



**Universiteit  
Utrecht**



**Gemeente  
Soest**

## **Digital Transformation progress in Local Governments through Critical Success Factors**

J.F. (Jan) Kemper

*Thesis*, Utrecht University  
Utrecht, The Netherlands  
j.f.kemper@students.uu.nl  
0085472

Supervisors:

1st supervisor: Drs. N.A. (Nico) Brand

2nd supervisor: Dr. J. (Jens) Gulden

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## PREFACE

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This thesis is dedicated to all who have contributed to this journey. I hope that the findings and insights presented here will contribute to the ongoing process of digital transformation and serve as a valuable resource for future research and practical applications.

Utrecht, June 19<sup>th</sup>, 2024

J.F. (Jan) Kemper

## ABSTRACT

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This thesis dives into the digital transformation of local governments with a particular focus on the municipality of Soest in the Netherlands. It seeks to identify and analyze critical success factors (CSFs) such as corporate culture, leadership, and change management, which are essential for the successful implementation of digital transformation. These insights led to the development of the Digital Transformation Progress Maturity Model (DTPMM), a framework designed to assess and guide digital transformation progress in local governments.

To achieve this, the research used data gathered through systematic literature reviews to establish a theoretical foundation. This was followed by in-depth interviews with experts from the municipality of Soest to gain practical insights and validate the theoretical findings. The information collected was then used to design the DTPMM.

The model was then validated through case studies conducted in Soest and the Utrechtse Heuvelrug, providing a practical context for its application. These case studies highlighted the model's practical utility and suggested enhancements. The findings emphasize the importance of strategic alignment with broader digital agendas and offer a structured approach for local governments to effectively plan and execute digital transformation initiatives.

By addressing the main research question on evaluating CSFs, this study provides actionable insights and frameworks that can help local governments achieve and measure their digital transformation goals, thereby improving public service delivery and operational efficiency.

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# 1 INTRODUCTION

The path toward digital transformation has been a progressive evolution. This evolution goes back to the beginning of computerization, where the focus was primarily on automating manual processes and data management (Schallmo & Williams, 2018). The introduction of the Internet was an important shift, as organizations began to recognize the potential of digital technologies. More recently, the rise of smart city initiatives has further shown the need for local governments to also embrace digital transformation, not just as a technological upgrade, but as a fundamental shift in the way they operate and communicate (Pittaway & Montazemi, 2020).

Technological readiness has been one of the primary driving factors of digital transformation in local governments according to Xiao et al. (2022). The introduction of mobile technology, cloud computing, and the increasing accessibility of big data analytics have provided opportunities for improving public service delivery. Societal changes, particularly the digital abilities of citizens, have raised expectations for digital accessibility and transparency in government operations. The gap between what digital technology can offer and what citizens' expect has been a push factor for local governments to adopt more digitally-oriented strategies. Figure 1 shows all the driving factors identified by Xiao et al. (2022), including citizens' expectations.

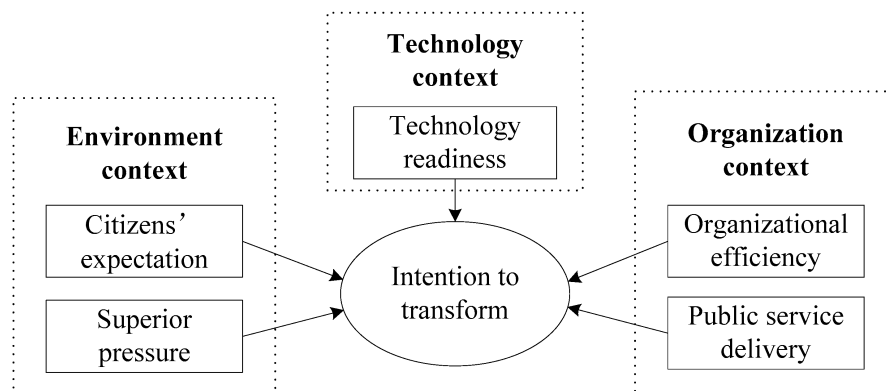


Figure 1, Research model (Xiao et al., 2022)

Unlike commercial organizations, where digital transformation is mostly driven by profit maximization and market competition, local governments face different challenges and objectives. Their transformation efforts are primarily focused on enhancing public service efficiency, ensuring access to services, and aiming for transparency and accountability. Hafsel et al. (2021) identified different distinguishing characteristics of governments, more elaborated upon below;

## Inter-organizational collaboration

Local governments are often tasked with tasks too large to complete themselves. Thus, projects are often executed interdisciplinary with other local governments. An example of this is the 'Regionale ICT-Dienst Utrecht' (RID). This is an IT initiative brought to life by the cooperation of different local governments to facilitate them in the field of IT (RID, 2024). Figure 2 shows which local governments are participating in this initiative.

## Bureaucratic structures and political constraints

(Local) governments operate within complex bureaucratic systems, characterized by hierarchical structures, rules, and processes. Which are essential for maintaining order and accountability but can sometimes lead to inefficiencies or delays in decision-making. Political constraints also play a significant role, as government actions and policies are often influenced by political ideologies and elections.

## Complexity rooted in organizational structuring, technologies, and innovation

(Local) governments face complexity due to outdated legacy systems and the need for modern technology and innovation. These old systems make it hard to adopt new technologies and innovate, adding to the challenge of managing a government's complex structure.

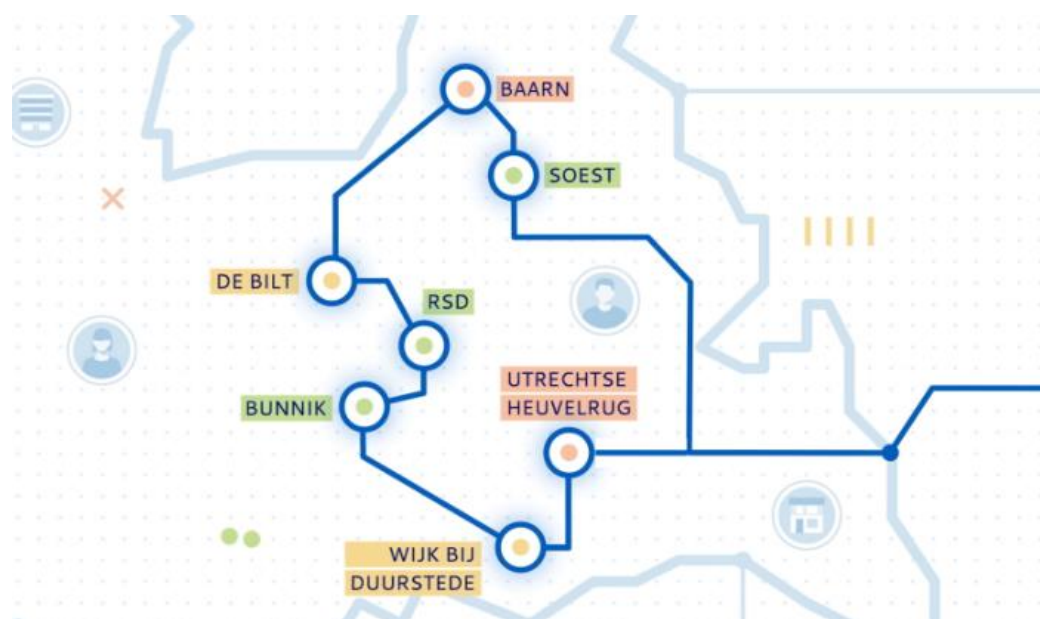


Figure 2, Local government entities participating with the RID (RID, 2024)

Local governments face their own challenges in their digital transformation path (Govpilot, 2023). The presence of legacy systems often acts as a hurdle. Budgetary constraints are a persistent issue, as many local governments operate under strict financial limits. Political influences and the need for compromises among various stakeholders can also slow down decision-making processes. Additionally, the cultural shift required to embrace digital methods can be a substantial barrier, especially in governments with a longstanding tradition of manual processes.

Currently, the state of digital transformation in local governments shows a varied landscape. While some have made significant steps in integrating digital technologies into their operations, others are still at the beginning stages of this journey. A study by Deloitte indicates a growing acknowledgment of the importance of digital transformation by government officials (Eggers & Bellman, 2015).

The lack of digital transformation initiatives can have serious implications. Delays in adopting new technologies can lead to inefficiencies in service delivery, increased operational costs, and a decline in public trust. These backlogs can hinder a local government's ability to react to new challenges and opportunities in a timely and effective way.

## 1.1 CONTEXT

This research focuses on understanding digital transformation in local governments. It explores how local governments are adopting new digital technologies to improve their services. For example, the implementation of online portals to enable citizens to access services like renewing passports or driver's licenses at any time, increasing accessibility. However, transforming traditional systems to digital ones is challenging, as it requires significant changes in infrastructure, staff training, and (cyber)security measures. The main goal of this study is to study and compare different digital transformation initiatives within a local government setting. This comparison will be based on specific measures of success, known as critical success factors (CSFs). By looking at these CSFs, the study aims to find out what works well and what does not in digital transformation, helping local governments improve their strategies in the future.

This study explores the digital transformation initiatives at the municipality of Soest, a local government in the Netherlands with 47.448 residents at the time of writing (Kerngegevens, 2024). This classifies the municipality of Soest as an 'M50' (previously 'PMG') local government, also known as medium/large (Netwerken Van Onze Leden | VNG, n.d.). The results of this research are in turn mainly applicable to M50 local governments.

## 1.2 GAP IN KNOWLEDGE

### Academic gap

While there is existing literature like Pittaway and Montazemi (2020) addressing the adoption of digital technologies in public sectors, there is a lack of empirical research specifically targeting local governments in the Netherlands like the municipality of Soest. The existing literature mainly centers around larger governmental entities or conventional commercial organizations, leaving a gap in knowledge of how smaller, local government entities are going on their digital transformation journey.

The existing literature has a main focus on the technological aspects of digital transformation, often overlooking the human and organizational aspects. Research done by Osmundsen et al. (2018) has considered 21 different empirical studies regarding digital transformation, not specifically local governments, and created a list of success factors. Regarding future research, the study expressed surprise at the lack of emphasis on change management in relation to digital transformation, particularly considering the expected conflicts, uncertainties, and power struggles. It suggested that future research could benefit from exploring both the positive and negative consequences of digital transformation, especially its effects on employees and management.

The absence of an actionable framework to evaluate the effectiveness of digital transformation, in local governments specifically, with the use of key performance indicators or critical success factors, further shows this gap. This study aims to fill this gap by identifying and examining critical success factors that are essential for successful digital transformation in local governments, using a case study from the municipality of Soest. The results from this case study should be useful for other medium-sized local governments like those in the M50 group.

A report by Freriks et al. (2023) highlights the importance of cultural and organizational aspects in digital transformation. The report does not provide a qualitative analysis of cultural factors, particularly leadership and culture. This nuanced understanding of cultural dynamics could offer valuable insights for addressing the human and organizational challenges in local government digital transformation.



## **Societal impact**

This study has the potential to cause changes in how organizations view their digital transformation initiatives. By evaluating the effectiveness of digital transformation initiatives, this study has the goal to directly impact how local governments deliver services to the public. Improved digital services can lead to quicker, more transparent, and user-friendly interactions between citizens and their local government, potentially increasing public satisfaction and trust. The insights gained from this research could guide local governments in making informed decisions about technology implementation.

### **1.3 PROBLEM STATEMENT**

While Sánchez and Zuntini (2019) and Accenture (2014) have identified barriers like multiple competing priorities, satisfaction with the status quo, lack of organizational agility, and legal or regulatory restrictions in the context of digital transformation in local governments, the primary focus of this thesis is not to directly solve these barriers. Instead, these barriers provide a backdrop against which this study aims to explore and discuss Critical Success Factors (CSFs) and identify suitable Key Performance Indicators (KPIs) for effective digital transformation. The actual challenge addressed here revolves around how to successfully avoid and deal with these barriers through the identification and application of relevant CSFs and KPIs.

#### **Multiple competing priorities**

In the realm of local government, resources are often stretched thin across various departments, each with its own set of priorities and obligations. This competition for resources leads to a scenario where digital transformation initiatives must 'compete' for attention and funding with other initiatives. The challenge lies not only in securing sufficient resources but also in maintaining a balanced focus that does not get sidelined.

#### **Satisfaction with the status quo**

A significant problem of digital transformation in local governments is long-lasting satisfaction with existing processes and systems. This satisfaction often comes from a familiarity with current methods and a reluctance to try new technological advancements. The comfort in 'the way things have always been done' poses a barrier to adopting new digital strategies that can improve service delivery and operational efficiency.

#### **Lack of organizational agility**

Local governments often operate within sturdy bureaucratic structures that are resistant to change. This lack of organizational agility hinders the ability to adapt and implement new technologies quickly. In an era where technological advancements occur all the time, this rigidity can result in missed opportunities and an inability to keep up with the evolving digital advancements.

## Legal or regulatory restrictions

Accenture's (2014) study underscores the impact of legal and regulatory processes on digital transformation in local governments. These entities are bound by various laws and regulations that may not only be complex but are also falling behind on current technological capabilities. Navigating these legal and regulatory landscapes requires careful planning and often slows down the execution of digital initiatives.

The combination of these problem statements – competing priorities, satisfaction with the status quo, lack of organizational agility, and restrictive legal and regulatory frameworks – creates a complex environment for digital transformation in local governments. Addressing these problem statements requires an approach that not only involves technological advancements but also a shift in organizational mindset, culture, and policies. While recognizing the significant impact of legal and regulatory restrictions, this study does not directly address this aspect.

