature selection process. However, it should be noted that some selection criteria were based on assessing the relevance of abstracts, which may result in readers reaching different conclusions and accessing different literature. In this study, validity is supported by the use of relevant search words and the presentation of theory that is pertinent to the research questions. Additionally, for the interview process, reliability and validity is ensured through the variation of the roles belonging to the interview objects, and by recruiting from successful norwegian organizations.

3 Theory

3.1 Defintion of a Project

Schwalbe (2015, p.4) defines a project as “A temporary endeavor undertaken to create a unique product, service or results. Projects are different from operations in that they end when their objectives have been reached or the project has been terminated”

According to Schwalbe(2015) a project almost always involves uncertainty. This makes it even more crucial to be able to manage a project in such a way, so that it is possible to estimate and map external factors that could cause uncertainty. Furthermore, uncertainty invokes risk, as follows that being able to handle uncertainty is often the core of project management.

A project consists of constraints. According to (Schwalbe , 2015). Project managers often choose to focus on the triple constraint; scope, time and cost. Scope is essentially the expected outcome of the project, from the customers point of view. Time is the duration of the project. Lastly, cost is the resources required in order to finish the project. Additionally, some projects value a fourth constraint; quality. This is essentially how to make sure of the customers satisfaction, as well as the overall quality of the finished product.

3.2 Project Management

As stated by Schwalbe (2015, p.8) ”Project management is the application of knowledge, skills, tools and techniques to project activities to meet the project requirements.” A project managers role is therefore trying to hit all of the constraints of a project, namely scope, time, cost and quality requirements, in addition to meet the needs and expectation of the everyone involved in the project. Therefore most essential part of project management is to handle the problems that may arise when attempting to uphold the constraints, and at the same time keeping the customer happy (Schwalbe, 2015).

A project is often divided in the following phases; first a initiation phase, then a planning phase, a executing phase, a monitoring/testing phase, and lastly a closing phase. Furthermore, stakeholders are a crucial part of project management. This could consist of the project team, customer, or the project sponsor. Moreover, it is common that they could have different expectations of the finished result from the project. It is therefore essential to facilitate for these wishes in both the initiation phase as well as throughout the project. (Schwalbe, 2015)

3.3 Project Risk Management

According to Krane et al. (2012,p.5) risk is defined as "an uncertain event or condition that, if it occurs, has a positive or negative effect on a project's objectives" Setting priorities to describe what is important, is a critical component of risk management. However, the various actors in a project will have different interests and goals. As a result, conflicts might emerge as a result of competing interests. (Krane et al., 2012) Despite this, Krane et al. (2012) claims that project risk management often overlooks underlying conflicts of interest between the different roles in a project. Instead it focuses on the project's short-term survival or success as client handover approaches.

3.4 Project Flexibility

Olsson(2005) proposes several different views on project flexibility; "The capability to adjust the project to prospective consequences of uncertain circumstances within the context of the project"(Olsson, p.67). Additionally Olsson(2005,p.67) suggests defining flexibility as "Owning a option or right to take an action in the future". "Room to manoeuvre" is another essential term in flexibility literature, by this we mean the the option to be able to make changes to a project as we learn more about its changes and needs (Olsson, 2008). However, according to Olsson(2008) there have been documented many substantial disadvantages of project flexibility on project constrains such as time and cost, but also project efficiency. Accordingly, these factors are often used as arguments against flexibility. Therefore, Olsson(2008)

states that the usual response to challenges connected to flexibility has been to restrict flexibility.

3.4.1 Uncertainty

Olsson(2008, p. 50) defines uncertainty as "The gap between the amount of information needed to perform a task and the amount of information already possessed by the organization". This is a frequently used phrase in both projects and projects flexibility theory.

3.4.2 External and Internal Flexibility

There exists two types of flexibility; Internal and external (Olsson, 2008). Internal project flexibility addresses as to how requirements should be met, whereas external project flexibility is addresses exactly what requirements should be met, and how the scope should be defined. The two different types of flexibility emphasize efficiency: having more opportunity to optimize resources - doing things right - and effectiveness: increasing the value of the projects to the project owner - doing the right things. (Olsson, 2008).

3.5 Resistance to Change

Resistance to change is often mentioned in the literature, and is often of the main reasons that many transformation projects fail in organizations. (Pardo del val and Fuentes, 2003). Pardo del Val and Fuentes(2003,p.153) further defines resistance to change as "any phenomenon that hinders the process at its beginning or its development, aiming to keep the current situation." According to Savic (2019), most of the resistance to change, stems in employees who are afraid of losing their positions. This makes it crucial to have the necessary knowledge and skills to handle this, in order to implement a successful change. Pardo del val and Fuentes (2003) suggests the following to tackle resistance to change: Firstly, it is necessary to evaluate the alignment of the already existing organizational culture, with the vision

of the change. Additionally, Pardo del val and Fuentes (2003) also point to training as a useful tool to handle resistance to change caused by communications barriers, thus reducing the gap of uncertainty. Below is a figure with the most common sources of resistance to change:

Table II
Results of the sources of resistance, ordered by means

Sources of resistance or inertia to change	Mean
Deep-rooted values	2.70
Capabilities gap	2.42
Departmental politics	2.42
Low motivation due to cannibalization costs and cross subsidy comforts	2.31
Incommensurable beliefs	2.31
Different interests among employees and management	2.27
Communication barriers	2.23
Organizational silence	2.20
Low motivation due to direct costs of change	2.15
Myopia, denial, perpetuation of ideas, implicit assumptions	2.11
Lack of a creative response due to fast and complex environmental changes	2.05
Lack of a creative response due to inadequate strategic vision	2.04
Change values opposite to organizational values	2.04
Forgetfulness of the social dimension of changes due to obsession of promoter	2.01
Lack of a creative response due to resignation	1.96
Leadership inaction, embedded routines, collective action problems	1.94
Cynicism	1.84
Forgetfulness of the social dimension of changes due to forgetting supervisors	1.67
Low motivation due to past failures	1.65

Note: Some of the factors generated (Table I) were merged, as in the pilot test we found the list of factors was too long

Figure 3: Sources of resistance, sourced from Pardo del Val and Fuentes (2003,p. 152)

3.6 Digitization vs Digitalization

Digitization is defined as "The conversion of text, pictures, or sound into a digital form that can be processed by a computer" (Oxford Learners Dictionary, 2022). Moreover, Digitalization refers to using or improving processes by using digital technologies and data. We can therefore conclude that digitalization assumes digitization.

3.7 Digitalization

According to Savic et al. (2019), Digitalization circulates around automating business processes. It can further be split into three phases:

1. The initial phase: When single processes or operations are automated.
2. The middle phase: When all of the linked processes from the first phase are automated and connected together.
3. The final phase: When one is able to integrate all the systems that support business processes and information flows into management systems.

3.8 Digital Transformation

Digital Transformation is a term that can be divided into two parts. You have the "Digital" part, which refers to implementing or digitalising processes. and then you have the "Transformation" part, which is about making the structural changes to be able to successfully implement the digital part. According to Savic (2019, p37) "The goal is to change a change an organizations culture and the way it works and thinks". Moreover, digital transformation relates to business, and creating a completely new business model, by using modern technology. Furthermore, Savic(2019) adds that while implementing new digital solutions strengthens the current businesses, it is not sufficient enough to change the core of a company. Organizational changes are also essential. This might apply to management, culture, or operations strategy. We can see an illustration of the distinction between digitization, digitalization, and digital transformation in the picture below, which was taken from Savic (2019, p. 37). Each of these concepts is further broken down into focus, aim, action, tools, challenges, and examples. As an illustration, consider how the purpose of digital transformation is to alter a company's culture, as well as the way it operates and thinks. The focus of this transformation is on knowledge leveraging. They could enlist the help of a variety of cutting-edge digital technologies to do this. The resistance to change is a problem, though. Further the illustration suggests that human resources must address this issue. Furthermore, virtually everything electronic is a prime example

of digital transition.




	DIGITIZATION	DIGITILIZATION	DIGITAL TRANSFORMATION
Focus	Data conversion	Information processing	Knowledge leveraging
Goal	Change analog to digital format	Automate existing business operations and processes	Change company's culture, the way it works and thinks
Activity	Convert paper documents, photos, microfilms, LPs, films, and VHS tapes to digital format	Creation of completely digital work processes	Creation of a new digital company or transformation to a digital one
Tools	Computers and conversion/encoding equipment	IT systems and computer applications	Matrix of new (currently disruptive) digital technologies
Challenge	Volume <i>Material</i>	Price <i>Financial</i>	Resistance to change <i>Human resource</i>
Example	Scanning paper-based registration forms 	Completely electronic registration process 	Everything electronic, from registration to content delivery 

Figure 4: Differentiation of terms, (Savic et al., 2019)

3.9 Digital Capabilities

Helfat et al. (2007, p.1) states that "To survive and prosper under conditions of change, firms must develop the dynamic capabilities to create, extend, and modify the ways in which they make their living." However, the original definition of dynamic capabilities is defined by Tecce, Pisano, and Shuen, (1997, p.516) and is referred to as "The firms ability to integrate, build and reconfigure internal and external competencies to address rapidly changing environments" (Helfat et al., 2007). Additionally, Helfat et al. (2007, p. 1) defines a dynamic capability as "The capacity of an organization to purposefully create, extend, or modify its resource base."

The advantages that organizations can receive from their ability to adapt and innovate depends not only on how well their internal processes work, but also on how well these capabilities fit with their overall environment. In simpler terms, the success of dynamic capabilities in helping a company adapt, exploit opportunities and drive change, is influenced by how well they align with the company. (Helfat et al., 2007)

Furthermore, (Helfat et al., 2018) suggests the classification of dynamic capabilities,

into three sorts of functions aimed at strategic change;

”1) sensing new opportunities and threats/innovation and scanning,”(Helfat et al., 2018, p.1393)

”2) Seizing new opportunities through business model design and strategic investments”(Helfat et al., 2018, p.1393)

” 3) transforming or reconfiguring existing business models and strategies” (Helfat et al., 2018, p.1393)

Weritz et al. (2020) identified 6 dynamic capabilities as relevant to support a digital transformation. These were;

(1) Absorptive capacity: ”An important ability to effectively discover and exploit, process, obtain and transform new external and internal knowledge.”(Weritz et al.,2020, p. 6) It affects the digital transformation process by aiding the identification of new market possibilities as well as dangers, in order to leverage them to improve the organizational performance and as a competitive advantage.

(2) Agility and flexibility: ”Organizational agility and flexibility, which is the ability to rapidly respond to customers needs and market changes, be proactive for new business opportunities and market trends as well as implement and adapt changes into business models and processes. ”(Weritz et al., 2020, p. 6) This is the ability to adjust quickly to customer demands and shifts in the market, to be prepared in identifying new business possibilities and market trends, and to incorporate changes into processes and business models. It will enable the company to recognize and capitalize on new possibilities to reach digital maturity.

(3) Cross-functional collaboration: ”The ability to align the work of different business units through cooperation with the goals of understanding different perspectives and tasks, wide knowledge exchange and development of solutions by using new ways of thinking and working.” (Weritz et al., p.6) This contributes to strengthen the bond between departments within the firm, enables new ways of thinking and finally the development of analytical abilities, which all may aid in the digital transformation process.

(4) Innovation capacity: "It is the ability to transform or create new management practises, structures, process, or routines with the goal of discovering new things, trying and implementing them. (Weritz et al., 2020, p.7). Companies that are able to innovate, experiment and take risks are more likely to explore and adopt new technologies while effectively being able to navigate the unpredictable landscape of digitalization. (Weritz et al., 2020)

(5) Market orientation: "The ability to scan the environment and identify new opportunities as well as customer needs. " (Weritz et al., 2020, p. 7) The effect of this capability is that it enhances the overall performance of an organization during the process of digital transformation. This is by being able to respond to customer preferences as well as adapting to changes in customer behaviour. Furthermore, focusing on the customer is essential in achieving digital maturity, as this implies being able to address evolving customer needs. (Weritz et al., 2020)

(6) Relational capability: "The ability to build relationships and share financial, institutional as well as technological resources within an internal and external network." (Weritz et al., 2020. p. 7) In order to remain competitive, it is crucial to have the ability to collaborate and form strong relationships with partners, as not every company possesses all the necessary skills and capabilities on its own. Sharing resources and building strong alliances becomes important in this context. (Weritz et al., 2020)

3.10 Change Management

3.10.1 Kotters 8-Step Change Model

Kotters 8-step change model is a well known model in change management theory. It was defined by Kotter, with the purpose of understanding and managing change in organizations. He gathered experience from consulting and noticed common themes when dealing with change efforts. (Tang, 2019). "His model is aimed at the strategic level of the change management process, and is best interpreted as a "vision" for the change process" (Tang, 2019, p. 146)

Establishing a sense of urgency	Urgency motivates subordinates and generates a sense of realism with respect to change efforts goals. It is also essential to achieve the right chemistry and mix amongst team members, paying close interest to levels of emotional commitment.
Forming a powerful guiding coalition	Forming a powerful guiding coalition is the most concerned in the gathering of the powers that be, senior management and key influences within an organization, encouraging teamwork and unity throughout the process
Creating a vision	The creation of this vision serves as a roadmap for the change effort, developing strategies on how one is to undertake each phase of the change
Communicating the vision	Leader should involve key influencers from as many facets of the change process for their individual buy-in, communicating clearly and thoroughly throughout the process
Empowering other to act on the vision	It involves eliminating change obstacles, anticipating and looking ahead, focusing on the change systems and structures declining change. Risk taking is also encouraged in the form of activities and ideas
Planning for and creating short-term wins	Breaking up the over change initiatives into smaller manageable fragments that can be measured for completion and success. Leaders should be rewarded for their efforts leading to the overall change initiatives
Consolidating improvements and producing still more change	Focus is centered on change systems, policies, procedures that hinder the vision, hiring, promoting and developing subordinates who can implement the vision
Institutionalizing new approaches	Clarifying connections between new behaviors and organizational success. Leadership development and succession is also of significance

Table 7: Kotters 8-step model, sourced from (Tang,2019,p.146)

3.10.2 Lewin's Change Management Model

According to Tang(2019, p. 136) "Lewin's three stages change model denoting the step by step phases of unfreezing, changing and refreezing,using the analogy of changing the shape of a block of ice. This subsequent process of change elaborates the varying outline sequence upon the essential stages of change.