### 1.4 EXPECTED CONTRIBUTIONS

Academically, this study aims to add to the existing literature on digital transformation in local governments. Focusing on the municipality of Soest, it provides an empirical study that contributes to a better understanding of how M50 local government entities adapt to and implement digital technologies. This research will address the existing gap in empirical studies regarding the measurement and evaluation of digital transformation efforts in these settings.

Practically, the study's findings are expected to offer actionable insights for local governments undergoing digital transformation. By developing and analyzing specific critical success factors (CSF), the research will provide a framework that can be used by other local governments to measure and enhance the effectiveness of their digital initiatives. This framework consisting of CSFs' can take the body as a dashboard, displaying various sources of information.

The results of this study are useful in guiding policy decisions and strategic planning, ensuring that digital transformation efforts are in line with the needs and expectations of the community. The study seeks to change the way local governments, e.g. the municipality of Soest, approach digital transformation, leading to more efficient and transparent services.

## 2 KEY CONCEPTS

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This literature review aims to provide insights into the challenges and opportunities facing public sectors as they plan and execute digital transformation initiatives. The following chapters

### 2.1 CRITICAL SUCCESS FACTORS

#### Definition

Critical success factors (CSFs) are elements that significantly influence the effectiveness of various initiatives. They serve as important factors for organizations to direct their efforts and resources toward. As defined by Rockart (1979), CSFs are those aspects of a business that must be effectively managed and controlled to ensure the organization's success.

Critical Success Factors (CSFs) and Key Performance Indicators (KPIs) are closely related concepts in business management and strategic planning, but they serve different purposes.

- Critical Success Factors (CSFs): A CSF is an influencing factor that is most influential to achieve goals and objectives.
- Key Performance Indicators (KPIs): A metric to make a CSF quantifiable.

The relationship between CSFs and KPIs is that KPIs are used to measure the success or progress towards achieving the CSFs. In simpler terms, CSFs define what is critical for success, and KPIs measure whether these critical factors are being achieved. For example, if a CSF for a company is 'customer satisfaction', a possible KPI could be 'percentage of returning customers' or 'customer satisfaction score from surveys'.

## Application

Effective implementation of digital transformation in public organizations relies on critical success factors (CSFs). Research emphasizes organizational alignment over technological advancements, highlighting the importance of aligning IT strategies with overarching objectives and organizational structures (Jonathan, 2020). According to Jonathan (2020), challenges in the public sector originate mainly from navigating stakeholder interests and politically influenced decision-making processes, limiting flexibility in IT investment and organizational change. Despite these challenges, digital transformation offers significant benefits, underscoring the need for public sector leaders to address complexities and leverage identified CSFs to maximize outcomes, as shown in Figure 3. Future research can explore the generalizability of these CSFs across diverse contexts.

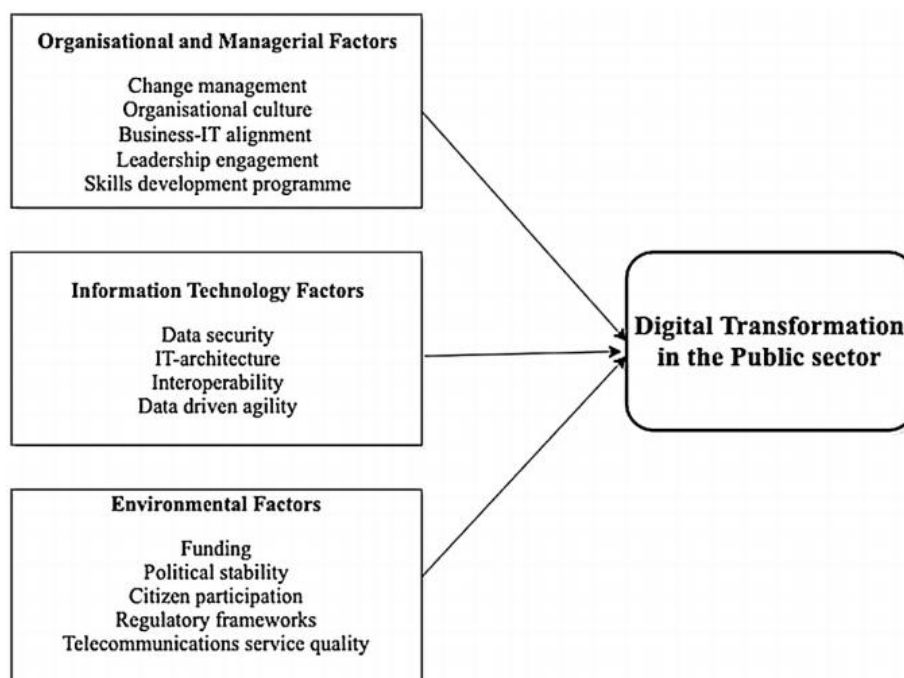


Figure 3, CSFs to maximize digital transformation outcomes (Jonathan, 2020)

## 2.2 KEY PERFORMANCE INDICATORS

### Definition

Key Performance Indicators (KPIs) are essential tools in organizational management across various industries (Setiawan & Purba, 2020). They are employed as a method to solve management problems and improve performance. KPIs are identified and categorized based on specific goals and objectives within an organization. The implementation of KPIs varies across different sectors, such as construction, education, e-commerce, finance, and healthcare, each with unique criteria and measurement methods.

### Application

A Deloitte article examines the challenges and strategies for measuring the return on investment (ROI) of digital transformation initiatives (Mapping Digital Transformation Value, 2023). It highlights a study involving 1,600 leaders, revealing the importance of a holistic approach to identifying digital transformation value. The research identifies 46 KPIs across various categories, underscoring that organizations often underutilize these KPIs and tend to focus on a limited set. The article emphasizes the need for a structured, comprehensive measurement framework to accurately measure the full impact of digital transformation. Figure 4 shows the KPIs that are most found by Deloitte in their research.

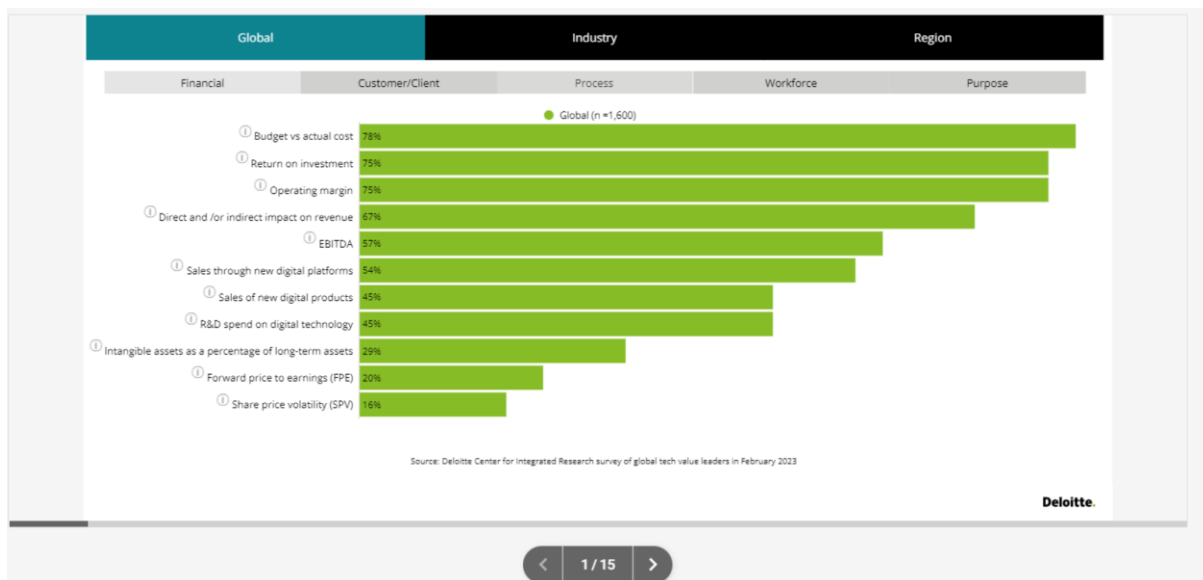


Figure 4, Most used KPIs to measure digital transformation according to Deloitte (Mapping Digital Transformation Value, 2023)

The book "How the Wrong KPIs Doom Digital Transformation" by Schrage et al. (2022) emphasizes the importance of selecting the right Key Performance Indicators (KPIs) for successful digital transformation. It argues that many organizations fail in their digital initiatives by focusing on inappropriate KPIs, like technological capabilities instead of business objectives. The authors propose a framework for effective digital transformation, centered on a strategic KPI portfolio, committing to data as a digital asset, orchestrating data flows, and continuously improving KPIs. This framework aims to align digital strategies with measurable business outcomes, promoting a more effective and sustainable digital transformation.

The framework proposed in the book for successful digital transformation consists of four key components:

1. **Create a strategic KPI portfolio:** This involves choosing transformational KPIs that reflect increased customer value and revenue growth, and operationally aligning digital capabilities with desired business outcomes.
2. **Commit to data as a digital asset:** This step requires identifying key data points that make up the KPI portfolio, establishing clear, objective enterprise-wide data standards and definitions, and ensuring effective data governance.
3. **Orchestrate data flows to make KPIs shareable, visible, and dynamic:** This involves coordinating and sequencing data through systems, processes, and business units to calculate reliable strategic metrics.
4. **Commit to continuous KPI improvement:** This final component focuses on the continuous evolution of KPIs to drive ongoing value creation.

## 2.3 DIGITAL MATURITY

Teichert's paper about digital transformation maturity outlines the different stages of digital transformation and identifies the maturity levels of organizations undergoing digital changes (Teichert, 2019). This sets the basis for understanding where local governments, such as the municipality of Soest, might stand in their digital transformation journey compared to conventional commercial organizations.

# 3 RESEARCH APPROACH

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## 3.1 RESEARCH QUESTIONS

To fill the gap in knowledge a main research question (MRQ) has been created. The MRQ aims to offer an answer to partially deal with the aforementioned problem statements which can be found below.

**MRQ:** "How can critical success factors for digital transformation be identified, measured, and evaluated to assess the progress of digital transformation in an M50 local government setting?"

To systematically address this MRQ, several sub-research questions (SRQs) have been formulated. Each SRQ focuses on a specific aspect of the MRQ, breaking down the broader question into manageable and targeted areas of research.

**SRQ1:** What are the main characteristics of digital transformation with (local) governments?

- **SRQ1.1:** Which characteristics define a (local) government?
- **SRQ1.2:** Which characteristics define a digital transformation?
- The sub-SRQs are created to have a structured approach to answering SRQ1. SRQ1.1 and SRQ1.2 are combined to answer SRQ1.1. The definition of digital transformation will mainly be defined through a literature review. This is compared to the perceived definition of the municipality of Soest to create a uniform definition.

**SRQ2:** Which critical success factors are important in digital transformation initiatives within local government applications?

- **SRQ2.1:** What are the key critical success factors (CSF) that contribute to the success of digital transformation initiatives?
- This sub-SRQ is focused on a broad sense of digital transformation with no specific view on local government. As there is more literature available for this scope. With the CSFs' of this sub-SRQ in mind, it is researched which of these CSFs' are also applicable in M50 local governments. This is done by performing expert interviews at the municipality of Soest, an M50 local government.

**SRQ3:** Which set of key performance indicators can be used to measure critical success factors associated with local governments in digital transformation?

- This question aims to create an artifact by combining key performance indicators with the critical success factors from SRQ3. This is possible with the knowledge from SRQ1. This artifact is aimed to be applicable in local government specific settings, e.g. the municipality of Soest or other M50 local governments. The artifact is realized with the use of a digital scorecard.

**SRQ4:** How can the set of key performance indicators developed in SRQ3 be validated through real-world applications?

- This sub-research question is about validating the key performance indicators with field experts by demonstrating or visualizing the usability and accuracy of the defined framework.

## 3.2 SRQs IN RELATION TO PROBLEM STATEMENTS

The set of research questions defined in Chapter 2.1 is linked to and can be organized based on the problem statements identified in Chapter 1.3. This categorization provides a structured understanding of how each research question directly addresses specific problem statements faced by local governments in their digital transformation efforts. Linking the sub-research questions to the problem statements, this chapter can demonstrate how each question is intended to contribute to dealing with these challenges. This structured approach ensures that each aspect of the problem statement is systematically addressed.

### Multiple competing priorities

To address the problem of multiple competing priorities, SRQ2 and SRQ4 are particularly relevant. SRQ2 aims to identify the key critical success factors that contribute to the success of digital transformation initiatives. By determining these critical success factors, local governments can focus on clear goals, thereby reducing the confusion caused by competing priorities.

Also, SRQ4 seeks to validate the set of key performance indicators developed in SRQ3 through a case study. This validation process helps identify which areas of digital transformation are most focused on, allowing local governments to concentrate their resources on the most impactful critical success factors.

### Satisfaction with the status quo

Addressing the satisfaction with the status quo, SRQ1 explores the main characteristics of digital transformation within local governments. By uncovering these characteristics, this question aims to identify the underlying reasons for the existing satisfaction. Understanding these factors can help in developing strategies to overcome resistance to change and encourage a more proactive approach to digital transformation.

### Lack of organizational agility

The issue of lacking organizational agility is addressed by SRQ3, which focuses on identifying a set of key performance indicators that can measure the critical success factors associated with local governments in digital transformation. These KPIs provide clear metrics for assessing progress and effectiveness, thereby helping local governments become more agile and responsive to changes. By using these KPIs, local governments can track their transformation efforts and make necessary adjustments to improve agility.

## Remaining problem statements

Regarding the problem statement on legal or regulatory restrictions, no specific research questions have been formulated to address this issue. This is because mitigating legal or regulatory restrictions requires a deep understanding of policies and regulations specific to Dutch law, which is beyond the scope of this research.

### 3.3 RESEARCH FRAMEWORK

A research framework visually explains how the research will be conducted, outlining the steps and methods that will be used. The framework guides the entire study, showing what will be looked at, how it will be analyzed, and what methods will be used to gather and interpret the different sources of information.

The research model depicted in Figure 5 outlines the systematic approach to answering the MRQ of this research. Each part of the model builds on the previous one to ensure a coherent and comprehensive research process.

#### SRQ1

What are the main characteristics of digital transformation with (local) governments?

The approach starts with a literature review to explore existing digital transformation (DT) theories, identifying the general characteristics of DT. This foundational work creates a theoretical understanding, which is important for the next stages.

Next, expert interviews are conducted to gather insights specific to local governments (LG). These interviews focus on the unique characteristics and challenges LGs face in their DT efforts, adding to the initial literature review by adding practical perspectives.

The characteristics identified through the literature review and expert interviews are integrated to form a comprehensive understanding of DT in LGs. This integration helps compile a set of CSFs that are both relevant and applicable to local government contexts.

#### SRQ2

Which critical success factors are important in digital transformation initiatives within local government applications?

An in-depth review of digital transformation evaluation theories is then conducted to establish a set of CSFs for assessing (conventional) DT initiatives. This section identifies specific CSFs that are important for any organization.

The further literature review examines how conventional organizations handle digital transformation. This step helps identify CSFs relevant to LGs by combining this with the results from SRQ1.

#### SRQ3

Which set of key performance indicators can be used to measure critical success factors associated with local governments in digital transformation?

The identified CSFs are then translated into key performance indicators (KPIs) to measure their effectiveness. These KPIs provide practical metrics for assessing how well LGs have implemented the determined CSFs from SRQ2, making the evaluation process concrete and actionable. The combination of CSFs and KPIs results in the intended framework.

### SRQ4

How can the set of key performance indicators developed in SRQ3 be validated through real-world applications?

To validate the developed KPIs and the overall framework, a case study is conducted. This real-world application validation tests the contents of the framework by their relevance and utility. This is done by conducting expert interviews.

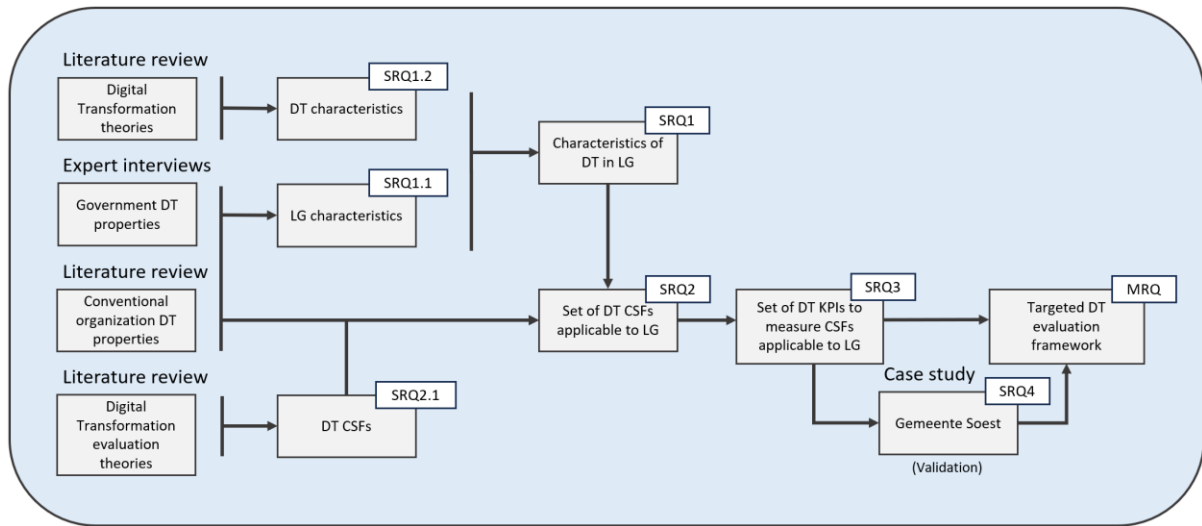


Figure 5, Research framework

### 3.4 DESIGN SCIENCE

Design science is an approach to research that centers on the creation and analysis of objects in particular contexts (Wieringa, 2014). These artifacts, which range from frameworks to algorithms, are created to interact with a certain problem setting. This method addresses both how things should be (design problems) and how to understand them as they are (knowledge questions) by combining scientific investigation with practical design. Figure 6 shows Wieringa ‘s Engineering cycle.

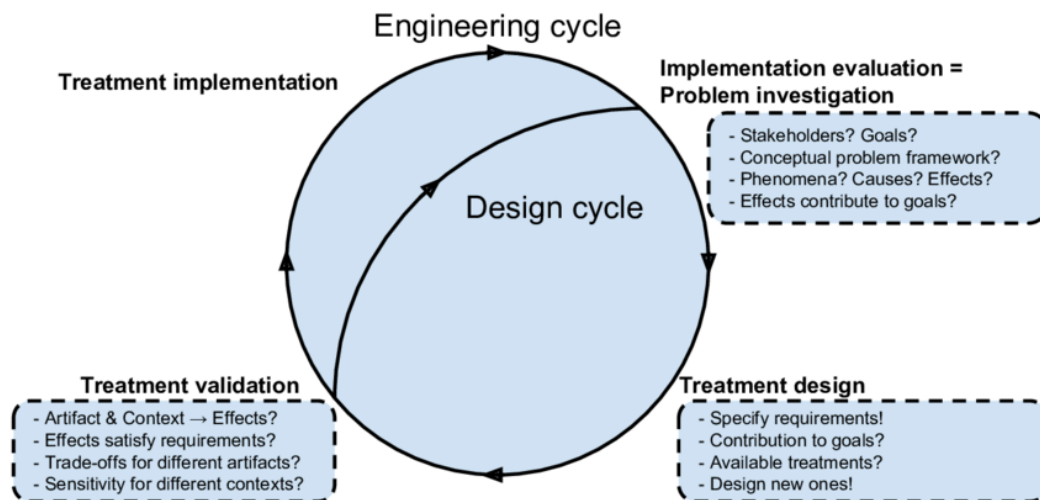


Figure 6, Wieringa ‘s Engineering cycle (Wieringa, 2014)



### 3.4.1 Problem investigation

This stage involves examining the root causes of identified problems, such as variability in digital transformation initiative effectivity, the ineffectiveness of one-size-fits-all strategies, and employee resistance to process optimization (the aforementioned problem statements). The investigation uses data analysis, interviews, and process reviews to gain insights necessary for devising solutions. SRQ1 and SRQ2 are investigating questions as they set the foundation for further research.

### 3.4.2 Treatment design

Based on the investigation findings, a solution strategy is developed. This involves selecting specific actions and plans aimed at addressing the key issues. The strategy is tailored to the unique challenges identified in each problem area. SRQ3 creates an artifact and thus belongs in the treatment design phase of design science.

### 3.4.3 Treatment validation

The effectiveness of the solution strategy is tested by evaluating if the set requirements are met. This includes assessing improvements in initiative effectiveness, flexibility in management approaches, and employee engagement with the new processes. The validation uses feedback, performance metrics, and pilot testing to ensure practical outcomes. Within this research, SRQ4 validates the findings in a real-world scenario.

	Systematic Literature review	Expert interviews	Multi-case study
<b>SRQ1:</b> What are the main characteristics of digital transformation with (local) governments?	X	X	
<b>SRQ2:</b> Which critical success factors are important in digital transformation initiatives within local government applications?	X	X	
<b>SRQ3:</b> Which set of key performance indicators can be used to measure critical success factors associated with local governments in digital transformation?	X	X	
<b>SRQ4:</b> How can the set of key performance indicators developed in SRQ3 be validated through real-world applications?	X	X	X

Table 1: Research methods used to answer SRQs

## 3.5 RESEARCH METHODS

The research methods that are used for each sub-research question are schematically displayed in Table 1.

### 3.5.1 Systematic Literature Review

#### Definition

There are guidelines in place for performing systematic literature reviews to ensure that the review process is systematic, transparent, and traceable (Kitchenham, 2004). This technique is important for establishing the credibility and reliability of the literature review.

Wohlin's (2014) guidelines on snowballing in systematic literature offer a method to find more studies in the same area of research, making sure that all relevant studies are considered. This method is especially useful for uncovering a wider range of studies related to the subject and their influence on other research.

## Application

Three SRQs focus mainly on systematic literature reviews. For each, a set of search keywords has been compiled, as shown in Table 2. Additionally, each literature review will be expanded into a more comprehensive and detailed systematic literature review, which will be thoroughly documented.

Search keywords		
SRQ1	SRQ2	SRQ3
Digital transformation characteristics	Digital transformation success factors	Digital transformation KPIs local government
Local government digitalization	Critical factors for digital transformation	Performance indicators digital change public sector
E-governance in local government	Digital project success criteria	Measuring digital transformation success
Public sector digital transformation features	Successful digital transformation elements	KPIs for government digital projects
	Key drivers for digital change	Public sector digitalization metrics

Table 2, Systematic literature review search keywords per SRQ

### 3.5.2 Pearl growing

#### Definition

The pearl growing search technique, distinct from snowballing and citation mining, focuses on the iterative process of expanding a literature search starting from a key reference or "pearl." Unlike snowballing, which typically involves tracking citations backward (references within an article) and forward (articles that cite the key article), pearl growing is more nuanced. It not only includes these steps but also systematically integrates subject headings and keywords associated with the key article to identify additional relevant literature (Hadfield, 2020).

#### Application

Pearl growing is used to identify critical success factors by first locating key literature that outlines these factors. Based on the keywords and themes identified in this literature, the study then searches for relevant metrics and additional studies.

### 3.5.3 Expert interviews

#### Definition

Expert interviews are an important tool in qualitative research, providing insights into specialized fields (Bogner et al., 2009). These interviews are not just conversations but are methodically planned and executed interactions with field experts who possess specialized knowledge, experience, or competence in a specific area.

Expert interviews are defined as a qualitative research method where interviews are conducted with a purposeful selection of individuals who are considered to be experts in their field. The definition of an 'expert' is relative and depends on the research question; it refers to individuals with exceptional knowledge or experience in a specific area (Meuser & Nagel, 2009).

Conducting expert interviews requires careful planning. This includes the identification of experts, the development of interview guides, and ethical considerations such as informed consent and confidentiality (Harvey, 2011). The interviews can be structured, semi-structured, or unstructured, depending on the research objectives.

### **Application**

Each SRQ will have a designated group of stakeholders identified for interviews. The specific individuals to be interviewed will be determined later, depending on their availability.

SRQ1: Interviews will be conducted with experts in digital transformation, focusing specifically on members of the E-Team, which is composed of IT professionals experienced with digital transformation within the municipality of Soest.

SRQ2: The group of stakeholders to be interviewed for SRQ2 will be the same as those identified for SRQ1.

SRQ3: The group of stakeholders to be interviewed for SRQ3 will be the same as those identified for SRQ1.

SRQ4: The to-be-interviewed experts will mainly entail managers who have a clear overview of past digital transformation within the organization and project leaders who have played a part in digital transformation.

#### **3.5.4 Case study**

##### **Definition**

“A case study is an empirical research method that investigates a phenomenon within its real-life context”, (Stake, 1995). The purpose of a case study is to explore, describe, or explain complex issues, often retaining the holistic and meaningful characteristics of real-life events.

Case study research involves the detailed and intensive analysis of an individual unit. This unit can be a person, a group, an organization, an event, or a community. The methodology typically involves the collection of detailed qualitative data through various means such as interviews, observations, documents, and artifacts (Baxter & Jack, 2015).

Case studies can be single-case or multiple-case designs and can be conducted in a variety of ways, including exploratory, descriptive, or explanatory. The choice depends on the research question and the objectives of the study.

##### **Application**

For SRQ4, a selection of departments from the municipality of Soest and the municipality of the Utrechtse Heuvelrug will be analyzed through case studies. These studies will adopt a multi-case approach, as they encompass several departments that need to be examined. The methodology of these case studies will be explanatory in nature, focusing on uncovering the progress of specific success factors toward a mature digital transformation organization. The selected departments for the multi-case study in SRQ4 are an IT-oriented and an operations-oriented department from both municipalities.

## 4 FINDINGS

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Each section of this chapter is dedicated to one of the SRQs and follows a consistent structure to enhance readability and understanding. Every section begins by repeating the SRQ (and, if possible, sub-SRQs) it addresses, ensuring that the focus of the section is clear.

Following the restatement of the SRQ, each section includes:

1. **Approach:** This part details the methodology and research techniques used to gather and analyze the data relevant to the SRQ. It explains the specific steps taken, such as literature reviews, interviews, or case studies, to provide a transparent account of how the findings were obtained.
2. **Results:** Here, the findings related to the SRQ are presented. This section discusses the information collected, highlighting key insights and patterns that emerged from the research. Visual aids such as figures, tables, and charts are used where appropriate to illustrate the results.
3. **Sub-Conclusion:** Each section concludes with a summary of the findings, reflecting on their significance in relation to the SRQ. This sub-conclusion presents the results, providing a concise answer to the SRQ and discussing its implications for the broader research question.

To maintain a cohesive narrative throughout the chapter, a sub-section at the start of every section, except the first, links it to the previous one. This approach helps to contextualize the findings within the broader scope of the research and shows the progression of answering the main research question.

### Overview

This chapter begins with an exploration of SRQ1, which investigates the main characteristics of digital transformation within local governments. This section is divided into two parts: the first part examines the unique characteristics that define local governments, while the second part defines digital transformation as understood in the context of this study. By combining insights from literature and interviews with experts from the municipality of Soest, this section sets the foundation for understanding the environment in which digital transformation occurs.