The first step of change is the "Unfreeze" stage. This involves making the necessary preparations in order for the organization to accept that the change is essential. A key element of the unfreezing stage is preparing a persuasive message which illustrates why the existing way of doing things have to change. In other words, the leaders have to create uncertainty that drives the employees and others to be open for change. This could for example be through leaders pointing out factors such as declining sales figures or financial results, to illustrate that a change has to take place. Leaders must create a controlled crisis by encouraging the organization to re-examine its core, which in turn can produce a strong incentive to seek out an alternate path. Without this drive, leaders will fail to obtain the support and participation required to create effective change.(Tang, 2019)

The second step of change is the "Changing" stage. This stage builds off on the uncertainty that was created in the first stage. This is when the remainder of the employees begin to see how to tackle the uncertainty as well as figure out new ways to do things. Additionally, they start to believe and act in a way that supports the new change. In order to be able to get to this stage, it is important to spend time when implementing the change.This will allow the employees to understand how the change will benefit them. Consequently, this will allow the employees to embrace the new direction as well as proactively participate in the change. (Tang, 2019). Tong(2019, p. 139) further states that "Not everyone will fall in line just because the change is necessary and will benefit the organization. This is a common assumption and pitfall that should be avoided."

The third step of change is the "Refreezing" stage. This stage continues where the last stage left of. When the employees have started to embrace the new processes and ways of working, it is time for the organization to "refreeze". This means that

the changes are integrated into day to day processes, to make sure that they are used consistently. Additionally, this aids in the employees feeling comfortable with the new ways of working, which again leads to more stability. Even though change is a continuous in many businesses, the refreezing step is critical. Without a refreezing step, employees can feel trapped in a transition trap, unsure of how things should be done, which further leads to nothing being completed to full capability. (Tang, 2019). Additionally, as part of the refreezing process, leaders must celebrate the success of the change. This allows employees to achieve closure, rewards them for enduring a difficult time, and gives them hope that a future change will be beneficial. (Tang, 2019).

Below is a figure that illustrates Lewin's three stages change model.

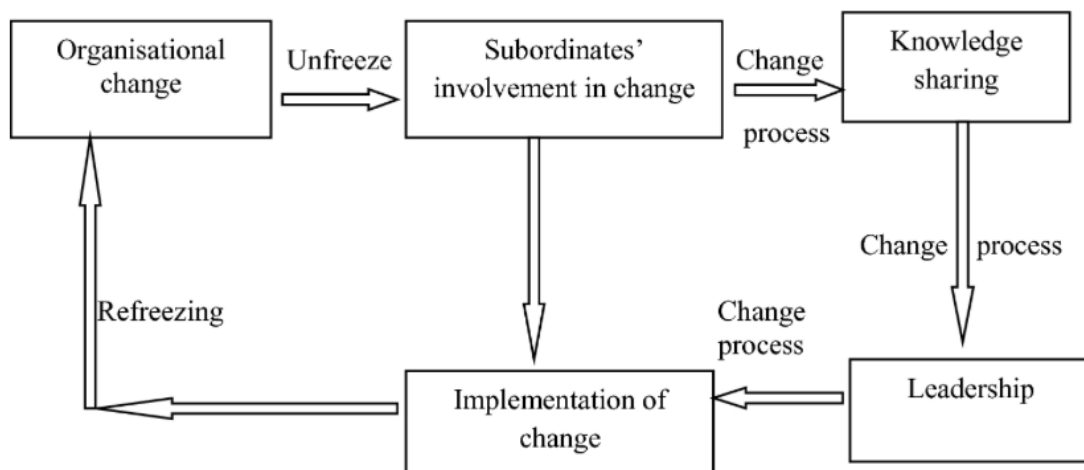


Figure 5: Lewin's three stages change model sourced from , (Tang, 2019)

3.11 Pre Study: Specialization Project: Leading Digital Transformation Through Data Governance

Through the research conducted in my specialization project; "Leading Digital Transformation through Data Governance"(Chelliah, 2022), I studied data governance, what this is, as well as how to use data governance as a tool for a digital transformation, and the potential value it can have for an organization.

3.11.1 Data Governance Definition

According to Chelliah (2022) there are several different definitions of data governance; Zhang et al. (2022) suggests that data governance is the systematic management of data, with the authority to transform information into a strategic asset for the organization by the application of specific procedures, rules, and even values. Furthermore, Khatri and Brown (2010) highlights to important terms related to data governance, which are governance: Who takes the decisions, and what decisions need to be done to make sure of effective management and use of IT. and Management: which is about making and implementing decisions.

To summarize the essence of data governance is organizing and ensuring the quality of available data, and using this to make decisions. Chelliah (2022) further mentions the importance of data quality, and measuring this through qualitative and quantitative indicators.

The following tables are sourced from Dai et al.(2016, p.445) and provides what we mean by qualitative indicators and their definition.

Indicator	Definition
Accuracy	The degree to which data correctly describes the “real world” object or event being described
Completeness	The proportion of stored data against the potential of ‘100 percent complete’
Consistency	Similarly when comparing two or more representations of something against its definition
Timeliness	The degree to which data represents reality at the required point in time.
Validity	Conformity of data’s syntax (format, type, range) to its definition.
Uniqueness	Nothing will be recorded more than once based on how it is identified

Table 8: Qualitative indicators (Dai et al.,2016,p.445)

The table below taken from Dai et al.(2016,p.446) shows comprehensive metrics for data quality.

Indicator	Metric
Accuracy	Percent of data is correct (correct data/total data) (e.g. ZIP code, SSN)
Completeness	Percent of data is completeness data (e.g. phone number, address)
Consistency	Percent of data is correct consistency (Such as business rules and logical rules of consistency)
Timeliness	Percent of data is correct timeliness (For example, ages, educational degree at a special time or date.)
Validity	Percent of data is validity (such as first name, last name, suffix, and etc.)
Uniqueness	Percent of data is uniqueness (e.g. primary keys, foreign keys)

Table 9: Metrics for data quality (Dai et al.,2016,p.446)

Chelliah(2022) mentions the term data governance maturity, and goes on to elaborate what this. By this we mean the level this organization has reached in implementing data governance efforts. In other words, low data governance maturity implies a lack of organized data and a lack of use of data to improve operations and processes. In contrast, high data governance maturity implies well organized data with high data quality and dependability, as well as the active use of data to improve operations and processes.

4 Results of the Literature Review

4.1 Definition and Dimensions of Digital Maturity

Westerman et al. (2012) states that digital maturity is the combination of two distinct but linked factors; “Digital intensity” and “transformation management intensity”. According to Westerman et al. (2012), Investment in technology-enabled initiatives to alter how the business runs is known as digital intensity, whilst transformation management intensity is about creating the necessary leadership capabilities to be able to drive a digital transformation in an organization.

Similarly, Wernicke et al. (2023, p. 1) states that “digital maturity can be seen from a technological perspective and from a managerial perspective”. Furthermore, Wernicke et al. (2023), further goes on to explain that therefore a framework for assessing digital maturity would include whether the organization adopts digital technologies, are able to change existing processes, as well as create new opportunities.” This is similar to what Westerman et al. (2012) suggested. Furthermore, Wernicke et al. (2023) states that if maturity is 1) managed in a systematic manner and 2) the effects on capabilities and performance are monitored, increased maturity would represent the establishment of evaluative processes that create chances for change within operational processes and organizations.

Digital maturity is thus more than just the actual implementation of digital technologies, it is also about the ability to implement and evaluate organizational effects within digital site improvement processes. Therefore digital maturing is an organization’s increasing capability to conduct improvement processes in regards to the digital, in a structured manner while taking technology, organizational structure and environment into account (Wernicke et al. , 2023). Conversely, Perera et al. (2023, p.3) defines digital maturity as « the status of digital transformation, including implemented changes and acquired capabilities”

Goumeh et al. (2021, p.1) states that «Currently, there is no commonly accepted definition for the term “digital transformation””. However, Goumeh et al. (2021) suggests a definition in two parts; “The term “transformation” expresses a funda-

mental change within the organization which impacts strategy, structure and the distribution of power. The digital transformation itself can be seen as a continuous phase of adoption in order to fulfill the digital needs of consumers, staff and partners in a dramatically shifting digital environment.”. Additionally, Goumeh et al. (2021,p.1) suggests a definition of “digital” which can be broken down into three areas:

- ” 1. Creating value at the new frontiers of the business world
2. optimizing the processes that directly affect the customer experience.
3. building foundational capabilities that support the entire overall business initiative” (Goumeh et al. , 2021, p.1).

An additional suggestion was “that digital transformation is an evolutionary process that leverages digital capabilities and technologies to enable business models, operational processes and customer experiences”(Goumeh et al. , 2021, p.2).

Pramanik et al. (2019, p.323) conducted a study with the goal of understanding “the nature of demand for digital transformation”. Pramanik et al. (2019) suggests several definitions of digital transformation: “The use of technology to radically improve performance or reach of enterprises” (Pramanik et al., 2019, p. 325), “transformation as the ultimate level of digital literacy that is achieved when the digital usages which have been developed enable innovation and creativity and stimulate significant change within the professional or knowledge domain” (Pramanik et al., 2019, p.325) Pramanik et al. (2019, p. 325) further suggests that “digital transformation initiatives have commonalities, divided primarily into four different dimensions: use of technologies, transform value creation, change structures and focus on financials”

The terms digital maturity and digital transformation are often used interchangeably, and even though they are closely related there is a differentiation between them, according to Goumeh et al. (2021); “Digital maturity” refers to what stage of a digital transformation the organization has reached. Furthermore it also describes what a business has already done to make the changes and keep up with the technological innovations. Therefore it is not only about technology, but also

about how the company has transformed its products, services, skills, culture and ability to handle the change. In other words, it is about how well the organization has adapted. (Goumeh et al. , 2021)

4.2 Transitioning to Digital Maturity

According to Goumeh et al. (2021, p.1), digital transformation has a broad impact on various aspects of an organization. Therefore, to effectively plan and execute a transition, it is essential to include several shareholders. Additionally these stakeholders should have a shared understanding of the areas that need to be addressed, in order to prioritize digital transformation initiatives. Furthermore managers play a crucial role in assessing the current state of their organizations digital transformation and further identifying the steps that need to be taken for their transformation roadmap. Therefore it is important that they develop a digital strategy plan that aligns with the digital transformation. (Goumeh et al. , 2021)

According to Westerman et al. (2012), to encourage continuous digital transformation, organizations need a both strong leadership in combination with creative ideas from employees at all levels. However, in many organizations these things can be slow or too careful, which hinders them from investing in new and innovative ideas (Westerman et al. , 2012)

Additionally, Westerrman et al. (2012) has identified what they find to be common patterns for how companies have built their digital maturity. Strong transformation management capabilities are a common factor for these.

The first practice that Westerman et al. (2012) states as important is “Transformative vision”. According to Westerman et al. (2012, p.12) “A strong vision helps to frame in people’s minds a picture of how the company will be different in the future. It also helps people understand what former assumptions may no longer be valid”. An example of this is from the French Yellow pages, who had to re-envision their business, as their traditional print model kept losing to digital competitors such as google. The CEO was able to highlight to the employees that they were not in the business of producing heavy yellow books, but rather in the business of connecting

business to local customers. “Books were just a technology that could be replaced by websites or location-aware smartphone apps” (Westerman et al. , 2012, p.12)

The second practice Westerman et al. (2012) states as important is “Digital Governance” “Effective investment rules and coordination mechanisms improve efficiency and ensure digital efforts are moving in the right direction” (Westerman et al. , 2012, p. 12) In other words, this means to establish a set of clear rules, policies and processes to help guide the initiatives. According to (Concentrix.com, 2023), “Digital governance is a framework for establishing accountability, roles, decision-making, and change management authority for an organizations digital presence” As a result it ensures that digital initiatives align with the organizations overall goals and priorities.

The third practice is engagement. Employees that share a common vision can help to make that goal a reality. As a result they could be less resistant to change as well as contribute to uncover previously unseen opportunities. In other words, the employees become more of a resource than a barrier. (Westerman et al. , 2012)

The fourth practice is IT-business relationships: In a digital transformation its essential to rethink large aspects of the business, and here IT is a crucial tool in doing so. In certain businesses it could be the CIO who is well suited to lead digital initiatives. However, in other businesses, the digital agenda may be driven by the business side or through collaborative efforts between IT and business teams. This may vary depending on the organization and its circumstances. (Westerman et al. , 2012)

According to Kane et al .(2017), there are five essential practices of enterprises that are evolving into more digitally mature organizations.

Firstly Kane et al. (2017) suggests that making fundamental changes to how organizations develop and organize the employees, encourage innovation in the workplace, as well as promote digitally focused cultures and experiences. This is very similar to what Westerman et al. (2012) proposes as ”Digital governance”. Moreover, as exemplified by Kane et al. (2017, p. 3)”More than 70 percent of respondents from digitally maturing companies say their organizations are increasingly organized

around cross-functional teams versus only 28percent of companies at early stages of digital development” . This is similar to what Westerman et al. (2017) stated about engagement.