Following this, SRQ2 goes into identifying the Critical Success Factors (CSFs) that are important for successful digital transformation initiatives. This section initially provides a broad overview of CSFs coming from existing literature and then narrows down to those specifically relevant to local governments through qualitative data gathered from expert interviews.

Building on the identified CSFs in SRQ2, SRQ3 focuses on determining the Key Performance Indicators (KPIs) that can effectively measure a selection of those critical success factors. This section uses the 'pearl growing' search technique and integrates insights from interviews to develop a practical framework for evaluating the impact of CSFs on digital transformation initiatives.

The final section, SRQ4, validates the KPIs and the overall framework, from SRQ3, through expert interviews. This section presents case studies from the municipality of Soest and the municipality of the Utrechtse Heuvelrug. The validation process includes feedback from field experts and an analysis of the results, providing a framework for future improvements and considerations to the framework.

## 4.1 MAIN CHARACTERISTICS OF DT WITH (LOCAL) GOVERNMENTS

### Research question

The sub-research question that is explored in this chapter is: "What are the main characteristics of digital transformation within local governments?" This overarching question can be dissected into two sub-research questions (SRQ1.1/1.2) aimed at understanding both the attributes of local governments and the meaning of digital transformation.

- **SRQ1.1:** Which characteristics define a (local) government?

Local governments operate with unique characteristics that differentiate them from other entities, such as commercial organizations. Identifying these defining characteristics is important to distinguish their digital transformation processes from other types of organizations.

- **SRQ1.2:** Which characteristics define a digital transformation?

Digital transformation in any sector refers to integrating digital technology into all areas of operation, fundamentally changing how organizations operate and deliver value to stakeholders. Understanding how digital transformation is defined generally is important to identify how this interplays with a local government setting later on.

### Approach

#### ***SRQ1.1 and SRQ1.2:***

The approach to answering SRQ1.1 is based on unstructured interviews with five officials from the municipality of Soest. These discussions revolved mainly around the function and management of local governments, providing a practical context to the theoretical aspects covered in an earlier chapter [Ch.1.3]. All interviews were conducted in Dutch and all quotes mentioned in this research have been translated into English for clarity. Each interview was carried out with an agreed-upon informed consent form, which can be found in Appendix A.

SRQ1.2 starts with a literature review to establish a precise definition of digital transformation. This definition is then presented to the interviewees. The objective is to find out whether their personal definitions align with the ones found in the literature. If inconsistencies are observed, the focus shifts to understanding what those differences are and exploring the reasons behind them. This approach ensures a better understanding of how digital transformation is perceived and interpreted within the context of local government.

The interviewees selected for this research question are detailed below:

**Interviewee 1** has a background in spatial planning and ascended to a leadership role within two years of beginning their career. After approximately 12 years in the spatial and physical domain, they transitioned into ICT, not as a technical expert but as a leader in the field. Their experience spans multiple municipalities, focusing on process and information management.

**Interviewee 2** has experience with geographic domains and their applications, including zoning plans. Their career began with a consultancy role in implementing geographic applications for municipalities, emphasizing practical applications of technological solutions within local government frameworks.

**Interviewee 3**, with a professional history in operational and project management roles, has focused on the success factors influencing digital transformation within local governments. Their research and practical involvement have been important to understanding the digital shift within municipal settings.

**Interviewee 4**'s educational background includes history and cultural studies, but their career trajectory led them into digital transformation projects within local governments. Initially involved in information management through a traineeship, their role has evolved to support digital operations and transformation strategies within the municipality.

**Interviewee 5** has evolved from a role focused on traditional local government functions into leading digital transformation initiatives. Their career includes leadership roles in IT and digital strategy implementation across different municipalities, underscoring a blend of traditional governance and modern digital strategies.

## Results

### **SRQ1.1:**

#### “Which characteristics define a (local) government?”

Local governments have a level of autonomy that allows them to create policies that fit the unique challenges and needs of their specific situations. However, this autonomy operates within the constraints of national laws. As one interviewee noted:

*“We can come up with all sorts of things, but ultimately, in principle, we must comply with the law.”* - Interviewee 5

This statement emphasizes the balance between innovation and adherence to legal limits, highlighting the creative yet compliant approaches local governments must think of.

Accountability in local governments is primarily maintained through elected officials and direct community interactions. This structure ensures that the decisions and actions of local governments closely align with their communities' interests. Emphasizing the role of community feedback in shaping policies, especially in areas like digital transformation, another interviewee pointed out:

*“You really have to involve your community a lot in it [digital transformation].”* - Interviewee 4

Engagement like this not only shows transparency but also enhances the effectiveness and acceptance of new initiatives.

A main function of local governments is to provide essential services, managed more effectively at a local level. Interviewee 5 discussed the complexities involved in service delivery, especially when undergoing digital transformations:

*“The diversity of services we provide as a local government is enormous, which poses a challenge, especially when we look at the digital transformation processes that are supposed to make these services more efficient and accessible to citizens. Each of these services has its own specific requirements and regulations, which makes it complex to apply a uniform approach.”* - Interviewee 5

Local governments play a big role in community development and planning, ensuring that infrastructure developments and digital transformation initiatives meet current and future needs. The importance of community involvement in these processes cannot be overstated, as shown in interviewee 2's remarks:

*“We must do well to focus on participation and we must make use of the energy that exists in society. And we need to ensure that people can have a say.”* - Interviewee 2

This approach promotes development that connects with the public and also secures the necessary support and resources for successful implementations.

When comparing the earlier literature review with the interview insights, several similarities and differences become clear:

**Alignment on challenges and collaboration:** Both the literature and the interviews recognize the importance of inter-organizational collaboration and the challenges posed by bureaucratic structures and outdated technologies.

**Difference in community involvement:** While the literature focuses more on structural and technological challenges, interview responses highlight the role of community involvement and feedback in shaping digital strategies, an aspect that is not emphasized in the literature review.

**Regulatory compliance and autonomy:** The interviews contribute insights into the balance of autonomy and regulatory compliance, showing how local governments handle these aspects in practice, which is less detailed in the literature.

### ***SRQ1.2:***

“Which characteristics define a digital transformation?”

A study by Mergel et al. (2019) provides the following definitions which are directly quoted from their research. These definitions will serve as the baseline for further exploration and analysis in this study.

“

- *Digitization:* to highlight the transition from analog to digital services with a 1:1 change in the delivery and the addition of a technological channel of delivery;
- *Digitalization:* to focus on potential changes in the processes beyond mere digitizing of existing processes and forms; and
- *Digital transformation:* to emphasize the cultural, organizational, and relational changes that are highlighted in the outcomes section in order to differentiate better between different forms of outcomes.

“

Mainly digitization and digital transformation are essential definitions to get across to the interviewees to limit any confusion between the two.

All interviewees reached a consensus on the definition of digital transformation, closely aligning with the one previously presented. Interviewee 4 offered a particularly insightful perspective, which is captured in the following quote:

*"At the municipality of Soest, we also see it as, yes, place and time-independent work, because digital is really a computer. But it also offers the possibility to work in the cloud. So that is perhaps the biggest difference with your definition, that we indeed see it very closely together with the cloud, thus allowing you to work from anywhere, whenever you want."*

- Interviewee 4

This quote shows that digital transformation in the municipality of Soest is not just understood as digitizing processes; for example, it is about transforming how and where work can be done. By leveraging digital technologies, work is no longer limited to traditional office settings or fixed hours. Employees can perform their tasks from various locations and potentially outside of standard working hours. This concept aligns closely with the initial definition provided.

Interviewee 5 pointed out a document that outlines the digital transformation strategy specifically for the municipality of Soest (“Digitaal Werken: Zo Doen We Het in Soest,” 2022). Figure 7, extracted from this document, visually explains the primary focus areas of digital transformation for Soest, which are aimed at being effectively innovative, flexible and agile, collaborative, and safe and transparent.

#### Effectively Innovative (Doelmatig innovatief)

- The goal is to ensure that internal processes are not only technologically advanced but also effectively meet the demands of the community and the evolving digital landscape. It also underlines the importance of using innovation not just for its own sake but to improve efficiency, responsiveness, and service delivery within the municipality of Soest.

#### Flexible and Agile (Flexibel en wendbaar)

- This aspect underlines the importance of adaptability in both work habits and the use of technology, facilitating remote and efficient work processes. It also suggests that the digital transformation strategy incorporates the need for the municipality of Soest’s structures and processes to be adaptable, allowing them to quickly respond to changes and new technical challenges.

#### Together (Samen)

- ‘Together’ focuses on collaboration and new forms of participation. It shows the importance of transparency and inclusiveness in the digital transformation processes, involving various stakeholders and community members. Ensuring that all voices are heard and that there is a joint approach to digital transformation.

#### Safe and Transparent (Veilig en transparant)

- This focus area highlights the importance of security and transparency in all digital operations. The emphasis is on building trust through secure, open, and transparent processes. Reflects the priority given to protecting citizen data and maintaining high standards of transparency in how data is used and how digital systems are managed.





Figure 7, ("Digitaal Werken: Zo Doen We Het in Soest," 2022)

**SRQ1:**

"What are the main characteristics of digital transformation within local governments?"

During one of the interviews, the '2030 digital decade' topic came up as a big influence on the shaping of local government digital transformation initiatives. Now and in the future. The topic is elaborated upon further to compare their characteristics to those of the municipality of Soest.

**2030 Digital Decade**

As previously found the municipality of Soest has its own distinct characteristics in implementing digital transformation strategies. However, as highlighted in SRQ1.1, a local government does not operate in isolation and lacks full autonomy in this area. It is required to align with overarching definitions and follow regulations established by higher governing entities, in this case, the European Union. This connection ensures that while Soest can innovate to some extent, its efforts must still conform to the standardized frameworks set at the European level to maintain consistency and compliance across regions.

The European Union's (EU) 2030 Digital Decade defines a strategy geared towards digital advancement and inclusivity throughout the European Union (Het Digitale Decennium Van Europa, 2021). Specifically tailored for local governments, this initiative aims to ensure that the benefits of Europe's digital evolution are uniformly distributed across communities, regardless of their size or location, figure 8 displays this strategy.

- Skills: At least 80% of all adults should possess basic digital skills, and there should be 20 million ICT specialists in the EU, with more gender balance.
- Infrastructure: All European households should have gigabit connectivity, and all populated areas should be covered by 5G.
- Business: Three out of four companies should use cloud computing services, big data, and Artificial Intelligence.
- Government: All key public services should be available online, with all citizens having access to their e-medical records and 80% of citizens using an eID solution.

These targets are part of the EU's broader goal to strengthen its digital ecosystem so that it is secure, sustainable, and inclusive.

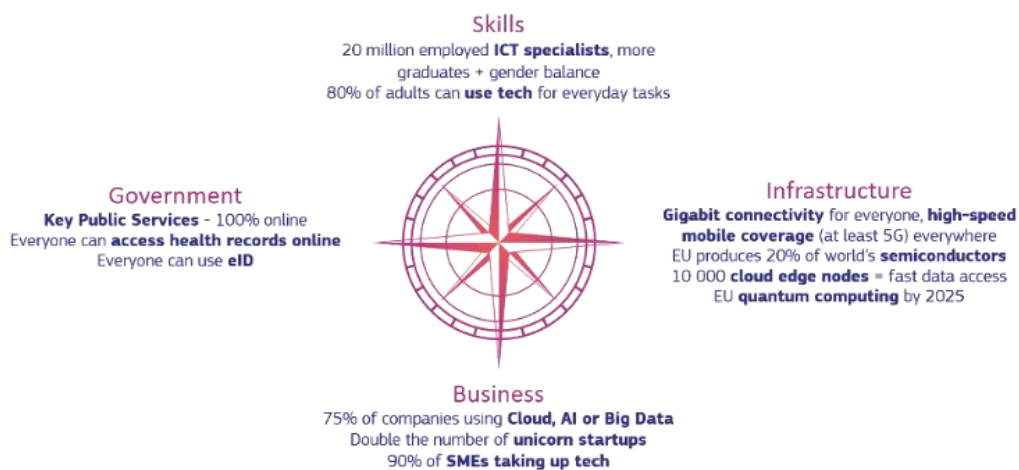


Figure 8, 2030 Digital Decade (Het Digitale Decennium Van Europa, 2021).

Implications for the municipality of Soest:

For the municipality of Soest, adhering to the EU's 2030 Digital Decade is not just an option but a requirement, influenced by EU laws, rules, and regulations. The municipality must align its local digital transformation initiatives with the EU's targets to ensure compliance and to leverage the broader benefits of digital transformation.

These upcoming regulations (2030) should be taken seriously by any local government, including Soest, as these digital transformation characteristics do not always align perfectly with the existing ones. More about this in the section below.

To align the digital transformation characteristics of the municipality of Soest with the objectives of the Digital Decade 2030 initiative, a comparison has been made. Also, a primitive adaptation strategy is presented. A summary of how the characteristics already align and what actions may be necessary:

## Existing similarities

1. Effectively Innovative (Municipality of Soest) and Business (Digital Decade 2030):
  - Both focus on leveraging technology for efficiency and improved services.
  - The municipality of Soest emphasizes internal process innovation, while Digital Decade 2030 highlights the broader use of cloud computing, big data, and AI among businesses.
2. Flexible and Agile (Municipality of Soest) and Infrastructure (Digital Decade 2030):
  - Soest's focus on adaptability aligns with the Digital Decade's emphasis on widespread infrastructure like gigabit connectivity and 5G, which are enablers of agility in digital services and remote operations.
3. Together (Municipality of Soest) and Government (Digital Decade 2030):
  - Collaboration and inclusivity in Soest can be enhanced by the Digital Decade's push for online public services, promoting broader and more unbiased access to digital resources.
  
4. Safe and Transparent (Municipality of Soest) and Skills (Digital Decade 2030):
  - Ensuring data security and transparency in Soest complements the Digital Decade's aim to improve digital skills across the population, potentially increasing public trust and competency in using digital platforms.

## Actions needed for alignment

1. Expand digital skills:
  - Develop and implement training programs made to increase digital literacy in Soest's residents to match the Digital Decade's goal of 80% of adults with basic digital skills.
  - Focus on gender-balanced recruitment and training initiatives to contribute to the broader goal of 20 million ICT specialists.
2. Upgrade digital infrastructure:
  - Assess and enhance the digital infrastructure in Soest to ensure gigabit connectivity for all households and 5G coverage in all areas, facilitating the flexibility needed for modern digital services.
3. Enhance digital business Ecosystem:
  - Promote the use of cloud computing, big data, and AI among local businesses. This can be aligned with Soest's innovation goals by providing support and incentives for businesses to adopt these technologies.
4. Digitalize public services:
  - Expand and improve online public services, ensuring they are user-friendly and accessible to all citizens, including secure online access to medical records and eID solutions. This would directly support the 'Together' characteristic of collaboration and inclusivity.
5. Strengthen security and transparency:
  - Further develop frameworks and practices that ensure the security and transparency of digital operations in Soest, aligning with the Digital Decade's focus on secure, transparent digital environments.
  - By following these steps, the municipality of Soest can better align its digital transformation initiatives with the ambitious goals of the Digital Decade 2030, ensuring that its strategies not only meet current but also future needs and standards.

### Sub-conclusion

This chapter has gone through both theoretical frameworks and empirical insights to answer the first research question. The results of SRQ1.1 and 1.2 have presented the complex interaction between local government characteristics and digital transformation, specifically exposing the unique challenges that local governments like Soest face in their digital transformation journey.

The interviews with employees from the municipality of Soest, complemented by a literature review, have provided a set of perspectives that emphasize the complicated nature of digital transformation in the public sector. The findings indicate a strong emphasis on adaptability, collaboration, security, and transparent governance as key characteristics of Soest's digital transformation strategy. These characteristics are not only important in enhancing service delivery and operational efficiency but also in fostering an inclusive and secure digital environment for community members.

The alignment of Soest's digital transformation characteristics with the goals of the European Union's 2030 Digital Decade initiative presents a strategic roadmap for Soest. The necessity to adapt to the Digital Decade's objectives of "enhancing digital skills, upgrading infrastructure, and digitalizing public services" requires a proactive approach. It does not only involve adopting new technologies and processes but also rethinking organizational cultures and communicating more deeply with the community.

#### **SRQ1.1: "Which characteristics define a (local) government?"**

- Effectively Innovative
- Flexible and Agile
- Together
- Safe and Transparent

#### **SRQ1.2: "Which characteristics define a digital transformation?"**

"Digital transformation: to emphasize the cultural, organizational, and relational changes that are highlighted in the outcomes section in order to differentiate better between different forms of outcomes" (Mergel et al., 2019).

#### **SRQ1: "What are the main characteristics of digital transformation with (local) governments?"**

Digital transformation in local government involves integrating digital technologies across all areas, emphasizing adaptability, collaboration, security, transparent governance, and, most importantly, alignment with broader initiatives like the EU's 2030 Digital Decade. These characteristics serve as a baseline for determining the most suitable critical success factors in sub-research question 2.

## 4.2 IMPORTANT CSFs IN DT WITH LOCAL GOVERNMENTS

### Research question

The sub-research question addressed in this chapter is: "Which critical success factors are important in digital transformation initiatives within local government applications?" This question breaks down into a further sub-research question (SRQ2.1) aimed at identifying the critical success factors that contribute to the success of such initiatives.

- **SRQ2.1:** What are the key critical success factors (CSF) that contribute to the success of digital transformation initiatives?

This sub-research question aims to establish a general understanding of the critical success factors that are important to digital transformation efforts, not specific to local governments.

### Connection to SRQ1

The results from SRQ1 established that the characteristics of digital transformation in local governments primarily revolve around cultural aspects, such as adaptability, collaboration, and transparent governance. Understanding this cultural foundation is essential as SRQ2 will build on these insights to identify the specific critical success factors (CSFs) that drive successful digital transformation in local governments. By recognizing the importance of cultural factors highlighted in SRQ1, SRQ2 can focus on pinpointing and analyzing the key success factors that are most relevant and impactful in this context.

### Approach

#### ***SRQ2.1:***

SRQ2.1 involves conducting a literature review to gather critical success factors for digital transformation that are not limited to local government settings. This step is important as it helps identify a wide range of factors that have been recognized as essential. The goal here is to compile a universal set of CSFs that can potentially apply to different organizational environments, providing a foundation for further research.

#### ***SRQ2:***

Building on the findings from SRQ2.1, SRQ2 shifts the focus specifically to the local government context. Here, the critical success factors identified from the broader literature are discussed with stakeholders in local government to evaluate their relevance and importance in this particular setting. Through discussions with interviewees who are experienced in local government digital transformation, the study seeks to validate and prioritize these factors. This process not only ensures that the critical success factors are applicable to the public sector but also helps in understanding which factors are critical and which may be less significant for local government.

The insights gained from SRQ2 then serve as a base for SRQ3, which focuses on more practical applications or further explorations of how these prioritized critical success factors impact digital transformation initiatives within local governments. This progress from a broad review of the literature to focused interviews and practical application ensures a thorough and contextual analysis of what drives successful digital transformation in local government settings.

## Results

### **SRQ2.1:**

“What are the key critical success factors (CSF) that contribute to the success of digital transformation initiatives?”

Leyh et al. (2021) have identified many critical success factors related to digitalization, as seen in Figure 9. Digital transformation, in contrast to digitalization, is broader and more comprehensive. It involves not just the adoption of digital technology, but a fundamental transformation of business processes, corporate culture, and customer experiences to create new or change existing business processes and practices (Mergel et al., 2019). It encompasses changes in strategy, culture, and customer interactions in addition to technological upgrades.

<b>Dimension</b>	<b>CSFs</b>
<b>Corporate organization</b>	<ul style="list-style-type: none"> <li>• Corporate culture</li> <li>• Implementation of a digital mindset</li> <li>• Unified digital corporate strategy / vision</li> <li>• Leadership</li> <li>• Top management support</li> <li>• Change management</li> <li>• Digital talent in leadership positions</li> <li>• Qualification</li> </ul>
<b>Technology</b>	<ul style="list-style-type: none"> <li>• Data collection / Big data analysis</li> <li>• Hardware</li> <li>• Software</li> <li>• Unified database in an overall system</li> <li>• Data security</li> </ul>
<b>Customer</b>	<ul style="list-style-type: none"> <li>• Customer centric management model</li> <li>• Omni-channel-management</li> </ul>
<b>Project management</b>	<ul style="list-style-type: none"> <li>• Network effects through open systems / partnerships</li> <li>• Long-term implementation through short intensive sprints</li> <li>• Resources</li> </ul>
<b>Value creation</b>	<ul style="list-style-type: none"> <li>• Networking of the entire value network</li> <li>• Implementation of new KPIs</li> <li>• Cross-functional development teams</li> <li>• Lean thinking / OpEx</li> </ul>
<b>Value proposition</b>	<ul style="list-style-type: none"> <li>• Servitization</li> <li>• Fast prototyping</li> <li>• Scalability</li> </ul>

Figure 9, CSFs defined by Leyh et al. (2021)

The methodology used to identify the critical success factors for digitalization was done with an approach combining both empirical data and a theoretical framework (Leyh et al., 2021). The researchers utilized a quantitative method by employing a 5-point Likert scale survey to assess the influence of various critical success factors. Participants were asked to rate each factor based on its impact on the success of digital transformation projects, ranging from 'No influence' to 'Very high influence'. Additionally, participants selected the top three critical success factors they considered to be most critical, providing a prioritized insight into which factors are deemed essential by practitioners in the field.

This quantitative data was then complimented by qualitative data gathered from interviews and literature reviews, which helped in contextualizing the numerical ratings and provided deeper insights into how each critical success factor impacts digital transformation efforts.

Despite the focus on digitalization, this research remains highly relevant for the current study on digital transformation for multiple reasons. First, digitalization is often a first step towards full digital transformation, providing foundational elements that are critical in the broader context of the transformation. The critical success factors identified for digitalization are just as essential in digital transformation efforts. Additionally, understanding the nuances of digitalization helps understand the scope of technological integration needed for a successful digital transformation, which often builds on the strategies developed during digitalization. Thus, insights gained from this digitalization-focused research can still provide valuable building blocks for this analysis of critical success factors in digital transformation.

The information from the literature review and additional interviews, from SRQ1, emphasize the complex characteristics of public sector digital transformations. The findings revealed a significant focus on adaptability, collaboration, security, and transparent governance. These are essential characteristics that not only enhance service delivery and operational efficiency but also aim for a secure and inclusive digital era for the community.

For these reasons, the "Corporate organization" dimension from the aforementioned table has been selected to build upon in the discussions of these findings. The critical success factors from this dimension will be directly used in this research without modification because, for the current scope and scale, this is exactly what the research needs. This dimension includes critical success factors such as corporate culture, digital strategy implementation, and leadership support, which are essential in shaping an effective digital transformation strategy. These factors resonate with Soest’s emphasis on a robust organizational framework that supports adaptability and collaborative governance. Thus, leveraging the "Corporate organization" dimension (figure 10) provides a structured way to integrate these complex variables into a cohesive analysis, ensuring that their strategies are responsive to both community needs and the broader digital agendas.

Dimension	CSFs
<b>Corporate organization</b>	<ul style="list-style-type: none"> <li>• Corporate culture</li> <li>• Implementation of a digital mindset</li> <li>• Unified digital corporate strategy / vision</li> <li>• Leadership</li> <li>• Top management support</li> <li>• Change management</li> <li>• Digital talent in leadership positions</li> <li>• Qualification</li> </ul>

Figure 10, Corporate organization CSFs (Leyh et al., 2021)

This section outlines the critical success factors within the "Corporate Organization" dimension essential for the effective digital transformation of an organization. These factors are:

**Corporate Culture:** This refers to the values, norms, and behaviors that show themselves within an organization, and how these are adapted to support and promote digital transformation.

**Implementation of a Digital Mindset:** This is about having an attitude that is open to changes, and the ability of the organization to adapt to new digital ways of working.

**Unified Digital Corporate Strategy/Vision:** This indicates having a uniform strategic vision for digital transformation that is shared and pursued throughout the organization.

**Leadership:** The role of leaders is to provide direction, inspiration, and resources for digital transformation projects.

**Top Management Support:** The active support and involvement of the highest level of management in promoting digital transformation initiatives.

**Change Management:** The processes and techniques used to manage changes within the organization, including minimizing resistance to change and ensuring a smooth transition.

**Digital Talent in Leadership Positions:** The presence of digital competencies and understanding within the management team to effectively lead digital transformation.

**Qualification:** The development and enhancement of the skills and knowledge of employees to effectively use new technological tools and methods within the organization.

### ***SRQ2:***

"Which critical success factors are important in digital transformation initiatives within local government applications?"

To answer SRQ2, it is important to identify which of the eight critical success factors previously outlined are (most) relevant to the municipality of Soest. This assessment was conducted using a methodology similar to that of the original study, though it was adapted to focus on a smaller sample within a single organization. Instead of conducting a survey followed by interviews, a qualitative survey approach was used. This involved engaging in discussions with the same interviewees from SRQ1 to explore their perspectives on each critical success factor. This method ensures a thorough understanding of the factors by the interviewees.

In alignment with the procedures of the original study, interviewees were asked to evaluate the critical success factors based on their importance, ranging from 'No influence' to 'Very high influence.' These responses were then quantified using a 5-point Likert scale. The resulting averages for each critical success factor are presented in Figure 11. For enhanced clarity, the critical success factors have been numerically coded.

- [1] Corporate Culture
- [2] Implementation of a Digital Mindset
- [3] Unified Digital Corporate Strategy/Vision
- [4] Leadership
- [5] Top Management Support
- [6] Change Management
- [7] Digital Talent in Leadership Positions
- [8] Qualification



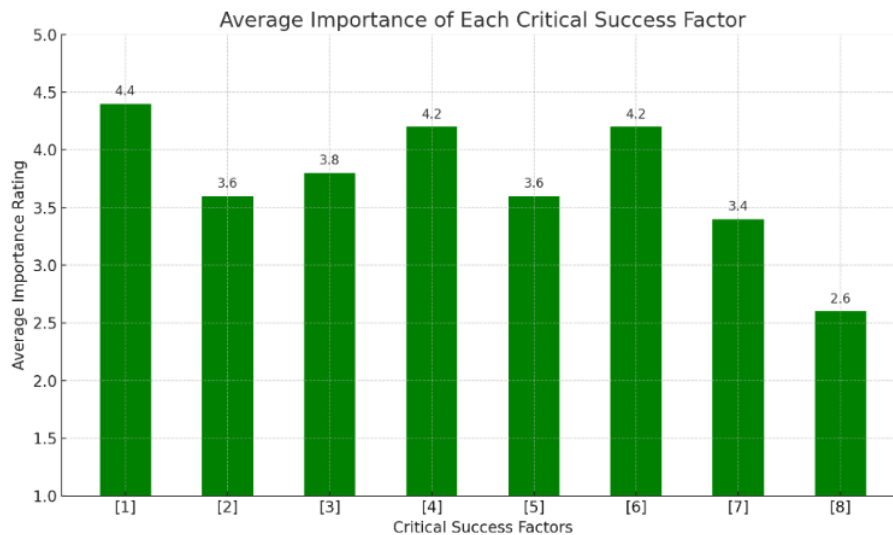


Figure 11, Average importance of each critical success factor

[1] Corporate Culture (Average Importance Rating: 4.4):

Corporate Culture received the highest rating, underscoring its perceived importance in shaping the adaptability and innovation capacity of the organization's digital transformation. Interviewee 5 noted the importance of culture by saying: *"75% of success is determined by culture"*. While they did not give a specific source for this statement, it does show what the perceived effect of culture could be.