Secondly Kane et al. (2017) highlights planning ahead, which means having digital strategies that simultaneously focus on business capabilities as well as technology. As a result one is able to link the digital strategies to the companies core business, additionally by focusing on project flexibility and organizational change, one can enable companies to be able to adjust to rapidly changing digital environments. (Kane et al., 2017)

Thirdly, Kane et al. (2017) proposes taking small steps. A typical characteristic in more digital mature organizations is that they are more likely to invest resources in smaller experiments or project which later turn out to become larger innovations. This is something that is not as often seen in less digitally mature organizations according to Kane et al. (2017). Additionally, Kane et al. (2017) states that more digitally mature firms also are much better at keeping these smaller projects from stagnating, in the face of more urgent investment requirements.

Next, Kane et al. (2017) mentions the importance of becoming talent magnets: It is important that organizations facilitate for their employees to be able to develop digital skills. Kane et al.(2017) states that this makes it less likely that employees changes jobs: As exemplified by Kane et al.(2017,p.4) who states that “Vice president-level executives without sufficient digital opportunities are 15 times more likely to want to leave within a year than those with satisfying digital challenges”. It follows that firms with a higher level of digital maturity, sees the need and value of using resources to develop digital talents. Often they usually do more than just traditional training, but create appealing workplaces in which people desire to stay in order to achieve their professional goals while gaining digital skills and experience. (Kane et al., 2017)

Finally Kane et al. (2017) highlights the importance of leadership. As another typical characteristic for more digitally mature organizations is that they have leaders who have the vision required to lead a digital strategy and are prepared to com-

mit resources to be able to achieve that objective. Furthermore, these leaders are more likely to have established a compelling vision for what their digital enterprises can be and to see digital activities as critical to accomplishing their business goals. Additionally, when compared to their less digitally mature counterparts, a higher percentage of digitally progressing organizations aim to expand their digital investments, thereby widening an already considerable gap in the level of digital success. (Kane et al.,2017)

Furthermore, Perera et al. (2023) highlights the existence of pilot projects, which are small digital investments that later can be integrated in to existing processes. This is exemplified by Perera et al. (2023, p 8) “Digitalization initiatives are integrated into businesses based on learning from pilot projects and efforts to expand employee digital skills are in place. Here Perera et al. (2012) also highlights another characteristic: efforts to expand digital skills of the employees.

Furthermore Perera et al. (2023) additionally highlights the importance of leaders seeing the necessity of a digital vision, as this is essential to business success. When there exists a broad digital vision which is backed up by the leaders, who believe in the importance of digital transformation. This leads to the other parts of the organization coming ahead with more digital initiatives. (Perera et al., 2023)

Pinto et al. (2023) suggests that “a company must develop capabilities related to five dimensions to achieve digital maturity, and thus competitive advantages; such as strategy, market, operation, culture and technology.”

Pinto et al. (2023) conducted a study on digital maturity in retail companies. Moreover, they proposed a roadmap that provides a path to digital maturity for retail companies. Firstly, Pinto et al. (2023) emphasized the significance of a digital culture as well as the availability of technological resources as the true foundation for a digital transformation. Accordingly, Pinto et al. (2023) explains the importance of a change-oriented culture, as this often implies a willingness to learn, develop ideas, endure failures and experiment. Furthermore, Pinto et al. (2023) highlights technological capabilities as necessary to design solutions that support digital businesses. This is exemplified by “To achieve digital maturity, firms must rely on and develop

digital assets, such as social media, mobile devices, analytics, cloud computing, and internet of things. (Pinto et al., 2023, p.8)

Secondly, Pinto et al. (2023,p.8) states that “ The next step on the roadmap is the development of a digital strategy”. In particular because a digital strategy leads managers through a digital transformation, producing results through the use of digital technologies. Additionally, Pinto et al.(2023)’s findings exemplify that mature firms have a clear and consistent digital strategy. This, together with technology, a clear vision and a defined digital plan are essential for a digital transformation. Therefore Pinto et al. (2023) concludes with the fact that creating a digital strategy that matches with company plans is a key success element in digital transformation.

Lastly Pinto et al.(2023) adds that in their study, some digital maturity dimensions such as leadership, people and governance did not show significant relevance, however Pinto et al.(2023, p.8) states that “This does not suggest that these dimensions are unimportant, but they are juxtaposed with other dimensions in the research model.” Pinto et al.(2023, p.9) states that “Digital transformation requires an agile and flexible culture that accepts change naturally, which suggests not working with such standardizations” Additionally they state that “Other Digital transformation maturity models require changes to an organizations business model and are not characterized as merely technological resources” (Pinto et al., 2023, p.9)

4.3 Drivers for Digital Transformation

Vial(2017, p. 122) states that “Digital technologies are inherently disruptive”. According to the oxford dictionary, disruptive is defined as “causing problems, noise, etc. so that something cannot continue normally”. Furthermore Vial (2017, p.122) suggests a differentiation of three types of disruption ; “consumer behavior and expectation, competitive landscape, and the availability of data”. Consumers today have extensive access to new information and trends, and are therefore influenced significantly by digital technologies. As a result the consumers no longer feel that the service that is provided to them is enough as their expectations increase in tact with the digital developments. Therefore in order to keep the customer, the organization has to be able to provide the services as the customer expect. (Vial, 2017).

Moreover, digital technologies create disruption for organizations in the market. This means that digital technologies enables it to be easier to combining different services and products to create a completely new way of offering the same service. Thereby redefining existing markets, according to Vial (2017). To illustrate, Vial et al. (2017) mentions the music industry as an example. Previously it was common to buy physical cds to be able to listen to music, however this way of listening to music was then replaced by music subscription services such as spotify. As a result, the cd industry was pushed out of the market by these new firms who had provided a new way of enjoying music (Vial, 2017)

Additionally digital technologies also promote data generation. This leaves firms with large amounts of data that they attempt to utilize for their own profit. This could be through for example using data analytics to aid in decision making for their customers, in order to gain a competitive edge. (Vial, 2017)

In their research of digital transformation of banks and financial institutions, Pramanik et al.(2019) states that banks rely heavily on emerging digital technologies as they use both information and financial technologies. Furthermore these financial institutions are subject to regulations, which have consistently required them to change in order to meet compliance standards. Thus implying laws and regulations as both a driver and a barrier for digital transformation.

Furthermore findings from Pramanik et al. (2019) suggested three external drivers influencing digital technology adoption; these were customer demand, technology proliferation and risk. Similarly to Vial (2017), Pramanik et al. (2019) states that customers expect a certain level of digitalization. Furthermore, there are significant risks of not adopting digital technologies. According to Pramanik et al. (2019) if banks are unable to effectively utilize digital technologies, it can result in a decline in their market share. Additionally, customers may opt for providers that offer better digital solutions. As a result, leading to a loss of competitive advantage. Therefore, it is crucial for banks to adapt and leverage digital technologies to meet customer expectations and remain competitive, as the failure to do so can have a significant consequence for their overall success. (Pramanik et al., 2019). This is reasoning that is applicable to all organizations.

4.4 Barriers for Digital Transformation

Pramanik et al. (2019) suggests that having a digital business strategy is essential for the adoption of technology. However, a digital business strategy is a critical transformational challenge for leaders to address. This is a result of the fact that transformation involves more than just adopting new technologies. Additionally, It also requires the organization to envision new possibilities as well explore new ways to extend, interact, combine and integrate existing businesses with digital technologies. Shahi and Sinha (2020) conducted a study where one of the research questions were “What are the challenges that a traditional organization faces to transform digitally?”. Firstly, Shahi and Sinha (2020) mentions “Lack of vision” as a major challenge for a digital transformation. “In total 17 out of 20 participants feel that the lack of clear strategy, objective or vision is the major challenge”. This is also something both Westerman et al. (2012) and Kane et al. (2017), highlights as important thereby signifying the challenge when there is a lack of. Furthermore, another challenge that Shahi and Sinha (2020) found to be significant was regarding the culture of the organization. They found that resistance to change was the main barrier in regards to the culture. This is a barrier that also is exemplified by Pinto et al. (2023), as they also state the importance of a change oriented cul-

ture in order to succeed with a digital transformation. Furthermore, Vial (2017, p. 129) states that “inertia and resistance can hinder the unfolding of an organizations digital transformation”. To illustrate inertia, Vial (2017, p.129) exemplifies that “incumbent firms are deeply embedded in existing relationships with customers and suppliers, have well-established production processes that are highly optimized but often rigid and rely on resources that cannot easily be reconfigured.”. This example illustrates that is it the structural components of the organization, such as production processes or culture, that so rooted in the everyday lives which makes digital transformation difficult. (Vial, 2017). Additionally, when talking about resistance, Vial (2017) refers to the resistance among employees which can arise. Moreover, Vial (2017) argues that “resistance is a product of inertia rooted in everyday work that cannot be addressed by simply altering the behavior of employees. Rather, it requires that processes be altered to enable flexibility in the face of change.” (Vial, 2017, p. 130)

Moreover lack of technical abilities was mentioned by Shahi and Sinha (2020). Employees with digital abilities are crucial as this contributes to the factors adaptability, innovation and creativity, collaboration and communication, data literacy as well as agility just to mention a few. Additionally, this also is closely linked to another barrier; complexity of technology.

Another barrier mentioned by Shahi and Sinha (2020) was “Lack of collaborative efforts from all functions of the organization”. In other words this meant little to no sharing of information across different departments. As a result the information often became redundant or repetitive. Additionally another significant barrier that also contributed to redundant data was the lack of data management strategy (Shahi and Sinha,2020). Therefore it made the data unorganized and much harder to utilize in decision making.

4.5 Benefits

Pramanik et al. (2019) states that the disruption of the traditional market from all of the new technologies make it imperative for traditional businesses to keep up with the possibilities of digital technology. Furthermore, there can be found many motives behind the reasoning for large corporations utilizing digital technologies, such as; meeting the expectation of stakeholder, especially compliances, simplifying procedures, earning benefits, innovation, preparing for risks and competition, and developing new business models are just a few examples of drivers according to Pramanik et al.(2019)

4.6 Stages of Digital Maturity

This section covers different digital maturity models in the literature and some well known models in the industry. It will summarize what different authors highlights as characteristic for low, transitional, and mature stages of digital maturity, as well as show some models.

4.6.1 Early Stages:

Perera et al. (2023, p. 4) states that “The early stage of digital maturity comprises of basic parts of modern life that represent foundations of the digitalisation process including online services, collection and distribution of information online through the use of websites, emails, e-commerce platforms and social networks” Perera et al. (2023) further elaborates that corporations at this stage navigate around an immature digital culture that is often characterized by no digital awareness, to a very sparse understanding of how digital technology might impact the business. Additionally, there is often no signs of a digital strategy. (Perera et al., 2023)

4.6.2 Transitional Stages

Findings from Perera et al. (2023) shows evidence of greater use of technology in the transition stages. Such as through the use of Internet of Things, as well as process automation and cloud computing. Additionally, at this stage, operational processes have reached a level where information and decisions are easily accessible and clear. As a result, this often leads to the implementation of comprehensive expert systems, which are advanced computer systems that can mimic the knowledge of experts in a field. Furthermore, there exists more of a digital strategy in the organization and the leaders have realized the value of digital transformation for business success. (Perera et al., 2023)

4.6.3 Mature Stages

Perera et al. (2023) highlights that the mature stages of digitalization often are characterized by analytics through technologies such as machine learning, artificial intelligence, neural networks and deep learning, as well as large data bases. Additionally the use of technologies to design new business models to adapt to digital change, strategically. Furthermore, similarly to the transition stages, the mature stages also carry the importance of the leaders seeing the necessity of a digital vision. This together with a strong culture for innovation contributes to generate business values in measurable ways. (Perera et al., 2023)

Finally, Pinto et al. (2023), suggests that a characteristic of a final maturity stage is that the businesses tend to build market and operational competencies. Furthermore, they also form collaborative relationships, in order to be able to rapidly respond to changing client needs. Additionally, Pinto et al. (2023) found that companies that offer new value creation options to their customers are at a greater level of digital maturity.

4.7 Evaluating Digital Maturity Models

In 2018, Deloitte released their Digital Maturity model as a "tool to enable digital transformation". (Anderson and Ellerby, 2018,p. 9) stated that "One of the things holding the communications industry back from broader process in digital transformation is the lack of a clear, industry-oriented roadmap. The Digital Maturity Model is an effective tool to provide guidelines for a clear path throughout the transformation journey." It was developed in collaborations with the TM forum. This model began by defining five dimensions in a business, as a result there managed to create a holistic view of digital maturity. These five dimensions; customer, strategy, technology, operations and, organization culture, were later divided into 28 subdimensions as shown in the figure below.

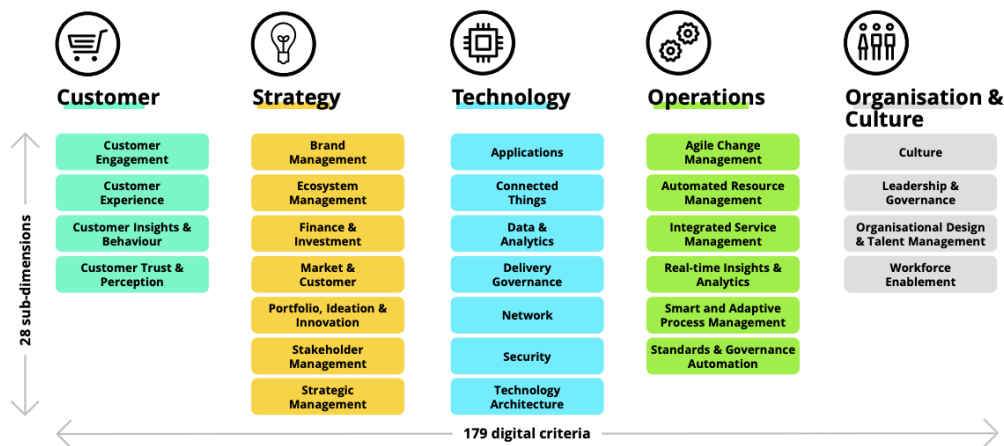


Figure 6: The five dimensions in the digital maturity model and their subdimensions (Anderson and Ellerby, 2018, p.11)

The five dimensions can be explained as following:

1. Customer: The essence is that they wish to build loyalty with the customer so that they perceive the organization as their trusted digital partner. Additionally they wish to make communication easy. By doing so they will enable customers to have more control of their future, by providing the resources necessary to navigate and shape their digital journey.(Anderson and Ellerby, 2018).
2. Strategy: Focuses on the transformation a business has to go through in order to achieve its competitive advantage, from a digital initiative. Additionally, that it

has to be integrated into the entire business strategy (Anderson and Ellerby, 2018).

3. Technology: This dimension supports the achievement of the digital strategy by analyzing a businesses digital infrastructure, which includes helping to process, create, store, exchange and secure data. It examines if the business has the right technology in place to support digital initiatives (Anderson and Ellerby, 2018).

4. Operations : This dimension focuses on the evolution and execution of tasks and processes through the use of digital technology to drive strategic management and improve corporate efficiency and effectiveness (Anderson and Ellerby, 2018).

5. Organisation Culture: This dimension focuses on defining and creating a culture within the organization that supports progress in digital maturity, this includes governance and other digital ability increasing processes, as well as having the flexibility to grow and innovate. (Anderson and Ellerby, 2018).

This model is based off 28 sub-dimensions that again was parted into 179 criteria to assess digital maturity. The tool is then used to measure their digital maturity through three phases; Imagine, deliver and run. These phases could remind of Lewins three stage model mentioned in the theory chapter. The imagine phase is about doing an assessment on the current situation in regards to digital maturity, and from then set goals and define a strategy to reach those goals. Secondly, the deliver phase is about starting the digital transformation process and implementing the plans made in the first phase. Additionally, this phase simultaneously assesses how these initiatives are working to make sure that everything is running smoothly. Third and lastly is the Run phase, this is when you monitor the implementation, after it has been fully implemented. Furthermore in this phase, it is important to continuously evaluate how the product is working for the customers as well as assist them when necessary. To summarize, this phase is about continuous operation, monitoring and improving your implementation (Anderson and Ellerby, 2018).

Secondly, in 2016 Forrester released their report called "The Digital Maturity Model 4.0", written by Martin Gill and Shar VanBoskirk. They stated that "Forrester's digital business maturity model 4.0 allows you to plot your organizational maturity, offers comparative benchmarks, and helps guide your actions to elevate your digital

capabilities” (Gill and VanBoskirk, 2016, p.1). Furthermore, Gill and VanBoskirk (2016, p.2) states that ”The model accommodates three scenarios; overall digital transformation, digital marketing focused and digital business focused”

1. Overall digital transformation: This means evaluating core parts of an organizations total digital transformation, ”such as executive support for digital strategy, digital staff resourcing, how success is measured, and business functions/IT relationship effectiveness.” (Gill and VanBoskirk, 2016, p.2)

2. Digital marketing focused: In other words, the model examines attributes specific to a company’s digital marketing, such as the extent to which digital helps brand strategy. (Gill and VanBoskirk, 2016)

3. Digital business focused: It also assesses how the digital aids sales and service interactions, ”including touchpoint integration and technology sophistication” (Gill and VanBoskirk, 2016, p. 2)

Similarly to Deloittes digital maturity model, Forresters digital maturity model also measures the organizations digital maturity in dimensions. While Deloitte has five dimensions, forresters focuses on four dimensions, namely: Culture, technology, organization and insights.

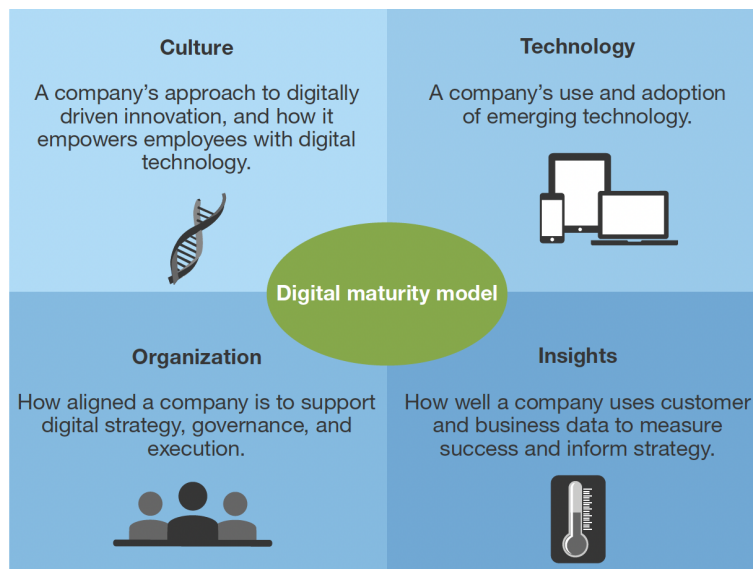
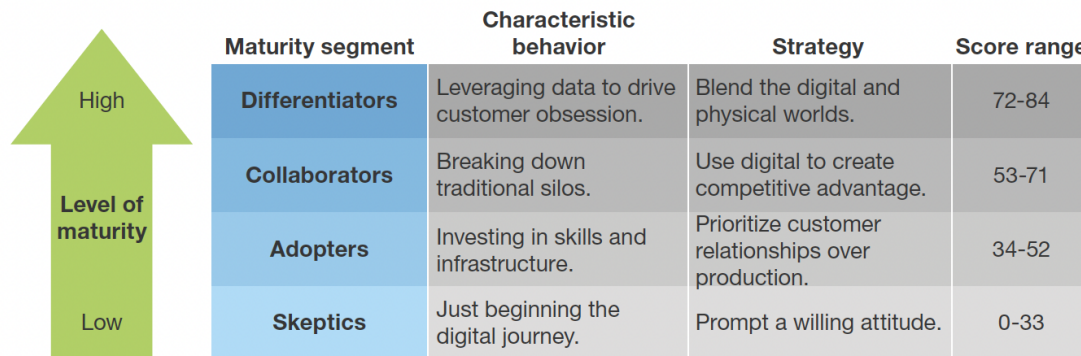


Figure 7: Four dimensions determine digital maturity in forresters mode (Gill and VanBoskirk, 2016, p.3)

Furthermore, this model differentiates the level of maturity into four levels; skeptics, adopters, collaborators and lastly differentiators. The figure below illustrates the levels.



	Maturity segment	Characteristic behavior	Strategy	Score range
High	Differentiators	Leveraging data to drive customer obsession.	Blend the digital and physical worlds.	72-84
	Collaborators	Breaking down traditional silos.	Use digital to create competitive advantage.	53-71
	Adopters	Investing in skills and infrastructure.	Prioritize customer relationships over production.	34-52
Low	Skeptics	Just beginning the digital journey.	Prompt a willing attitude.	0-33

Figure 8: Forrester's four levels of digital maturity (Gill and VanBoskirk, 2016, p.5)

Gill and VanBorkirk (2016) argues that determining which one of these four levels you belong can aid in deciding how to focus your digital strategy. As illustrated the figure has four columns in total; "Maturity segment" which is the different levels of maturity. Secondly we have "Characteristic behavior" which indicates typical behaviour for each maturity level. Next we have the "strategy" column, which explains what type of strategy the corresponding maturity level uses in order to reach that level. Lastly we have the score range column, which indicates the score that one has received through their own review with a set of statements and questions.

The purpose of this figure is to visualize what typical behaviours and strategies are needed in order to achieve the desired level of maturity. As an example, to belong to the highest level of digital maturity according to this figure; "Differentiators", the strategy has to be through "Blending the digital and physical worlds", as a result a typical behavior is "Leveraging data to drive customer obsession". (Gill and VanBorkirk, 2016)

Each of the four digital maturity levels can be explained as so, in increasing order:

1. **Skeptics:** Skeptics are the firms with the lowest level of digital maturity. They often don't prioritize digital technologies and have little to none experience with innovation and having a strategy for implementing digital technology. They can

also be in the very beginning of their digital journey. (Gill and VanBorkirk, 2016). Furthermore, to aid their organization in adopting a more technology positive culture as well as recognize the stakes that comes from digital disruption, Gill and Vanborkirk (2016) suggests that they should do the following: Firstly, they should start couple of pilot projects to acquaint executives with its possibilities. This is similar to both Westerman et al. (2012) and Perera et al. (2023) who all mentioned the importance of the existence of pilot projects. Gill and Vanborkirk (2016, p. 7) argue for this by stating that "Skeptics don't prioritize digital today, so they fall short on the fundamentals needed to satisfy empowered customers". Therefore, in a company that is so hesitant to embrace the digital, revamping all of these flaws on a large scale is unrealistic. Thus making it more important to trial in small steps, thereby gradually making management and organizations more and more aware of the value that exists in the digital, thereby creating new habits. Additionally (Gill and Vanborkirk, 2016, p.7) states that "As executives gain familiarity with digital, case-builders should show them the financial opportunity digital can yield (and the risks associated with ignoring digital disruption)". (Gill and Vanborkirk, 2016).

Secondly, they should integrate and unify digital resources. A key reason to why the skeptics struggle with having a clear strategy is a result of their decentralized organizational structure. Meaning that they have a structure with many separated teams who all make their decisions independently of one another. However Gill and Vanborkirk (2016, p.7) states that " Supporting digital with a centralized team doesn't guarantee digital maturity". Nonetheless, for the skeptic organizations, it can contribute to reduce redundancies. Additionally this offers and contributes to the digital efforts gaining more corporate visibility than what is possible through individual efforts. (Gill and Vanborkirk, 2016)

Lastly, they should focus on recruiting employees with digital abilities. The findings conducted by Gill and Vanborkirk (2016) demonstrated that the organizations who found themselves in the skeptic level had a much lesser percentage of employees with strong digital abilities, compared to their more mature counterparts. Furthermore, Gill and Vanborkirk (2016) suggests that skeptics are wasting resources by hiring the wrong people and by hiring people with market knowledge, in favor of people

with strong digital abilities, which is essential for digital maturity.

2. Adopters: This level have more digital abilities that the skeptics. Additionally they are more willing to invest in digital technologies to enhance their work. However, Gill and Vanborkirk (2016) states that adopters are typically organizations who prioritize production over customer relationships. Therefore they should: Firstly, Gill and Vanborkirk (2016) highlights the importance of using marketing to develop a strategy to create customers, over using marketing to implement programs and processes. Furthermore their study revealed that adopters had the "second smallest marketing technology and software budgets in the study" (Gill and Vanborkirk, 2016, p. 8), and adds that using marketing strategically is typical for more digitally mature organizations. (Gill and Vanborkirk, 2016)

Secondly, it is important to limit outsourcing of digital problems and rather try to develop those digital skills needed inside the company. Gill and Vanborkirk (2016) further states that while outsourcing these type of tasks may aid in speeding the digitalization process, it limits the learning that adopters need in order to continuously improve themselves and increase their digital maturity. (Gill and Vanborkirk, 2016)

Thirdly, it is essential to have processes for managing consumer privacy and data security. Furthermore, aside from reducing legislative risks, improved data management makes it easier to leverage consumer insights to monitor results, which is what is observed missing within adopters. (Gill and Vanborkirk, 2016)

3. Collaborators. Firms in collaborators are substantially more likely to interact internally and externally to facilitate practice and innovation with digital. Additionally they can report on the firms strong coordination and constant communication between departments. (Gill and Vanborkirk, 2016) to further evolve to the next level they should:

Firstly, they should become better at combining two different types of skills: logical and analytical skills with creative skills. Collaborators are usually better at tasks that require accuracy and working with data, rather than tasks that involve creativity. However the differentiators are particularly good at blending both cre-

ative thinking and analytical skills, and excel in coming up with creative strategies and effectively using analytics to achieve their goals.(Gill and Vanborkirk, 2016) Secondly, Gill and Vanborkirk (2016) highlights aligning skills and technology with the customer experience is essential to be able to create a unified digital experience. Gill and Vanborkirk (2016, p. 9) exemplifies this: "Burberry relies on marketing and IT to co-create internally- and externally-focused solutions. Specifically it assigns a business and a technology lead to work a pair to manage each of Burberry's functional areas, like stores or supply chains".