[2] Implementation of a Digital Mindset (Average Importance Rating: 3.6):

The importance of cultivating a digital mindset is recognized but slightly less emphasized compared to corporate culture. Multiple interviews have mentioned the belief that, while important, the practical implementation of this factor is mostly automatically followed after the more important factors.

[3] Unified Digital Corporate Strategy/Vision (Average Importance Rating: 3.8):

The strategic alignment of digital transformation is important but viewed with some hesitation by some. Interviewee 2 discusses the necessity of a unified strategy, *"Yes, it is necessary, especially with the political digital transition, because otherwise there would be no clarity, but writing a policy is also necessary. they just have to keep it up to date every year"*, indicating that while strategically critical, its practical implementation might not always be fully achieved. This might also be the reason that people do not see the direct benefit of this.

[4] Leadership and [5] Top Management Support (Average Importance Rating: 4.2 and 3.6 respectively):

Effective leadership is seen as essential for driving digital transformation initiatives. Interviewee 1 mentions that he thinks that leadership is important to take the initiative, but that top management should slowly decline as the executing team picks up the initiative from there. suggesting that leadership is more important than top management support.

[6] Change Management (Average Importance Rating: 4.2):

Managing change effectively is acknowledged as challenging, reflected in the moderate rating. Interviewee 5 discusses the effect of change management, "*To address change management, we founded the E-Team. So yes, this is very important to us*", indicating the critical role change management plays for the municipality of Soest specifically.

[7] Digital Talent in Leadership Positions and [8] Qualification (Average Importance Ratings: 3.4 and 2.6 respectively):

The need for digital expertise at the leadership level and a qualified workforce is recognized but seen as areas that will automatically improve over time. Every interviewee unanimously agreed that the actual employees do not all need all the qualifications. Thus, the employees that take more initiative, e.g. team leaders, have a higher importance level.

### Sub-conclusion

SRQ2 has explored the critical success factors that are most important for digital transformation within the municipality of Soest. The results showed that while some factors such as corporate culture, leadership, and change management are perceived as critical, others like digital talent in leadership positions and specific qualifications may vary in their perceived importance across different contexts.

It was somewhat surprising to find that 'Qualifications' received a relatively low importance rating. This finding suggests that while having a qualified workforce is beneficial, other factors like corporate culture and leadership may play more important roles in driving successful digital transformations. This insight underscores the complexity of digital transformation, where organizational elements often outweigh the basic technical skills.

While the identified critical success factors are indeed relevant and necessary for digital transformation, their broad applicability may indicate a need to address fundamental organizational capabilities and readiness for change. This implies that the success of digital transformation initiatives may be dependent on the organization's overall capacity to manage and embrace change, regardless of whether that change is digital or otherwise.

It is important to note that a lower importance rating does not imply that it is unimportant per se; rather, it indicates that it is relatively less important compared to other factors in this specific context. All factors play a role in the overall success of digital transformation, with varying degrees of influence depending on the specific organizational context.

#### **SRQ2.1: “What are the key critical success factors (CSF) that contribute to the success of digital transformation initiatives?”**

- Corporate Culture
- Implementation of a Digital Mindset
- Unified Digital Corporate Strategy/Vision
- Leadership
- Top Management Support
- Change Management
- Digital Talent in Leadership Positions
- Qualification

#### **SRQ2: “Which critical success factors are important in digital transformation initiatives within local government applications?”**

- Corporate Culture with a score of *4.4 out of 5*
- Leadership with a score of *4.2 out of 5*
- Change Management with a score of *4.2 out of 5*
- Unified Digital Corporate Strategy/Vision with a score of *3.8 out of 5*
- Top Management Support with a score of *3.6 out of 5*
- Implementation of a Digital Mindset with a score of *3.6 out of 5*
- Digital Talent in Leadership Positions with a score of *3.4 out of 5*
- Qualification with a score of *2.6 out of 5*

These critical success factors are used in sub-research question 3 to create specific metrics created specifically to each factor, as the factors can not be measured on their own without metrics.

### 4.3 IMPORTANT KPIS TO MEASURE CSFs OF DT INITIATIVES WITH LOCAL GOVERNMENTS

#### Research question

The sub-research question (SRQ3) addressed in this chapter is: "Which set of key performance indicators can be used to measure critical success factors associated with local governments in digital transformation?"

#### Connection to SRQ2

The results from SRQ2 identified key critical success factors (CSFs) for digital transformation in local governments. Understanding these CSFs is important as SRQ3 further develops these CSFs to determine the Key Performance Indicators (KPIs) that can effectively measure the impact and progress of these CSFs within local government settings.

#### Approach

SRQ3 will build on the critical success factors defined in SRQ2 by using the 'pearl growing' search technique, described in chapter 3.5.2 (Hadfield, 2020). First, it is essential to identify which critical success factors should be further developed. Interviews are conducted to explore the possibilities for measuring these attributes, as they do not conform to 'traditional' quantitative metrics. Following the interviews, a literature review is done to identify the most effective methods for measuring these specific critical success factors. Once the measurement approaches have been established, it is important to select a framework that facilitates insightful data analysis.

#### Results

For the scope of this research, it would be feasible to focus on the most highly rated critical success factors that resulted from SRQ2, instead of all of them. Even though all of them are important. This decision does not exclude the other critical success factors from future expansions of the to-be-developed framework. The most important critical success factors, and their associated scores, based on average importance ratings are:

- Corporate Culture (4.4)
- Leadership (4.2)
- Change Management (4.2)

The examination is restricted to these factors due to time and resource constraints. These critical success factors are chosen because they have the highest importance ratings, indicating they are most critical for successful digital transformation in local governments. Focusing on these ensures the analysis addresses the most impactful areas. Additionally, top-rated factors are likely supported by foundational research and practical evidence, which facilitates a structured approach to developing KPIs. By concentrating on a smaller set of highly rated factors, the research can provide a more detailed and nuanced investigation. This focused approach still promises relevant and meaningful results.

During the interviewing phase of SRQ2, discussions were held with the interviewees to preliminary discuss SRQ3. The aim was to brainstorm potential approaches for measuring the different critical success factors. A consensus was formed in the different interviews, suggesting the use of a structured questionnaire as a measuring tool.

All interviewees agreed to the questionnaire approach. Interviewee 4 highlighted the inclusiveness of this method, emphasizing its applicability across all organizational levels:

*"The questionnaire should encompass a range of perspectives — from management to middle management and even the frontline employees, including janitorial staff. It's about getting a comprehensive view from everyone."* – Interviewee 4

Similarly, interviewee 3 reflected on the necessity of ensuring that the questionnaire addresses various aspects of the organization's functioning:

*"We need to think about how management, policy, and the organization's operational framework interact when designing the questionnaire."* – Interviewee 3

Implementing a questionnaire within an organization often presents challenges, particularly regarding its collaboration with existing questionnaires and ensuring active participation. Interviewee 1 suggested that the design of the questionnaire could play an important role in overcoming these challenges:

*"Perhaps by crafting stimulating questions, we might encourage respondents to reflect more deeply on their experiences and insights, fostering a more thoughtful engagement with the questionnaire."* – Interviewee 1

The feedback pointed out the common difficulties in implementing questionnaires within organizational structures. It was generally agreed that without a well-thought-out implementation strategy, the effectiveness of the questionnaire would be limited.

### **Maturity Levels**

A maturity model, as detailed in the research by Van Steenbergen et al. (2010), is a tool used to assess the current level of capability, performance, and maturity of a particular domain within an organization. The maturity model helps organizations identify their strengths and weaknesses and provides a structured path for improvement.

The Focus Area Maturity Model (FAMM) design detailed in the research emphasizes flexibility and customization, allowing the model to be tailored to specific needs and contexts.

The maturity model provides a systematic framework to assess current capabilities related to digital transformation. This structured approach aligns well with identifying and measuring the effectiveness of the critical success factors identified in the earlier results.

Van Steenbergen et al. (2010) state that to create a maturity model, one needs to develop an assessment instrument using validated definitions. To position the defined critical success factors (capabilities) in the matrix for the maturity model, three maturity levels are used: 'Traditional', 'Middle ground', and 'Digital Transformation', as detailed in Table 3. Although a more differentiated measurement might be desirable, restricting to these three levels helps avoid overly complex elaboration and remains manageable within the time and resource constraints of this study.

<b>Maturity level</b>	<b>Description</b>
Traditional	Basic, fundamental practices that are typically the starting point for organizations. These definitions are based on established, conventional methods and perspectives.
Middle Ground	This represents an intermediate stage where organizations are adopting and integrating new practices and perspectives. These definitions reflect a transition from traditional methods to more advanced and effective practices.
Digital Transformation	The highest stage of maturity is when organizations have fully integrated advanced practices and technologies. These definitions reflect a deep integration of digital tools and a proactive approach to continuous improvement and innovation.

Table 3, Maturity levels

The maturity levels are based on Frederic Laloux's book "Reinventing Organizations." They correspond to Laloux's stages of Impulsive, Traditional, Achievement, and Pluralist (Laloux, 2016). These stages are displayed in Figure 12. Laloux's stages have been chosen over other frameworks due to their balanced combination of simplicity and comprehensiveness, which facilitates a clear understanding of organizational evolution. Additionally, the decision to use Laloux's framework was enforced by insights from one of the expert interviews, highlighting its practical applicability in a local government setting.

### Traditional (Laloux's impulsive and traditional)

The Traditional maturity level aligns with Laloux's Impulsive and Traditional stages. Organizations at this level operate with basic, established practices and clear hierarchies, focusing on stability and control, much like Laloux's description of early-stage, hierarchical organizations.

### Middle Ground (Laloux's achievement)

The Middle Ground maturity level corresponds to Laloux's Achievement stage. These organizations are in transition, adopting new practices and aiming for higher performance and efficiency. They reflect Laloux's focus on structured processes and goal-oriented innovations.

### Digital Transformation (Laloux's pluralist)

The Digital Transformation level aligns with Laloux's Pluralist stage. These organizations fully integrate advanced technologies and practices, emphasizing autonomy, continuous improvement, and a holistic approach. They embody the adaptive, values-driven, and innovative characteristics of Laloux's Pluralist organizations.

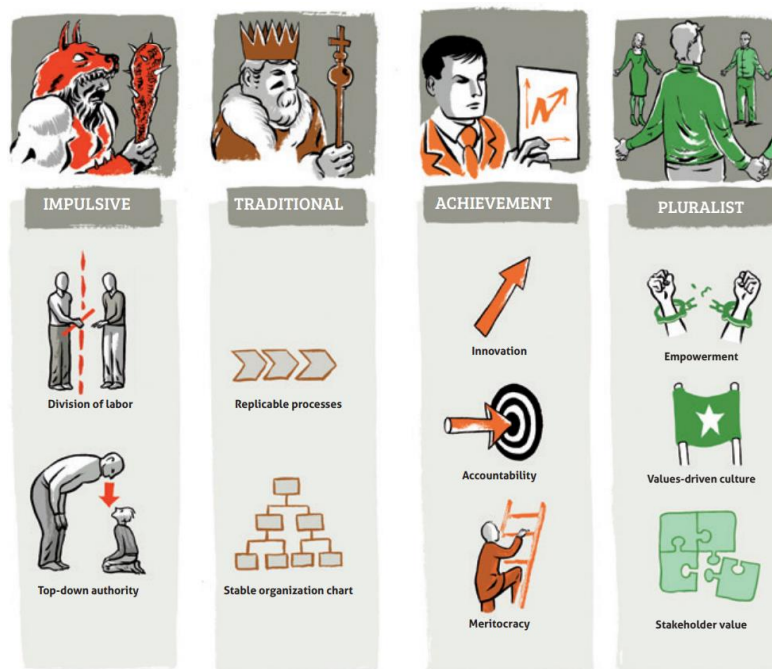


Figure 12, Organizational stages (Laloux, 2016)

### ***Maturity Model Metrics***

For each critical success factor (CSF), two metrics have been identified, and displayed in Table 4, in the literature to measure their effectiveness and impact within an organization. These metrics are later further divided into different maturity levels, providing a structured approach to assess digital transformation progress.

The following section presents a detailed analysis of the CSFs: corporate culture, leadership, and change management. Each section will outline the specific metrics associated with these CSFs, offering definitions and explanations based on existing research.

<b>Critical success factor</b>	<b>Metric</b>
Corporate culture	Respect
	Habits
Leadership	Emotional intelligence
	Foresight
Change management	Change readiness
	Engagement

Table 4, Critical success factor metrics

### **Corporate culture**

In the context of corporate culture, habits refer to the routine behaviors and practices that employees regularly engage in within an organization (Swidler, 1986). These habits are shaped by the shared values, beliefs, and norms of the organization, which in turn influence employees' attitudes and actions. Hedling and Bremberg (2021) define the importance of awareness, adoption, and integration of new skills, which can be translated into habits for the purpose of this study.

Respect in corporate culture refers to the consideration employees show towards each other, their leaders, and the organization as a whole (Li et al., 2018). It encompasses the treatment of individuals with dignity and the acknowledgment of their contributions and value to the organization.