Thirdly, it is important to utilize data through customer feedback to map the next step. (Gill and Vanborkirk, 2016)

The last level of digital maturity is the differentiators. Gill and Vanborkirk (2016) states that these are the businesses that stand out from their competitors, and experience the most significant revenue growth. They are much more skilled in functions such as project management and customer insights. For these organizations, the next step is to completely remove the gap between the digital and physical world. Thus merging their business and IT functions into unified teams with shared objectives(Gill and Vanborkirk, 2016). "For example, The Daily Beast includes digital marketing, content creation, customer experience, and digital technology on a single digital team. Its design lead an chief technology officer are both executive positions that report to the chief digital officer" (Gill and Vanborkirk, 2016, p. 10)

Westerman et al.(2012) proposes the following figure to define four levels of digital maturity. It has been done by combining two dimensions; digital intensity and transformation management intensity in varying levels. :

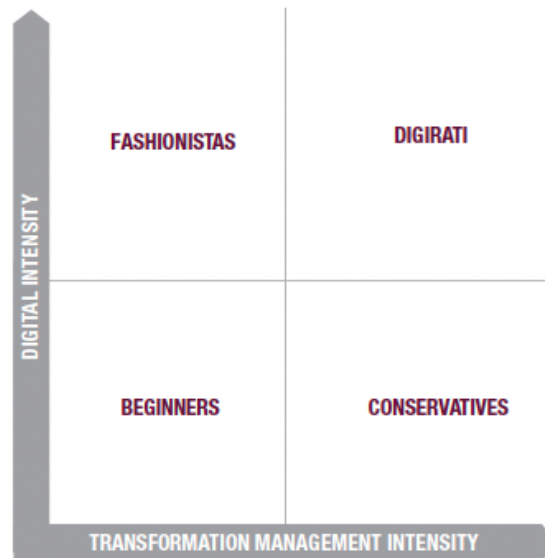


Figure 9: Four types of digital maturity (Westerman et al., 2012, p.4)

As exemplified by the figure, on the y- axis we have the digital intensity, and on the x- axis the transformation management intensity. Additionally, the figure is divided into four quadrants, which each represent different types of digital maturity with varying degrees of digital intensity and transformation management intensity. Companies in the lower left are called Beginners. Characteristic for these businesses are that they make little use of advanced digital capabilities. This is often a result of them being unaware of the opportunities, or missing an effective transformation plan in place for their smaller investments. (Westerman et al., 2012)

The quadrant in the top left is the Fashionistas. Characteristic for these companies is that they invest in the latest digital technology, however they are missing a transformation plan to be able to maximize their investments. In other words, the overall organization may struggle to effectively manage their digital transformation even though certain parts of the company are more advanced in their digital initiatives. (Westerman et al., 2012)

The quadrant on the bottom right of the figure are the Conservatives. This is in other words, the opposite of the Fashionistas. They understand the need for an transformation plan as well as governance and corporate culture to manage their investments. However, In contrast to the fashionistas they are often skeptical to new technologies, which unfortunately leads to them often missing out on opportunities

that their competitors would go for. (Westerman et al., 2012)

Lastly, the firms who find themselves in the top right quadrant are Digirati. These are the firms who can understand and balance investing in new technology and simultaneously be able to set a thorough transformation plan. Additionally, they are good at engaging a digital culture, which in the end can contribute to advancing their digital competitive advantage. (Westerman et al., 2012)

The figure below is supposed to summarize what the different authors have highlighted as important throughout the literature review.

	Westerman et al (2012)	Wernicke et al (2023)	Perera et al (2023)	Goumeh et al (2021)	Pramanik et al (2019)	Kane et al (2017)	Pinto et al (2023)	Vial (2017)	Shahi and Sinha (2020)	Anderson and Ellerby (2018)	Gill and VanBoskirk (2016)
Inclusion of shareholders				x							
Digital strategy plan and vision				x		x	x			x	x
Strong leadership	x		x			x					
Creativity and leadership	x										x
Digital governance: Clear communication	x					x				x	x
Digital governance: Stakeholder inclusion						x				x	x
Digital governance: Setting standards and establishing accountability and roles						x				x	x
Digital governance: Training and support						x				x	x
Digital governance: Continuous improvement						x				x	x
Collaboration between IT and business	x					x					x
Flexibility and change oriented culture			x		x	x	x	x		x	
Smaller investments			x			x					x

Figure 10: Summary of success criterias for digital maturity in the literature, own production

5 Results of Interviews

5.1 The Interview Objects

The interview objects all had varying roles and came from different companies. The roles varied from upper management, such as COO and technological leads, to the roles who work more hands on such as engineers, project managers and software developers. This resulted in a nuanced view on several of the questions, and highlighted different aspects. Even though the roles varied, it was interesting to see that the answers somewhat correlated to one another, which further signifies the importance of the points that were brought up.

5.2 Digital Investments

The interview objects were asked about how much and how they invest in digital technology, to map the importance of having the newest digital technology. Every single interview object believed that their company invested a significant amount of resources into their digital technology. Several also claimed that they would be out of business if one would take the technology out of the company. However, few of the interview objects knew exactly how much money they invested. However, [5] exemplified their investment in digital technology by explaining how easy it is for them to work from home. "As an example, when covid arrived and we had 2 days to close the office, I was able to simply bring my laptop with me and sit down anywhere. This is because we were prepared. In other companies and other countries, they had not done the necessary configurations, and needed to use alot of resources to install and configure so that they could work from home". This illustrates that this company had invested such a significant amount of resources in the digital, compared to their peers in other countries and branches.

5.3 Value Creation - What Value Does The Interview Objects See?

When asked about what value they see in digitalization and how technology can contribute to value creation, all the interview objects agreed that technology could contribute to value creation in several ways. A point that often was brought up was automization, and therefore also making certain repeating processes more efficient. Additionally, making information and data more visible and organized was also a factor that was highlighted by all the interview objects. Moreover, [4] explained that it aids them in completing more tasks in lesser time. Additionally [5] stated that technology made it easier to work from home, especially after corona. [5] further elaborates that after the pandemic, many became accustomed to the hybrid model of working. Then went to further argue that in order to keep the hybrid model, the work tasks need to be digitized and there has to be security measures in place. [1] added that digitalization adds value by simply making peoples life easier. [6] also stated that the most important value created was through simplifying a process, and thereby making information and data more available, thus making processes more effective.

5.4 Digital Abilities

In the literature, an important factor for digital maturity was how much resources the company invests in evolving their employees digital abilities. It was therefore wished to inspect how this was practiced in various Norwegian companies. Out of interview objects, all of them agreed that their company offered some kind of training or courses to increase their digital abilities. This could be in the form of workshops, certifications and more. However, [1], [3] and [6] also mentioned that it was more up to themselves as to how much time they wished to invest in evolving their digital abilities. [1] exemplified this by explaining how as a consultant in their company, they are typically placed at their customer 37,5 hours a week (a norwegian work week in hours). This automatically insinuates that training has to happen outside their working hours. However, he also added that it was voluntary if

the employees wanted to for example do a certification, the company did not require anything from them as such. Therefore, evolving the employees digital abilities was mostly decided by themselves, and they were responsible for their own learning. The company just provides the tools.

5.5 Ambitions

When asked what their future ambitions for what they wanted to achieve in regards to digitalization, the answers varied. [1] answered that it depended on their customers, but that it usually was one out of three outcomes; 1. Going from a manual process to a digital process. 2. An already existing digital process, which needs to be improved and modernised to fit the needs of today. 3. A complete innovation; when you typically identify a new need/requirement that has never existed in the company before. The solution to this new problem is often through digitalization, and then typically one would use new technologies to try and solve it in a efficient and smart way. [5] on the other hand, had a goal of automatizing their systems more by streamlining their data. [5] mentioned that their issue was that they had many systems who did not communicate with each other, and as a consequence they would often have to insert the same information several times. Moreover [4] mentioned that aiding organizations in becoming more sustainable was very important for them, additionally they wish to increase their customers accessibility, this including easier access to their data and services, as well as the ability to do their work from anywhere. [6] stated that they wished to make information more readily available for their customers.

5.6 Measuring Development

Several of the interview objects mentioned that it was important to measure the development of a digital transformation. An indicator mentioned by [4] and [1] is adoption, in other words: how well an implementation is used. [4] mentioned that a useful tool for measuring adoption is called gamification. [4] defined this as adding gamelike functionality, such as achieving points or keeping score of how much a

tool or technology is being used, internally in a company. The data could then be analysed on an internal basis or as a team. The effect of this is that there occurs a sense of an internal game in the company, and in order to "beat" the others, you need to use the tools. Other ways of measuring adoption and engagement are cost reductions, and improved customer satisfaction. [2] mentioned the same indicators, and also elaborated that one way of quantifying the development could be by looking customer complaints and if there has been a reduction. [5] however, stood out from the other interview objects in that they usually did not measure development in a quantified way. Nonetheless, the most import aspect for them was customer satisfaction, and to assess if a process has become more efficient or not. Their way of doing so was simply through feedback. [3] (the engineer) stated that he was not sure how they measured the development, but added that they often noticed there being need for some kind of adjustment in their customers processes before they saw close to a 100 percent satisfaction. Moreover, another possible way for them to see development was if the customer asked for even more configuration. [6] (The developer/consultant) had a very quantified way of measuring a process; through completing the tasks in the backlog. A backlog is a list of tasks which should be fulfilled to achieve a sub goal in software development.

5.7 Digital Transformation Barriers

Firstly, there lies a huge challenge in mapping different processes, and then streamlining them to eliminate redundancy, or in other words lack of governance policies. [5] A consequence of this is not being able to analyze and utilize the data. Additionally, when leaders do not have a thorough overview of the processes in an organization, and try to implement a change, there can occur a misalignment between the ones trying to push a change and the rest of the organization. Therefore, it is important to start in the bottom, map the processes, evaluate how well they are working, and then decide what the next step is. This allows organizations to better align their goals with their organizational culture. [5] [4] mentions several barriers, such as lack of ownership with decision makers or stakeholders, lack of continuity in the customers or employees not using the new technology, complexity of tech-

nology, or lastly that there is new technology that is constantly being rolled out. Lack of ownership results in discontinuity. Additionally the lack of usage of new technology is simply resources wasted. In regards to the complexity of the technology, it often makes the transition harder as there have not been done thorough enough preparations to set plans. Lastly when companies use long time to implement new technology, they often don't get the opportunity to be accustomed before there is even newer technology. [4] therefore also mentioned that this makes cloud technology very important as it allows for utilizing the newest technology by cutting implementation time. Hype was a barrier mentioned by [1] and [5], by this they refer to the situation that may occur if for example the decision makers or stakeholders go to a conference and see that their competitor is using a certain technology. This then leads to them asking themselves, "why aren't we using the same technology?" So the problem here becomes trying to implement something there in reality is no need for, as well as not making the necessary preparations as one feels the need to catch up with the competitor. [1] further states that this is starting in the wrong end, one should never start with the solution, but with accessing the needs. Owing to this, [1] argues that is critical to evaluate if their organization has the infrastructure needed to support this change, and if there in reality exists capacity in the organization to implement the digital transformation as wanted. A third point [1] mentioned is expectations. By this they mean that many have too high expectations as what they wish to achieve, this often leads to them going above what the organization actually is capable to, and failing. Lastly [1] brought up the speed of a transformation process, and that it often happens too rapidly. As a result, one ends up with products that have not been quality assured enough. Cyber security is often a critical aspect that gets overlooked in such a situation. [1] further elaborates that this is likely because we have business people who make the decisions and decide when to roll out the product, while its the developers and engineers who create the solutions, thus there being a lack of understanding for each others work and being different definitions of done. [3] explained that the challenge they often encountered was that there were certain people in the organization who are instigators of a certain transformation, but without having the rest of the company in the back. The rest of the company are often more critical to changing the way they work. This

leads to another barrier mentioned by both [3], [2] and [6], which is resistance to change. This is often the very core of many of the other barriers.

5.8 Measuring Success

[1] stated that what they defined as success often varied in projects, but for the end users specifically, they looked at the rate of adoption - is the new solution being used, and do they use more or less time than previously when trying to complete tasks. [1] summarizes the essence in "Did we make their lives easier or harder?", and adds that if the answer to this question is "harder", then they have done a bad job at completing a digital transformation. [2] Agrees with [1] and states that they also view adoption as a important indicator for measuring success. [2] states "You could for example use a tracking metric to get an overview of the number of users actually using it, feedback and customer service are also good ways of checking how much the solution is being used". Additionally, [2] also highlights revenue growth, has the data quality been improved, is the cyber security aspect improved, as well as cost savings as a result of becoming more efficient. Moreover [2] states that these indicators also helps the organization align with the digital transformation goal. "Access how the digital transformation has affected overall customer experience, this could be measured through customer requests, inquiries, reduction of complaints" "Data is very important, measure the success and impact of digital transformation by using data, and this could be through decision metrics, business impact, data driven decisions, adoption of dash boards" What is meant by this is that its important to have data metrics to be able to have a quantifiable way of measuring. Moreover, [3] stated that they do not necessarily measure success in a quantifiable way, however they often notice that a project has been successful when the customers begin to send questions in the support channel, as this indicates that they have begun to explore them system and even challenge it. So this again boils down to the rate of adoption. Furthermore, [4] states that success is characterised by a high rate of adoption, revenue growth, better efficiency and perhaps a greater degree of customer loyalty. In context to the situation where one has implemented a new system for your own employees [4] states that "If your employees are happy and are working

efficiently with the new system and digital technologies, you will get more in return for the investments you have made in these digital technologies” Lastly, [5] defines a digital transformation as successful when ”We have rolled out the new process and can see that everyone completes their tasks in a similar way because they follow the same process. Further when our data is also non redundant, we can see the results of this in for example power BI reports or as the results in a report.” Lastly, [6] also highlights the question of ”Is the data more readily available, and are the end users happy with the finished product”

5.9 Sustainability

As to sustainability, there were few who were able to offer insight. However interview object [1], [5]and [4] all believed that a digital transformation specifically to cloud technology, could contribute to reducing the organizations carbon footprint. [4] explained that digital transformation is important for sustainability, as there still exists many companies who still have their own data centres. These are often not efficient when it comes to use of electricity, data power and cooling. This results in them not being able to use their resources as efficiently in comparison to the large suppliers of cloud technologies does. Therefore, some corporations, especially large global ones with their own data centres often have a much larger carbon footprint than if they had used cloud technology where they pay for what they use. Hence if more companies move away from having data centres with their own servers to cloud technology, digital transformation will contribute to making them more sustainable.

5.10 Data Governance Practises, Advantages and Disadvantages

Although plenty of the interview objects suggested the importance of governing their data and storing and organizing data in a appropriate way, there were few of the interview objects who could actually confirm that they had proper data governance policies in place. [5] explained that they were in the process of automating

their processes and streamlining their data, but that they still had ways to go until they were mature in that aspect. A commonly mentioned disadvantage of missing data governance policies were data redundancy, or in other words: repetitive data. Although the objects agreed that less data governance measures made things less efficient and more redundant, [5] explained that there is a silver lining; For example, because the approval of access to different type of data has to be done manually, it adds an extra layer of security from unwanted intruders, and hinders that sensitive data could fall into the wrong hands.

5.11 Leadership and Culture

When asked how important leadership is for establishing a culture for digital maturity and data governance in an organization, there was a strong agreement from all the interview objects that leadership is essential to drive or establish any type of change. [4] elaborated this by highlighting the importance of having good role models. According to [4], the leaders of an organization have the possibility to go ahead as good role models by implementing and using the new technology first, and thereby also facilitating for the rest of the employees to use the technology in a clear and effective way. Additionally [5] also highlights the importance of delegating decisions and responsibilities to the people or roles who have proper insight on the matter. Thereby including larger parts of the organization to make correct decisions. [5]exemplified this by stating:

” Our CEO is good at saying ”Im sorry, I cant make that decision” or, ”this is about our HR system, so you have to ask our CHRO” . Our CEO involves the appropriate owners of data instead of just saying yes or no because it sounds smart or is easier”.

Both [1] and [2] adds that the majority of things should come from the leadership, especially vision, strategy and in general setting a good example for how things should be done. [1] further goes on to elaborate that ”Culture is kind of a reflection of what the leaders think”. [1] additionally states that ”If there is a fear in the organization and the leadership feels that there is no fear, then the leadership is off the grid. Then leadership needs to access what actually is going on in their organiz-

ation. The reason as to why a dissonance may occur between leaders and employees, is because the leaders do not do enough assessments as to see what is going on with their employees. This results in the leaders taking unnatural decisions that do not align with the rest of the organization.” Thereby signifying the importance of good culture starting from the top and going throughout the organization. Moreover, [2] highlighted the importance of having leaders with capabilities such as establishing a digital mindset, and fostering an agile and collaborative work environment, in order to drive the transformation. [2] also mentioned the importance of managers, as [2] argued that there is a differentiation between leadership and management. Leaders often focuses on setting the vision and taking the strategic decisions and setting longterm goals. While managers are more about planning and organizing daily operation, they are the ones trying to enable the company to hit the goals that leadership has set. Management is more present oriented and operational while leadership is more strategic and future oriented. [2]

5.12 Resistance to Change - Experiences, and How They Handled It

Resistance to change was a recurring theme during the interviews, and according to literature it is one of the main barriers for a digital transformation. [4] had an example of a situation where they were supposed to implement a new digital tool in the organization. The management consisted mainly of people above 50 years, who were used to using their phones to exclusively make phone calls, and writing in notebooks. This company had a great problem of getting their employees to utilize the new digital tools in the first phase, because the management did not use it themselves and therefore were not the best ambassadors. As a result, the rest of the employees did not see the need to use it themselves and started to question how efficient these tools actually were. So [4] and their team had to go in and work with the management, get them to utilize the solutions and make them act as good ambassadors and role models. In addition to this they started various measures in order to increase the adoption. These included dividing the organization into different groups; for example the younger employees who were much more accustomed

to technology vs the older employees who were used to pen and paper. By doing so, they were able to take into consideration the different roles in the company as well as which tools they needed. Furthermore they had a lot of training which made them more comfortable with the tools, and additionally constantly tried to show the benefits of these tools, for example through management who went ahead and told about how much easier their lives became by using these tools in a new way. Then a year later, they were able to see a significant improvement in the adoption rate as well as the success rate in the company. [4] additionally highlighted the importance of digital governance when wishing to tackle resistance to change. [4] stated that "Digital governance is extremely important when handling resistance to change since it creates a structured and systematic approach to managing and implementing digital transformations within an organization, because it betters the communication, it implies stakeholder inclusion, it sets standards and guidelines, it promotes training, it includes risk management and lastly digital governance promotes continuous improvement, and all of this together in way creates a framework which allows organizations to tackle resistance, as well as create a culture that adapts and embraces digital transformation"

This story corresponds much with what [1] highlights as important to succeed with a change. "Its important to really sit with the people undergoing the change, give them thorough training, and really explain to them why the change is important, that is how you avoid friction". Additionally through [1]'s experience, they had noticed that there often was less skepticism to technology among younger people in comparison to the older generation. This is a result of simply growing up with technology and being used to it from a young age. Furthermore, [1] argued that this also is because "the younger generation has a greater understanding of of that technology is not constant, and a lot of it is always dynamic and that there always can be a better solution. They are simply comfortable with the fact that what we know today could completely change tomorrow". Moreover [1] added that its important to really showcase the benefits of the new solution, and really be with them throughout the whole journey.

5.13 Indicators for Measuring Organizational Digital Maturity

[1] reported that when wishing to measure organizational digital maturity, they would look at three aspects; Productivity - "Are the users able to complete their tasks with the solutions we have provided them, or is there too much friction that leads to them being less productive and eventually waste time". The second is reliability. [1] states that "How does the technology affect the overall well being of the user, is the system so stressful because they feel like they can't rely on it". Lastly [1] mentioned the ability to report, "Is there a possibility of checking certain metrics of the usage of the solutions, and actively use this to better the solution, and map what ways it is being used"

[2] mentioned leadership and culture - a collaborative environment, resistance to change, customer centric approach, optimizing your processes, technology adoption, leveraging data in order to have data driven insights to help their decision making.

5.14 High vs Low Digital Maturity

There was a broad agreement among the interview objects that it is essential to keep up with the new technologies in order to stay relevant, and that there was a significant difference between organizations with high digital maturity vs low. The following figure summarizes what the interview objects viewed as characteristics for low digital maturity versus high digital maturity.

Interview object	Low digital maturity	High digital maturity	Interview object	Low digital maturity	High digital maturity	
[1]	Waste time figuring out simple tasks, such as how to make a database	Master their digital tools, save time and resources as a result	[4]	Unable to keep up with the digital transformation, resulting in losing their competitive edge, often ending up being bankrupt and out of business	Innovative, able to keep up with the disruptive nature of digital technology. Eks: spotify	
	More friction in the organization	Good communication across departments		[5]	Many manual processes, less effective	Automised processes, more effective
	Lack of communication across departments	Innovative, and constantly thrive to become better through feedback.			Unable to keep up with the disruptions in the market	Innovative, able to keep their competitive edge
[2]	Lack of structure in their data	Established and clear processes for their data	[6]	Less motivated employees	More motivated and engaged employees	
	Processes are slower	Processes are at a faster pace		Less effective, use more time for simple tasks	Much more effective, master their digital tools	
	More resistant to change	Open and eager to know how to become better		Dependent, often in need of outsourcing as they have little to none digital abilities in their own organization	Independent, often have their own digital governance and many employees with digital abilities	
[3]	More resistant to change	Open to becoming better				
	Lack of structure in their processes	Better established processes which makes it easier to implement changes				

Figure 11: Summary of what the interview objects viewed as characteristic for low digital maturity vs high digital maturity, own production

The figure below summarizes some of the points that the interview objects have mentioned and works as the base for further discussion in the next chapter

	[1]	[2]	[3]	[4]	[5]	[6]
Inclusion of shareholders	x	x		x	x	
Digital strategy plan and vision	x	x		x	x	
Strong leadership	x	x	x	x	x	x
Creativity and leadership						
Digital governance: Clear communication				x	x	
Digital governance: Stakeholder inclusion	x	x		x	x	
Digital governance: Setting standards and establishing accountability and roles				x	x	
Digital governance: Training and support		x		x	x	
Digital governance: Continuous improvement		x		x	x	
Collaboration between IT and business						
Flexibility and change oriented culture	x	x	x	x	x	x
Smaller investments						

Figure 12: Summary of what the interview objects highlighted as important

6 Discussion

6.1 RQ1 - What Practices Can Organizations Implement in Order to Become More Digitally Mature?

In order to answer this first research question it is necessary to define what digital maturity is. According to our literature review, there are several definitions as to what digital maturity is. However, a common factor mentioned by Westerman et al.(2012), Wernicke et al.(2023), Perera et al.(2023), Goumeh et al.(2023) and Pramanik et al.(2019) is the fact that it is closely related to digital transformation and that it has several dimensions to it. Furthermore the authors agree that digital maturity is an extension of digital transformation in the fact that digital maturity says something about what stage of a digital transformation one has reached. However, there is no accepted definition of the term digital transformation. Our interview objects had several definitions of what a digital transformation is; "The transformation we need to have in our processes and our systems, in order to best be able to use a new digital technology" [5], and [1] even suggested three different types of digital transformations when asked about what they wished to achieve in regards to digitalization ;

1. Going from a manual to a digital process
2. Improving an already existing digital process with new digital technology
3. Innovation, when they identify a completely new requirement, which needs to be solved through the implementation of digital technology.

This is similar to Savics (2019) differentiation of terms seen in figure 4. Therefore we suggest the following for our definition of digital transformation:

1. It is about identifying a need or a process which either can be improved or solved by some type of digital technology.
2. In order to leverage the digital technology, there has to be a transformation process in place. Meaning that the organization or whoever wishes to implement

a new solution has to prepare for a change. Furthermore they have to access their culture, how they work and think, and what processes they might need to change to be able to leverage the full value of a new solution.

Furthermore, to define digital maturity it is appropriate to adopt what Goumeh et al. (2021) says " Digital maturity refers to what stage of a digital transformation the organization has reached". Additionally this is similar to existing digital maturity models as they all define different levels ranging from low to high maturity.

We could argue that in many ways, digital transformation is a project, and digital maturity is the goal.

Now that we have established what we define as digital transformation and digital maturity, it is time to look more at what practices that could be useful for becoming more digitally mature. Through both the literature review and the interviews there have been common themes that have been mentioned by several sources repeatedly. By taking a starting point in figure 10 and figure 12, we wish to systematically look at each theme and analyse its points, barriers and validity.

Firstly "Inclusion of stakeholders" was only mentioned by Goumeh et al. (2021) in the literature review, however it was mentioned as important by interview object [1], [2], [4] and [5]. We can argue that a digital transformation process shares many characteristics of a project. Furthermore, in a project we have different stakeholders who all have various interests, and this digital transformation process will, according to the literature, affect many parts of the organization. Therefore it is important to include them in order to have an understanding of what needs to be assessed and prioritize accordingly. As a result this could lead to less friction between the departments. This also helps defeat the barrier mentioned by Shahi and Sinha (2020) - "Lack of collaborative efforts from all functions of the organization" and therefore can aid in reducing redundant data whilst also improving the information flow across departments. Additionally, a positive consequence of better information flow can lead to less friction, and thereby also contribute to reducing the resistance to change. Moreover, [4] and [5] mentioned "Lack of ownership among stakeholders or decision makers" as a barrier to digital transformation, as this can lead to lack of

continuity and usage of the new solutions. Which further substantiates this point.

Accordingly, [1] mentioned that a lack of understanding of each others roles and responsibilities could lead to a product that doesn't live up to quality expectations. Therefore this is another barrier that could be tackled by including shareholders and thereby improving the flow of information. This also matches with what section 3.9 says about digital capabilities; 3: Cross-functional collaboration. Which is described as "The ability to align the work of different business units through cooperation with the goals of understanding different perspectives and tasks, wide knowledge exchange and development of solutions by using new ways of thinking and working". Weritz et al. (2020) elaborates how this helps to improve the relationship between the departments, develops analytical skills and encourages new ways of thinking, all of which can help with the digital transformation process. Thus further highlighting the importance of this criteria.

Digital strategy and vision was mentioned by Goumeh et al. (2021), Kane et al. (2017), Pinto et al. (2023), Anderson and Ellerby (2018), Gill and Vanborkirk (2016), as well as interview object [1], [2], [4] and [5]. By digital strategy plan, Kane et al. (2017) implies having digital strategies that focus on both business competencies and technology by establishing a plan.

Additionally, Pinto et al. (2023) states that this aids in leading the company through a digital transformation whilst aligning the vision with the core of the company. When speaking of digital transformation barriers, [1] exemplifies this by speaking of hype as a barrier. They explain that a problem with hype is that stakeholders wish to implement technology that there in reality is no need for, and then proceeds to implement the said solution without the necessary preparations, which will then lead to more friction in the company, in addition to resources wasted.

Therefore a digital strategy is critical, as it allows the organization to evaluate if they have the infrastructure and resources to support this change. Thus we can also argue that this aids in tackling another barrier mentioned by interview object [1]; expectations and speed of the transformation process. We could argue that by having a clear digital strategy plan, we are able to convey to all the stakeholders what their realistic expectations should be.

Moreover, this hinders that the stakeholders might push a transformation process to go faster, thereby compromising the finished quality of the product. Furthermore, we could also argue that having a clear digital strategy plan and vision contributes to minimize any gap of uncertainty that could be existing in the organization, as well as better align the organizational culture with the goal of the digital transformation. Thereby also contributing to minimize the resistance to change, as a digital strategy would imply that one assesses all the affected areas of the organization, and therefore gets a better overview over what is going on in reality.