### **Leadership**

Adeniyi et al. (2024) explore the role of emotional intelligence in shaping organizational culture and leadership development. Their study indicates that leaders with high emotional intelligence are more likely to create a supportive and inclusive culture. These leaders can effectively manage stress, conflict, and change, contributing to a healthier and more productive workplace.

(Philip et al., 2023) investigate how visionary thinking influences leadership and organizational culture. They find that leaders who exhibit visionary thinking are essential for setting a clear direction and motivating employees. Weick (2005) has the same vision about the matter but decides to define it as 'foresight'. The three levels of foresight below are from their study.

## Change management

The concept of change readiness is important for organizations aiming to successfully adapt to changes. According to Combe (2014), change readiness can be categorized into three main drivers. Each of these drivers for change readiness is used to assess the organization's overall readiness for change. How the drivers interact with each other is shown in figure X.

- **Cultural Readiness:**

This involves assessing the organizational culture to determine if it supports change. A culture that values flexibility, innovation, and continuous improvement is more likely to be ready for change. This includes the attitudes, beliefs, and behaviors that characterize how the organization operates and responds to change.

- **Commitment Readiness:**

This focuses on the commitment of key stakeholders, including leaders and employees, to the change process. It involves ensuring that everyone understands the change, why it is necessary, and what their role will be in its implementation. High levels of commitment are essential for overcoming resistance and achieving successful outcomes.

- **Capacity Readiness:**

This refers to the organization's ability to manage and implement change, including having the necessary resources, skills, and infrastructure. It assesses whether the organization has the capacity to support the change through adequate training, technology, and processes.

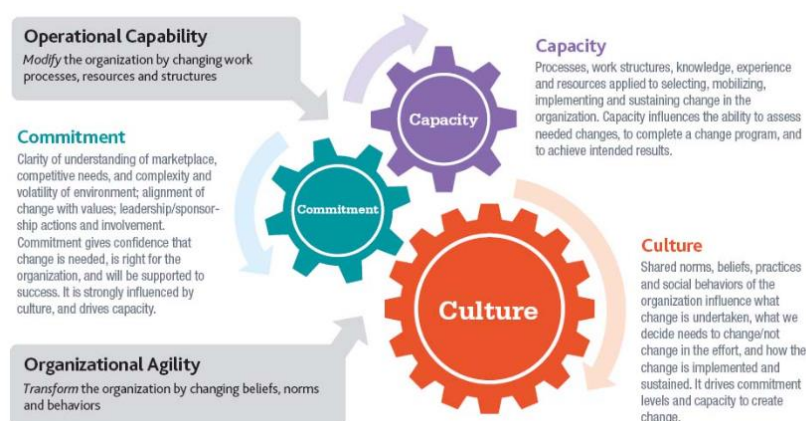


Figure 13, Change readiness drivers (Combe, 2014)

Organizational change is a complex process and is needed for ensuring that organizations remain competitive and relevant (Mack & Gilmartin, 2024). An important component of successful change management is employee engagement, which encompasses the stages of preparing, implementing, and solidifying changes within an organization. Mack and Gilmartin (2024) outline a three-stage model—unfreezing, changing, and refreezing—that provides a foundational framework for understanding how organizations can effectively manage and go through change. Figure 14 shows these stages of change.

As these stages of change are not directly useable in a maturity model, the stages have been altered to use the characteristics of each stage.

1. Unfreeze (Awareness and Preparation):



Focuses on recognizing the need for change, securing support, and preparing the organization for the upcoming changes.

2. Change (Implementation and Engagement):

Involves the active process of implementing changes, engaging employees, and maintaining open communication to support the transition.

3. Refreeze (Integration and Sustainment):

Ensures that the changes are solidified within the organization, sustained over time, and fully integrated into the organizational culture, with ongoing support and reinforcement.



Figure 14, Stages of change (Mack & Gilmartin, 2024)

**Metrics on Maturity Levels**

Each of the defined metrics can then be further divided into three distinct maturity levels: Traditional, Middle Ground, and Digital Transformation. This categorization provides an understanding of how organizations evolve in their approach to corporate culture, leadership, and change management. Table 5 illustrates these results, offering a clear visual representation of the progression through these maturity levels.

The following sections go into the specifics of each metric, examining how they are defined and measured across the different maturity levels. This detailed analysis provides insights into the stages of each critical success factor.

Critical success factor	Metric	Definitions		
		Traditional	Middle ground	Digital Transformation
Corporate culture	Respect	Recognition Respect	Appraisal Respect	Procedural Respect
	Habits	Awareness Habits	Adoption Habits	Integration Habits
Leadership	Emotional intelligence	Self-Awareness	Social Awareness	Relationship Management
	Foresight	Appreciative foresight	Instrumental foresight	Value foresight
Change management	Change readiness	Low Change Readiness	Moderate Change Readiness	High Change Readiness
	Engagement	Frozen engagement	Changing engagement	Unfrozen engagement

Table 5, Maturity model matrix systematic overview

## Respect

Recognition Respect	Appraisal Respect	Procedural Respect
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### Recognition Respect (Traditional)

This involves acknowledging and valuing every employee as a person, regardless of their job title or role (Darwall, 1977). This respect is fundamental and ensures that all employees feel seen and appreciated on a personal level.

### Appraisal Respect (Middle Ground)

This involves recognizing and appreciating an employee's skills, efforts, and contributions to the organization (Darwall, 1977). It focuses on valuing employees for their professional abilities and achievements, promoting a culture of merit and performance.

### Procedural Respect (Digital Transformation)

This involves ensuring that all organizational processes and decisions are fair. Employees are respected through transparent and equitable procedures, fostering a culture of trust and integrity. This respect level ensures that fairness is embedded in the organizational structure and decision-making processes. Although not directly discussing respect, Colquitt et al. (2001) emphasize the significance of procedural justice, highlighting that fair procedures contribute to favorable fairness perceptions, which in turn improve organizational commitment, job satisfaction, and trust.

## Habits

Awareness Habits	Adoption Habits	Integration Habits
------------------	-----------------	--------------------

### Awareness Habits (Traditional)

These habits involve staying informed and up-to-date about basic digital tools, technologies, and trends, for example, a new version of 'Outlook' (Hedling & Bremberg, 2021). Employees regularly seek out information and understand the basics of digital transformation. This includes understanding the stages of innovation adoption and recognizing the impact of new technologies on the organization.

### Adoption Habits (Middle Ground)

These habits involve actively using and experimenting with **new digital tools** and technologies, such as new online planner solutions, in daily work. Employees show a willingness to try out and adopt digital solutions, overcoming initial resistance and integrating these tools into their workflows. This stage emphasizes practical usage and the evaluation of new technologies for their effectiveness.

### Integration Habits (Digital Transformation)

These habits involve seamlessly incorporating digital tools and technologies into regular workflows and processes. Employees use digital solutions efficiently and consistently to enhance their productivity. This stage represents a deep integration where digital tools become a natural part of the organizational culture and everyday operations.

## Emotional Intelligence

Self-Awareness	Social Awareness	Relationship Management
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### Self-Awareness (Traditional)

Self-awareness is the ability of leaders to recognize and understand their own emotions, strengths, weaknesses, and values, and how these affect their behavior and decision-making, particularly in the context of digital transformation. Leaders who are self-aware can better deal with personal biases and lead more effectively. Even though Goleman (2000) did not directly specify a hierarchy in their definitions of emotional intelligence, it is possible to identify self-awareness as the most 'bare bones' definition they described.

### Social Awareness (Middle Ground)

Social awareness involves the ability of leaders to understand and empathize with the emotions of others, recognize social dynamics, and interpret the emotional currents within their team (Goleman, 2000). This awareness is needed when navigating the changes brought by digital transformation, helping leaders to connect with their teams and manage transitions smoothly.

### Relationship Management (Digital Transformation)

By combining the earlier levels of emotional intelligence and adding characteristics from Goleman (2000) it is possible to create this last definition. Relationship management is the ability of leaders to manage and influence their relationships with others, build strong teams, resolve conflicts, and inspire and motivate employees.

## Foresight

Appreciative foresight	Instrumental foresight	Value foresight
------------------------	------------------------	-----------------

### Appreciative Foresight (Traditional)

Appreciative foresight is about exploring the unexplored. It involves understanding and uncovering hidden opportunities and potential future developments that are not immediately obvious Weick (2005). Leaders use this focus to identify emerging trends, technologies, and societal shifts that might impact their organization.

### Instrumental Foresight (Middle Ground)

Instrumental foresight directs and works toward closure. It is a more goal-oriented approach that seeks to shape the future by setting clear objectives and working systematically toward achieving them. This type of foresight involves strategic planning and implementation. Leaders use instrumental foresight to establish clear visions and goals, and then develop detailed plans to achieve these goals.

### Value Foresight (Digital Transformation)

Value foresight brings people together and builds consensus Weick (2005). Kotter (2012) states, "Without credible communication, and a lot of it, employees' hearts and minds are never captured" when talking about planning change in an organization. Indicating this is a critical element to having optimal foresight.

## Change Readiness

Low Change Readiness	Moderate Change Readiness	High Change Readiness
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### Low Change Readiness (Traditional)

Cultural Readiness: Significant misalignment between cultural norms and the proposed change, high levels of resistance from employees, and lack of shared values supporting the change initiative.

Commitment Readiness: Leadership shows minimal commitment to the change, no clear change champions within the organization, and strategic goals conflict with the change efforts.

Capacity Readiness: Insufficient resources (human, financial, technological) to support the change, major skills and knowledge gaps, and inadequate processes to support change implementation.

### Moderate Change Readiness (Middle Ground)

Cultural Readiness: Partial alignment with cultural norms; mixed levels of resistance. Presence of both supportive and resistant subcultures. Some shared values align with the change.

Commitment Readiness: Leadership shows inconsistent commitment; some support, but not across all levels. A few identified and empowered change champions. Partial alignment of strategic goals with the change initiative.

Capacity Readiness: Adequate resources available, but with some limitations. Relevant skills and knowledge are present, but with noticeable gaps. Existing processes somewhat support change, but need improvements.

High Change Readiness (Digital Transformation)

Cultural Readiness: Strong alignment between cultural norms and the proposed change. Low resistance and high enthusiasm for change. Shared values and beliefs strongly support the change initiative.

Commitment Readiness: Leadership consistently shows a strong commitment to change. Multiple change champions actively drive the change. Strategic goals clearly align with the change efforts.

Capacity Readiness: Ample resources (human, financial, technological) to support the change fully. High level of relevant skills and historical knowledge. Well-established processes that support effective change implementation.

**Engagement**

Frozen engagement	Changing engagement	Unfrozen engagement
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Frozen Engagement (Traditional)

This stage involves preparing the organization to accept that change is very much needed. Disengaged employees are resistant to this unfreezing process, hindering the change. Effective communication is needed to create awareness about why the existing way cannot continue and to motivate employees toward change.

Changing Engagement (Middle Ground)

During this stage, the organization begins to transition to new ways of doing things. This period can be challenging as people start to learn new behaviors, processes, and ways of thinking. Effective communication and empowering employees are vital to helping them embrace new values, attitudes, and behaviors. This represents a deeper level of engagement where employees are actively involved in the change process and are adjusting to new ways of working.

Unfrozen Engagement (Digital Transformation)

This final stage involves establishing stability once the changes have been made. The changes are solidified and become the new norm. Support and training ensure that new behaviors are maintained. This stage reflects the highest level of engagement where new practices are fully integrated into the organization, and employees are fully committed to maintaining them. The term ‘Refreeze’ from the original paper has been changed to ‘unfrozen’ as it better reflects the state of digital transformation since ‘change’ does not refreeze but instead keeps being unfrozen forever.

### ***Understanding the Maturity Model***

To effectively use the maturity model, it's essential to understand its layout and what the different axes represent. The model is organized into a table that helps visualize the progression of various metrics across different maturity levels. Table 6 shows the full maturity model matrix, which includes all definitions and details discussed in this explanation.

**Vertical Axis (Rows):** The vertical axis lists the critical success factors (CSFs) and their corresponding metrics. These metrics are divided into three main categories:

- Corporate Culture: Includes metrics like Respect and Habits.
- Leadership: Includes metrics like Emotional Intelligence and Foresight.
- Change Management: Includes metrics like Change Readiness and Engagement. Each row corresponds to a specific metric, outlining its characteristics at different stages of maturity.

**Horizontal Axis (Columns):** The horizontal axis represents the three maturity levels:

- Traditional: This is the initial stage where organizations use basic, conventional methods and practices.
- Middle Ground: This transitional phase involves adopting more advanced practices and technologies, blending traditional methods with newer approaches.
- Digital Transformation: This is the most advanced stage, where organizations fully integrate digital tools and innovative practices, focusing on continuous improvement and adaptability.

### **How to read the maturity model:**

To read the table, start by locating the metric of interest on the left side of the table under its respective CSF. For example, if you are looking at the metric "Respect" under Corporate Culture, you will find it listed there.

Next, move horizontally across the row to see how "Respect" is defined and measured at each maturity level:

By comparing the definitions and characteristics of each metric across the maturity levels, you can understand the progression and identify where your organization currently stands and what steps can be taken to advance to a higher maturity level.