Additionally, when taking a look at the digital maturity models we can see that Deloitte's maturity model (Anderson and Ellerby, 2018) actually has "Strategy" as one of its key dimensions. This also signifies its importance in achieving digital maturity. Similarly, Gill and VanBoskirk (2016) also have a column for strategy in their maturity levels, as can be seen in figure 8. This implies the importance of strategy at each level. Moreover in figure 9 we see an illustration of Westerman et al. (2021) four types of digital maturity, where the x-axis is called "Transformation Management intensity" which also is about strategy. All in all, the fact that these digital maturity models have included strategy as a dimension in their models implies the importance of it in order to become more digitally mature. Lastly, having a clear strategy is also a key part of step 2 in Kotter's 8-step model for dealing with change processes: "Forming a powerful guided coalition", the keyword here is "guided" implying that it is essential to have a clear vision and strategy.

Strong leadership has been mentioned by all the interview objects, as well as Westerman et al. (2012), Perera et al. (2023) and Kane et al. (2023). Through the literature review, leadership was highlighted as important since they have to provide a digital strategy, convey a vision, as well as provide the resources that are necessary. Additionally, Perera et al. (2023) states that leaders are critical for communicating the vision in the digital transformation process. This is something that can be backed up by the steps "Creating a vision" and "Communicating the vision" from Kotter's 8-step model explained in section 3.10. Similarly, according to interview object [1] and [2], leadership should be responsible for the majority of things, such as vision and strategy, and generally providing a good example for how things should be done. During the interviews, there was a strong agreement among the interview

objects that leadership was important to be able to implement any type of change. We will also see that good leadership in many ways is almost a prerequisite for, and affects all of the other success factors that we talk about. Interview object [4] explains that leadership is important as they can act as good role models and therefore set a good example by integrating and utilizing new technology early, which then again demonstrates for the rest of the staff how to use the new solution in a clear and effective manner. We can again draw lines to Kotters 8-step model, as having good role models in leadership could play an important role in forming a powerful guided coalition. This is because, when we have strong leaders to look up to it is likely that the rest follows their footsteps and behaviours. [4] explained how they had seen an example of this; They had helped implement a new digital solution in the company, but saw that the rate of adoption was very low, and that the employees did not bother to use these tools, and even questioned if they were any effective. This turned out to be a consequence of the management and leaders not utilizing the solutions themselves. Therefore [4] had to go in and make the management work as better ambassadors and talk positively about the new solution. As a result, a year later the rate of adoption had increased. This specific story exemplifies how good role models are important to tackle resistance to change. Moreover, [5] also mentions how it is important to have a leadership who is good at delegating decisions and areas of responsibility to people who have proper insight on the matter. This again corresponds with Kotters 8-step model, as well as the importance of having a digital governance, which will be discussed further below. Furthermore [1] highlights the importance of leadership for establishing digital culture as well as making sure that there is alignment between the organization and its goals. This is similar to what Pardo del Val and Fuentes (2003) says about handling resistance to change in section 3.5; "It is necessary to evaluate the alignment of the already existing organizational culture, with the vision of the change" Therefore we can argue that the actions of the leadership is critical for the success of a change, as it affects many of our other success criterias.

Creativity together with leadership has not been mentioned by any of the interview objects, however it has been mentioned by Westerman et al. (2012) and Gill and Vanborkirk (2016). Westerman et al. (2012) states that organizations who

both have a strong leadership in combination with creative ideas from employees in all levels, encourages continuous digital transformation. Furthermore, Gill and Vanborkirk (2016) highlights the importance of "combining logical and analytical skills with creative skills" in the level called "Collaborators" in their digital maturity model, which is the second most digitally mature level in their model. Additionally, both Westerman et al. (2012) and Gill and Vanborkirk (2016) state that by combining these skills it aids in creating more creative strategies and thereby supports organizations in being more innovative. This argumentation corresponds with one of the dynamic capabilities that Weritz et al. (2020) mentions as important for a digital transformation; "Innovation capacity: The ability to transform or create new management practises, structures, process, or routines with the goal of discovering new things, trying and implementing them". Therefore, instead of calling this success criteria "Creativity and leadership" it would be more fitting to adopt the name Weritz et al. (2020) uses; "Innovation capacity", as we can argue that this is probably what the authors in the literature review meant, in addition to the fact that it has not been mentioned by any of the interview objects and only two authors in the literature review. Furthermore, we can also argue for this point by drawing a line to the first step of Kotters 8 - step model; "Establishing a sense of urgency". Since Innovation capacity is essentially about trying out new things and taking risks, we could argue that this contributes to establishing a sense of urgency, thereby contributing to driving the change process further.

Digital governance was mentioned as important by interview object [4] and [5] as well as Westerman et al. (2012), Kane et al. (2017), Anderson and Ellerby (2018) and Gill and Vanboskirk (2016). Westerman et al. (2012) highlights digital governance as important since it sets rules and policies which ensure that the digital transformation moves in the right direction. Digital Governance is a framework for establishing accountability, roles, decision making and change management authority for an organizations digital presence. Furthermore Anderson and Ellerby (2018) presents the importance of digital governance in their dimension for "Organisation and Culture", which is illustrated in figure 6. Moreover [4] stated that digital governance is very helpful when tackling the barrier resistance to change, and mentioned that this is because of several reasons:

1. It contributes to clear communication; this is a result of the fact that one establishes channels for communications, thereby making the goals and benefits of the digital transformation more clear for all parties. Additionally, this tackles the seventh barrier listed in figure 3 "Sources of resistance" from Pardo del Val and Fuentes (2003). Better communication also helps minimize the uncertainty for the employees, because it ensures that they understand the motivation behind the change and know how they align with the organization's strategy. To further back up this point, we can refer to step 4 in Kotter's 8-step model "Communicating the vision" which essentially is about being transparent about the entire process.

2. It promotes stakeholder inclusion, which we already argued for previously. However, to summarize, the inclusion of stakeholders contributes to creating a sense of ownership among the employees, which again aids in them being more willing to embrace the change.

3. It sets standards and establishes accountability and roles. This contributes to reducing the uncertainty and resistance to change because one can adopt the standard processes and procedures. As a result, employees are more likely to feel supported and less uncertain, since they have clear expectations and understand how the changes could be implemented. In other words, it leads to better alignment.

4. Training and support: [4] exemplified this through their story where they implemented a lot of training during the transitioning time, in order to increase the rate of adoption among the employees, and saw that this helped. By providing training, the employees are able to increase their digital capabilities, which then again helps the organization in building the employees' confidence and abilities to adapt to change. This again minimizes the uncertainty that the employees may feel, and also alleviates friction between the employee and the change, which leads to a smoother transition. Training also directly helps against the barrier "lack of technical skills". Here we can also draw similarities to the second step of Lewin's three-stage change model: "Changing", which states that it is important to spend time when implementing the change, so that the employees understand how the change will benefit them, as well as figure out new ways to do things. All of these factors contribute to reducing the resistance to change, as exemplified by [4]. Similarly, engagement

among employees have been mentioned by Westerman et al. (2012) and Kane et al. (2017). They state that creating engagement among employees contributes to them being less resistant to change, in addition to discovering new opportunities, therefore tackling organizational silence as described in figure 3. Examples of creating engagement among employees can be through training and workshops, and therefore investing in their digital abilities.

5. Promotes continuous improvement. [4] states that digital governance promotes continuous improvement. This means that organizations are encouraged to gather feedback, monitor outcomes, and make necessary adjustments to digital initiatives. Furthermore, by actively using input from employees and involving them in evaluation processes, organizations are able to address the resistance as well as improve the effectiveness of the change over time. This also matches with what [1] states as a characteristic of a digitally mature organization, namely a feedback loop. This again is something that corresponds with step 7 of Kotters 8-step model: "Consolidating improvements and producing more change".

Therefore we can argue that by mentioning digital governance, this implies the five factors mentioned above: clear communication, stakeholder inclusion, setting standards and establishing accountability and roles, training and support and lastly promotes continuous improvement

The next factor we are going to take a look at is "Collaboration between IT and business". This is one of our success criterias that have few articles nor interview objects mentioning it. Westerman et al. (2012) mentions it when talking about practises that they found to be common among digitally mature organizations, and further elaborates that IT is a crucial tool in rethinking the business, and that this could either be done through collaborative efforts between the IT teams and the business teams, or that one could have a own chief for this. We can argue the essence of what Westerman et al. (2012) is trying to present, is that there needs to be a partnership between departments. Therefore when looking at it in this light, we see that Kane et al. (2017) has a similar argumentation by exemplifying that "More than 70 percent of respondents from digitally maturing companies are increasingly organized around cross-functional teams versus only 28 percent of companies at

early stages of digital development”. The common theme here is cross collaboration between different departments, therefore we could argue that a better term would be to generalize it to collaboration between technology and business. However, why is it important to have a collaboration between these two? Firstly, it is essential for aligning the capabilities of digital technologies against the organizations business objective. [1] stated that a consequence of not having this understanding between the technology and the business often lead to a finished product which did not live up to the quality expectations, and mentioned cyber security as an example of what often became overlooked. [6], explained that as a technology consultant they often experienced a pressure from the product owner, who was responsible for the strategic decisions, to release a product before it actually was ”done”. [6] further explained that what they themselves defined as ”done” was connected to many technological aspects such as security, whilst for the product owner the product was ”good enough” ”if the button worked and something popped up on the screen”. This exemplifies why it is so important that there is understanding between departments. Moreover, to further substantiate the importance of cross collaboration, we can take a look at level 3 of Forrester’s digital maturity model by Gill and Vanborkirk (2016), here ”firms with strong coordination and constant communication between departments” are listed as a characteristic of a high level of digital maturity. Additionally, Weritz et al. (2020) mentioned Cross-functional collaboration as one digital capability that is relevant when supporting a digital transformation. Their findings contribute to further substantiate the importance of this point. Lastly we could argue that there are similarities between this point and the ”forming a powerful guided coalition” - step, as mentioned in Kotters 8 - step model.

Flexibility and change oriented culture has been mentioned by Kane et al. (2017), Pinto et al. (2023), Vial (2017), Pramanik et al. (2019), Perera et al. (2023), and Anderson and Ellerby (2018) throughout the literature review and by all the interview objects. According to Kane et al. (2017) project flexibility and change is important for organizations to be able to adapt to rapidly changing digital environments. Furthermore, Pinto et al. (2023) substantiates this by stating that a change oriented culture often ”implies a willingness to learn, develop ideas, endure failures and experiment.” Moreover, Vial (2017. p.122) states that ”digital technologies are

inherently disruptive”, their findings suggests that in order to keep up with the disruptive nature of digital technologies, flexibility and a change oriented culture is necessary, as this also allows organizations to fulfill the customers changing needs, and up keeping the competitive advantage. Pramanik et al. (2019) adds to this by stating that failing to adapting and utilizing digital technologies could have major consequences for their competitive edge. Lastly, Anderson and Ellerby (2018) includes a point called ”Agile change management” in one of their dimensions in figure 6. When taking a look at section 3.9 in our theory chapter about Digital Capabilities, we can observe that one of the capabilities that Weritz et al. (2020) lists as important is ”Agility and flexibility”, and defines this as ”the ability to respond to change”, moreover Weritz et al. (2020) also states that this will aid the organization in seeing new possibilities to reach digital maturity. Moreover, we could argue that these findings further are substantiated by our project flexibility theory in section 3.4. Olsson (2005) defines project flexibility as ”The capability to adjust the project to prospective consequences within the context of the project”, which essentially means to be able to respond to factors that cause change, without the consequences being too high. Moreover, we could argue that this implies the importance of being able to change plans in order to adapt to internal and external uncertainties that could affect the project success. Additionally when asked about barriers, [5] mentioned that one of them was the fact that new technology is constantly being rolled out, which then again highlights the importance of being flexible in order to not become outdated. However, during the interviews, agility was only directly mentioned by interview object [2], who stated that it was important to have leaders who foster an agile and collaborative work environment. This could be because of many reasons. It could be rooted in the fact that interview object [2] is a project manager, and therefore focused more on project management and project flexibility compared to the other interview objects who all had a technological background as well. However, the other interview objects did indirectly highlight the importance of agility when pointing out that they used different metrics such as customer feedback and rate of adoption to create a type of feedback loop, in order to continuously improve their solutions to better fit the customer. This was mentioned by [1], [2], [3], [4], [5], and [6], when they were questioned about how they measure success in

a project. These findings suggest that the interview objects have implemented an agile way of working, which further contributes to substantiate the importance of flexibility and a change oriented culture.

Smaller investments has only been mentioned by three authors in the literature review; Kane et al. (2017), Perera et al. (2023) and Gill and Vanborkirk (2016) and by none of the interview objects. However, the reasoning behind this point can be related to a lot of our basic theory. These three authors uses the term pilot projects, small steps and smaller investments. The essence of this is to start small initiatives and projects, which later could be integrated in to existing projects, according to Perera et al.(2023). Perera et al. (2023) further states that such initiatives could contribute to raising the digital skills of the employees, as they have possibilities to try and learn from these pilot projects without the consequences being too high. Additionally, Kane et al. (2017) says that the existence of such pilot projects could help organizations in finding new opportunities by being able to test the waters without fully committing. Gill and Vanborkirk (2016) further adds that the results of such pilot projects could help in communicating the possibilities of technologies, as they would have a concrete result or metric to point to. Moreover, we can actually draw a line from this point to the dynamic capability "Innovation Capacity" as mentioned by Weritz et al. (2020), as these pilot projects try to take new risks to discover new possibilities to perhaps changing their existing processes to the better. This point also corresponds with step six in Kotters 8-step model "Planning for and creating short term wins", we could argue that since pilot projects are a way of testing the waters, it could be an efficient way of "breaking up the change initiatives into smaller manageable fragments that could be measured for completion and success" (Tang, 2019, p.146). However, we could wonder why this has not been mentioned by any of the interview objects. It could be rooted in the fact that a major barrier for a digital transformation is lack of technological resources and technological skills, and therefore one might argue that this is the wrong use of resources, and that it perhaps only is applicable when one has an abundance of resources. Moreover, when looking at this from a practical view, it might simply be too much work for an organization and could lead to many small projects that don't really have any value, which eventually could lead to a loss of revenue. These

interviews were held during a time when day to day prices were very high as a result of the Russia and Ukraine war, which could explain the reluctance among the interview objects to take risks, it is simply not the time. Nevertheless there is definitely value from this point, however there are many of the other success criterias who affect the digital transformation process in the same way, so we could argue that this might not be the most important point.

6.2 RQ2: How Does High and Low Levels of Digital Maturity Affect Organizational Performance?

After establishing what practises that are beneficial for organizations to implement in order to become more digitally mature, the second research question wishes to highlight how high and low levels of digital maturity affect organizational performance.

Figure 11 shows a summary of what the interview objects viewed as characteristic for low vs high digital maturity.

Interview object [1], [2], [5], [6] mentioned that digitally mature organizations often were much more efficient than their less mature counterparts. They further elaborated that this was a result of them mastering their digital tools, and having clear and established processes which reduced repetitiveness and redundancy, as well as having good communication. Thus leading to spending less time on simpler tasks. This corresponds with what the literature states as Pramanik et al. (2019) does state that simplifying procedures are one of the many benefits of utilizing digital technologies. Furthermore, Perera et al. (2023) elaborates that low levels of digital maturity is often characterized by little to no digital understanding, whilst in higher level, organizations often tend to use and understand advanced digital technologies, such as machine learning. This corresponds with what Gill and Vanborkirk (2016) explains about their levels in their digital maturity model, that the lowest levels don't prioritize digital technologies, and should recruit employees with more digital abilities. Whilst in the highest level they actively use digital technologies to make better decisions. Additionally, Gill and Vanborkirk (2016) state that firms in the Collaborator level, which is the 2nd most digitally mature level, focus on strong communication and coordination between departments. As a result they end up with increased productivity, reduced costs, and a more optimized use of resources. Therefore, these organizations have a better understanding of how to leverage technology to enhance their efficiency and gain a competitive edge. On the opposite side, the effect of lower digital maturity leads to organizations struggling to better their efficiency, due to limited adoption or understanding of digital technologies

(Perera et al., 2023). As a result, they often rely on traditional, manual processes, which are often time consuming and prone to errors. This may lead to a worse operational efficiency, as they get higher costs, slower decision making and lower overall productivity. Additionally, according to interview object [5], these repetitive and manual processes and lack of positive results, may lead to the demotivating the employees as they feel that they do not master their work, or that their work is boring.

Secondly, interview object [1], [2], [3], [4] and [5] noted that more digitally mature firms were more open to change, innovative and open to becoming better in order to keep their competitive edge. This corresponds findings from Perera et al. (2023) who suggests that organizations in the mature stage have a strong culture for innovation. Moreover Pinto et al. (2023) found that the mature firms try to offer new ways of creating value to their customer, in order to be able to respond to their changing needs. As a result these organizations are more likely to adopt new technologies, explore new business models, and adapt to evolving customer preferences, which allows them to keep their competitive edge. This is important since digital technologies are inherently disruptive according to Vial (2017). On the other hand, a result of not having these characteristics and having those of low digital maturity may lead to an increased resistance to both change and innovation according to interview object [2] and [3]. Moreover they might be hesitant to adopt new technologies as they lack skills to be able to leverage digital solutions effectively. Furthermore, this resistance to change may hinder their ability to adapt to market trends, respond to customer demands and stay competitive (Vial, 2017). Moreover, this could therefore in the end, result in the firm going out of business as they are pushed out of the market, similarly to what happened to CD -shops in the music industry as exemplified by Vial (2017).

Lastly, according to interview object [6], organizations with high digital maturity have the advantage of being more self-reliant and less dependent on external resources. Similarly, Gill and Vanborkirk (2016) argues that in order to become digitally mature, it is necessary to limit outsourcing of digital problems and rather develop the skills to be able to handle them inside the organization. This because

developing digital skills also opens up for them to be able to continuously improve and increase their digital maturity. As a result of them being independent, allows them to develop and maintain their digital infrastructure, as well as being able to quickly adapt to changing markets, and overall being much more in control of their digital transformation journey. On the other hand, lacking the ability to be independent, as seen in less digitally mature firms, may result in limited control over decision-making, as they lack the knowledge in order to take informed decisions, as well as a limited flexibility, which potentially can impact their ability to innovate and respond to market changes.

To summarize, high levels of digital maturity positively impacts organizational performance by improving efficiency, fostering openness to change and innovation and enabling greater independence. On the other hand, low digital maturity can hinder organizational performance by negatively affecting efficiency, the ability to innovate as well as the ability to adapt independently to the disruptive nature of technology.

7 Conclusion

7.1 RQ1: What Practices Can Organizations Implement in Order To Become More Digitally Mature?

This master thesis has conducted research on what practises that are beneficial for organizations to implement in order to become more digitally mature. Through researching previous digital maturity models and various articles about digital transformation and its barriers and needs, we were able to define digital maturity in order to further assess what is needed. We suggested the following understanding of a digital transformation and digital maturity:

1. Digital transformation is about identifying a need or a process which either can be improved or solved by some type of digital technology.
2. In order to leverage the digital technology, there has to be a transformation process in place. Meaning that the organization or whoever who wished to implement a new solution needs to prepare for a change. This includes assessing their culture, how they work and think as well as what processes they might need to change in order to leverage the full value of a new solution.

Therefore, we established that digital maturity refers to what stage of a digital transformation the organization has reached.

Furthermore, we found that these beneficial practises ground many of their concepts and ideas in both change management theory as well as project flexibility theory, and established the importance of dynamic capabilities. Through the discussion we established different success criteria that was mentioned both in the literature review as well as by the interview objects, and we further justified these to our other established background theory. To summarize the findings, the list of practises that organizations can implement in order to become more digitally mature are:

1. Inclusion of stakeholders
2. Digital strategy and vision
3. Strong leadership with the following abilities:

-
- Being good rolemodels
 - Delegating roles and responsibilities
 - Encouraging culture and innovation
4. Digital governance, which includes:
 - Establishes channels for communication
 - Stakeholder inclusion
 - Setting standards and establishes accountability and roles
 - Training and support for the employees
 - Promoting continuous improvement
 5. Cross functional collaboration across departments
 6. Flexibility, agility and change oriented culture.

7.2 RQ2: How Does High and Low Levels of Digital Maturity Affect Organizational Performance ?

The purpose of the second research question of this master thesis was to highlight and substantiate how high and low levels of digital maturity can affect organizational performance.

In conclusion, the level of digital maturity within an organization has a significant impact on its performance. The research findings indicate that high levels of digital maturity are associated with improved efficiency, openness to change and innovation as well as greater independence. Digitally mature organizations tend to be more efficient by leveraging digital tools, streamlining processes, and promoting effective communication. Furthermore, they show signs of a strong culture for innovation, are more likely to actively adopt new technologies, as well as quickly adapt to changing customer needs, which results in them being able to keep a competitive advantage. Moreover, digitally mature organizations are more self-reliant, and capable of developing and maintaining their digital infrastructure, as well as being more in control of their own digital transformation journey.

On the other hand, organizations with low levels of digital maturity face challenges in improving efficiency, as a result of them relying on more manual processes that are time consuming and more prone to errors. Furthermore, they may demonstrate more of a resistance to change and innovation, and hesitate to adopt new technologies due to a lack of skills and understanding of the tools. Moreover, this resistance can hinder their ability to adapt to market trends and respond to customer demands, which affects their competitiveness negatively. Additionally, their dependence on external resources limit their control over decision making and flexibility, which in the end impacts their ability to innovate and respond to changes in the market.

To summarize, high levels of digital maturity positively contribute to organizational performance through improved efficiency, openness to change and innovation and greater independence. On the other hand, low digital maturity has a negative affect on organizational performance by negatively affecting efficiency, innovation capabilities, and the ability to adapt independently to disruptive technological advance-

ments. To conclude, organizations must strive to enhance their digital maturity in order to reap the benefits associated with digital transformation.

Bibliography

- B. N. Green and C. D. Johnson and A. Adams (2016). ‘Writing Narrative Literature Reviews for Peer-reviewed Journals: Secrets Of The Trade’. In: *Clinical Update* 96, pp. 39–49.
- Chelliah, S.D. (2022). ‘Specialization project: Leading Digital Transformation Through Data Governance,’ in.
- concentrix.com (2023). *Three steps toward a digital governance framework*. URL: <https://www.concentrix.com/insights/blog/digital-governance-framework/> (visited on 18th June 2023).
- Dai, WEI and Wardlaw, Isaac and Cui, Yu and Mehdi, Kashif and Li, Yanyan and Long, Jun. (2016). ‘Data Profiling Technology of Data Governance Regarding Big Data: Review and Rethinking.’ In: *Information Technology: New Generations*, pp. 439–450.
- Data.oecd.org (2017). *Enterprises by business size*. URL: <https://data.oecd.org/entrepreneur/enterprises-by-business-size.htm> (visited on 18th June 2023).
- DiCicco-Bloom, Barbara and Benjamin F Crabtree (2006). ‘The qualitative research interview’. In: *Medical education* 40.4, pp. 314–321.
- Goumeh, Faezeh and Ahmad Abdollahzadeh Barforoush (2021). ‘A Digital Maturity Model for digital banking revolution for Iranian banks’. In: pp. 1–6. DOI: 10.1109/CSICC52343.2021.9420566.
- Kane, G. C et al. (July 2017). ‘Achieving Digital Maturity’. In: *MIT Sloan Management Review and Deloitte University Press* 95.
- Khatri V. and Brown C.V. (2010). ‘Designing Data Governance’. In: *Communications of the ACM* 53, pp. 148–152.
- Klungseth, Nora Johanne et al. (2022). ‘Research and Evidence-based standards: Research and standards in combined efforts for a sustainable transformation of the built environment’. In: *OP Conference Series: Earth and Environmental Science (EES)*. URL: <https://ntnuopen.ntnu.no/ntnu-xmlui/handle/11250/3039351>.
- Komal, Bakhtawar and Janjua, Uzair Iqbal and Anwar, Fozia and Madni, Tahir Mustafa and Cheema, Muhammad Faisal and Malik, Muhammad Noman and

-
- Shahid, Ahmad Raza (2020). ‘The Impact of Scope Creep on Project Success: An Empirical Investigation’. In: *IEEE Access* 8, pp. 125755–125775.
- Krane, H. P., Olsson, N. O. E., Rolstadås, A. (2012). ‘How Project Manager–Project Owner Interaction Can Work within and Influence Project Risk Management.’ In: *Project Management Journal* 43(2), pp. 54–67.
- Olsson, N.O.E. (2008). ‘External and internal flexibility – aligning projects with the business strategy and executing projects efficiently.’ In: *Int. J. Project Organisation and Management* 1, pp. 47–64.
- Olsson, Nils. (2006). ‘Management of Flexibility in Projects.’ In: *International Journal of Project Management* 24, pp. 66–74.
- Pardo del Val, M and Martinez Fuentes, C. (2003). ‘Resistance to change: a literature review and empirical study.’ In: *Management Decision* 41, pp. 148–155.
- Rajasekar, Shanmuganathan and Philominathan, P. and Chinnathambi, V. (2006). ‘Research Methodology’. In: *Knowledge Management Techniques for Risk Management in IT Projects*.
- Raman K. G. and Meenakshi and Rajalakshmi V. R. (2018). ‘Effective Management of Various Forms of Creeping Featurism - “A Little More”, But Not Anymore’. In: *International Journal of Pure and Applied Mathematics* 119, pp. 643–656.
- Savić, Dobrica. (2019). ‘From Digitization, through Digitalization, to Digital Transformation.’ In: *Online Searcher* 43, pp. 36–39.
- Schwalbe, Kathy (2015). *An Introduction to Project Management, Fifth Edition*. Schwalbe Publishing.
- Shahi, C. and M. Sinha (2021). ‘“Digital transformation: challenges faced by organizations and their potential solutions”’. In: *International Journal of Innovation Science* 13, pp. 17–33. DOI: <https://doi.org/10.1108/IJIS-09-2020-0157>.
- Tang, Keow Ngang. (2019). *Change Management. In: Leadership and Change Management*. SpringerBriefs in Business.
- Vial, Gregory (2019). ‘Understanding digital transformation: A review and a research agenda’. In: *The Journal of Strategic Information Systems* 28, pp. 118–144. DOI: 10.1016/j.jsis.2019.01.003.

-
- Weritz, Pauline, Jessica Braojos and Jorge. Matute (2020). ‘Exploring the Antecedents of Digital Transformation: Dynamic Capabilities and Digital Culture Aspects to Achieve Digital Maturity’. In: *AMCIS 2020 Proceedings*.
- Wohlin, Claes (2014). ‘Guidelines for snowballing in systematic literature studies and a replication in software engineering’. In: *Proceedings of the 18th International Conference on Evaluation and Assessment in Software Engineering*. London, England, United Kingdom.
- Zhang Q.,Sun X., Zhang M. (2022). ‘Data Matters: A Strategic Action Framework for Data Governance.’ In: *Information Management* 59.



 **NTNU**

Norwegian University of
Science and Technology