Critical success factor	Metric	Definitions
Corporate culture	Respect	<p><b>Traditional Respect</b> This involves acknowledging and valuing every employee as a person, regardless of their job title or role (Darwall, 1977). This respect is fundamental and ensures that all employees feel seen and appreciated on a personal level.</p> <p><b>Middle-ground Respect</b> This involves recognizing and appreciating an employee's skills, efforts, and contributions to the organization (Darwall, 1977). It focuses on valuing employees for their professional abilities and achievements, promoting a culture of merit and performance.</p> <p><b>Digital Transformation Procedural Respect</b> This involves ensuring that all organizational processes and decisions are fair. Employees are respected through transparent and equitable procedures, fostering a culture of trust and integrity. This respect level ensures that fairness is embedded in the organizational structure and decision-making processes. Although not directly discussing respect, Colquitt et al. (2001) emphasizes the significance of procedural justice, highlighting that fair procedures contribute to favorable fairness perceptions, which in turn improve organizational commitment, job satisfaction, and trust.</p>
	Habits	<p><b>Awareness Habits</b> These habits involve staying informed and up-to-date about digital tools, technologies, and trends (Hedling &amp; Bremberg, 2021). Employees regularly seek out information and understand the basics of digital transformation. This includes understanding the stages of innovation adoption and recognizing the impact of new technologies on the organization.</p> <p><b>Adoption Habits</b> These habits involve actively using and experimenting with new digital tools and technologies in daily work. Employees show a willingness to try out and adopt digital solutions, overcoming initial resistance and integrating these tools into their workflows (Hedling &amp; Bremberg, 2021). This stage emphasizes practical usage and the evaluation of new technologies for their effectiveness.</p>
Leadership	Emotional intelligence	<p><b>Self-Awareness</b> Self-awareness is the ability of leaders to recognize and understand their own emotions, strengths, weaknesses, and values, and how these affect their behavior and decision-making, particularly in the context of digital transformation. Leaders who are self-aware can better navigate personal biases and lead more effectively. Even though Goleman (2000) did not directly specify a hierarchy in their definitions of emotional intelligence, it is possible to identify self-awareness as the most 'bare bones' definition they described.</p> <p><b>Social Awareness</b> Social awareness involves the ability of leaders to understand and empathize with the emotions of others, recognize social dynamics, and interpret the emotional currents within their team (Goleman, 2000). This awareness is crucial when navigating the changes brought by digital transformation, helping leaders to connect with their teams and manage transitions smoothly.</p>
	Foresight	<p><b>Instrumental foresight</b> Instrumental foresight directs and works toward closure Weick (2005). It is a more goal-oriented approach that seeks to shape the future by setting clear objectives and working systematically towards achieving them. This type of foresight involves strategic planning and implementation. Leaders use instrumental foresight to establish clear visions and goals, then develop detailed plans to achieve these goals.</p>
Change management	Change readiness	<p><b>Appreciative foresight</b> Appreciative foresight is about exploring the unexplored. It involves understanding and uncovering hidden opportunities and potential future developments that are not immediately obvious Weick (2005). Leaders using this focus on identifying emerging trends, technologies, and societal shifts that might impact their organization.</p> <p><b>Low Change Readiness</b> Cultural Readiness: Significant misalignment between cultural norms and the proposed change, high levels of resistance from employees, and lack of shared values supporting the change initiative. Commitment Readiness: Leadership shows minimal commitment to the change, no clear change champions within the organization, and strategic goals conflict with the change efforts. Capacity Readiness: Insufficient resources (human, financial, technological) to support the change, major skills and knowledge gaps, and inadequate processes to support change implementation (Combe, 2014).</p> <p><b>Moderate Change Readiness</b> Cultural Readiness: Partial alignment with cultural norms, mixed levels of resistance. Presence of both supportive and resistant subcultures. Some shared values align with the change. Commitment Readiness: Leadership shows inconsistent commitment, some support, but not across all levels. A few identified and empowered change champions. Partial alignment of strategic goals with the change initiative. Capacity Readiness: Adequate resources available, but with some limitations. Relevant skills and knowledge present, but with noticeable gaps. Existing processes somewhat support change, but need improvements (Combe, 2014).</p> <p><b>High Change Readiness</b> Cultural Readiness: Strong alignment between cultural norms and the proposed change. Low resistance and high enthusiasm for change. Shared values and beliefs strongly support the change initiative. Commitment Readiness: Leadership consistently shows strong commitment to the change. Multiple change champions actively driving the change. Strategic goals clearly align with the change efforts. Capacity Readiness: Ample resources (human, financial, technological) to support the change fully. High level of relevant skills and historical knowledge. Well-established processes that support effective change implementation (Combe, 2014).</p>
	Engagement	<p><b>Value foresight</b> Value foresight brings people together and builds consensus Weick (2005). Kotter (2012) states, "Without credible communication, and a lot of it, employees' hearts and minds are never captured", when talking about planning change in an organization. Indicating this is a critical element to having the optimal foresight.</p> <p><b>Unfrozen engagement</b> This final stage involves establishing stability once the changes have been made (Alick &amp; Gilmartin, 2024). The changes are solidified and become the new norm. Support and training ensure that new behaviors are maintained. This stage reflects the highest level of engagement where new practices are fully integrated into the organization, and employees are fully committed to maintaining them.</p>

Table 6, Maturity model matrix full overview

### Sub-conclusion

In this chapter, sub-research question 3 (SRQ3) was addressed: "Which set of key performance indicators can be used to measure critical success factors associated with local governments in digital transformation?" By focusing on the most highly rated critical success factors identified in SRQ2—corporate culture, leadership, and change management—SRQ3 aimed to create a framework for measuring the state of digital transformation in local governments.

The approach included conducting interviews to explore non-traditional quantitative metrics, followed by a comprehensive literature review to establish effective measurement methods. The consensus among interviewees supported the use of structured questionnaires, designed to capture a broad range of perspectives from various organizational levels. The challenges and insights gathered from these interviews helped the development of the KPIs and highlighted the importance of an inclusive and well-implemented questionnaire strategy.

By focusing on the most important success factors and utilizing a maturity model framework, a set of KPIs has been established that can effectively measure the state of digital transformation initiatives in local governments. This framework ensures a detailed and comprehensive evaluation. The insights gained from SRQ3 lay the groundwork for the practical validation in SRQ4.

### **SRQ3: "Which set of key performance indicators can be used to measure critical success factors associated with local governments in digital transformation?"**

- Respect
- Habits
- Emotional intelligence
- Foresight
- Change readiness
- Engagement

The metrics above, which are determined to measure the progression of digital transformation in local government settings, are positioned in a maturity model matrix (MMM). This MMM is further refined into an actionable maturity model and questionnaire in sub-research question 4.



## 4.4 CASE STUDY VALIDATION

### Research question

“How can the set of key performance indicators developed in SRQ3 be validated through real-world applications?”

### Connection to SRQ3

The findings from SRQ3 identified specific Key Performance Indicators (KPIs) important for measuring the progress of the critical success factors (CSFs) in digital transformation within local governments. Additionally, a maturity model matrix is developed to systematically assess these CSFs. These KPIs and the maturity model matrix provide practical handles for evaluating how well the identified CSFs, corporate culture, leadership, and change management, are being implemented.

The maturity model matrix is needed as SRQ4 focuses on validating the maturity model through expert interviews. By applying the maturity model developed in SRQ3, SRQ4 aims to validate and propose improvements to this framework in actual local government settings.

### Approach

To validate the maturity model matrix defined in SRQ3, the following steps are undertaken:

1. Selecting the maturity model matrix format

Determining the most appropriate format to visualize the maturity model matrix. This involves selecting a format that is not only comprehensive but also visually appealing. A well-designed matrix enhances understanding and engagement from decision-makers. The format should be clear and intuitive to help in accessible analysis.

2. Translation from maturity model to questionnaire questions

Transforming the maturity model matrix into a set of understandable and actionable questionnaire questions. This step ensures that the abstract concepts within the maturity model are communicated effectively to the respondents. The questions should be designed to be clear, understandable, and relatable. Van Steenberg et al. (2010) define this process as “formulating control questions for each capability”.

3. Validation of maturity model with a multi-case study

Gather expert opinions to validate the relevance and accuracy of the developed maturity model. Experts can provide insights into whether the decided-upon critical success factors are reflective of real-world practices.

### Results

#### 1. *Selecting the maturity model matrix format*

Van Gasteren (2021) defines a maturity model based on growth, as illustrated in Figure 15. This model enables visualization of current measurements relative to previous ones and allows setting goals for future measurements. This approach offers a clear picture of progress over time. For the maturity model defined in SRQ3, this visualization strategy will be used because it provides a comprehensive and dynamic way to track and analyze the evolution of critical success factors in digital transformation not just with a snapshot of time but in a ‘growth perspective’. This ensures a detailed assessment of growth stages and helps in identifying areas needing improvement. None of the actual content from the maturity model of Van Gasteren (2021) is carried over to the maturity model presented by this study.

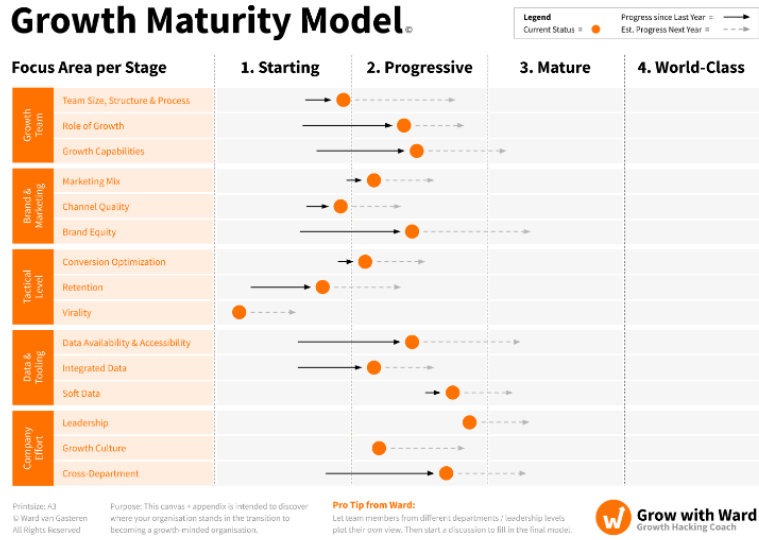


Figure 15, Growth maturity model by Van Gasteren (2021)

Building on this concept, the new maturity model is called the “Digital Transformation Progress Maturity Model”, figure 16. This model uses the same visualization strategy to effectively measure and visualize the progress and development of digital transformation initiatives, ensuring a clear and structured path for continuous improvement.

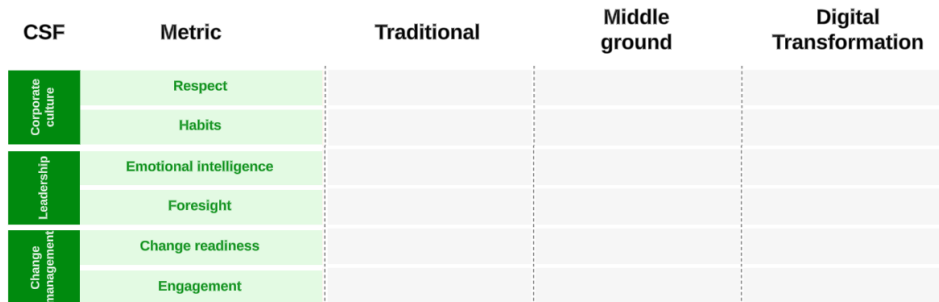


Figure 16, Digital Transformation Progress Maturity Model (DTPMM)

In Figure 17 a fictional interpretation of the DTPMM can be found, purely for illustrative purposes. The dots indicate the current measurement, while the arrows indicate growth compared to the previous measurement.

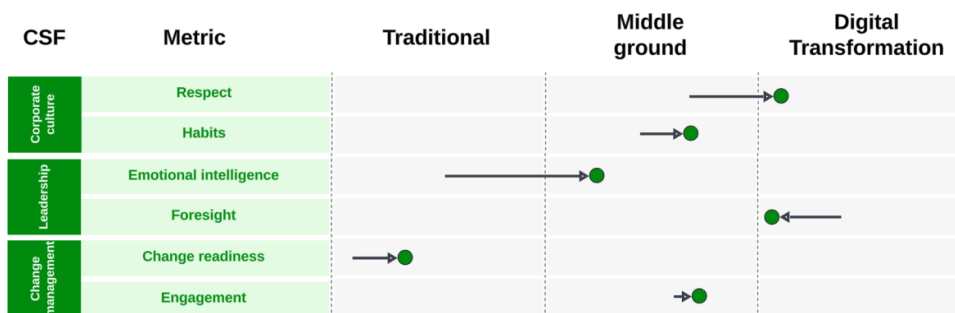


Figure 17, Digital Transformation Progress Maturity Model (DTPMM) with fictional content

## **2. Translation to questionnaire questions**

To measure the key performance indicators from SRQ3 associated with the critical success factors from SRQ2, the questionnaire questions on the next page have been created.

The critical success factors (CSFs) were translated into a multiple-choice questionnaire to facilitate easier and more consistent measurement. Multiple-choice questions were chosen because they allow for straightforward data analysis and comparison. Additionally, the predefined answers align with the Maturity Model (MM) definitions, ensuring that respondents' selections directly correspond to specific maturity levels. This approach not only simplifies the data collection process but also ensures that the responses accurately reflect the intended metrics, providing a clear and quantifiable assessment of the digital transformation progress.

To introduce the questions to the respondents, respondents are asked to provide their honest opinions, emphasizing that there are no right or wrong answers. The goal is to capture their personal perceptions. Additionally, respondents are presented with an informed consent form. For better readability and understanding, all questions have been translated into Dutch B1 language level (Ministerie van Algemene Zaken, 2024), with the translated version included in appendix B.1.

## Corporate Culture

### - Respect

“How would you rate your organization in terms of respect among employees and management?”

- A. Recognition Respect (Traditional): Employees are acknowledged and valued as individuals.
- B. Appraisal Respect (Middle Ground): Employees’ skills, efforts, and contributions are recognized and appreciated.
- C. Procedural Respect (Digital Transformation): Organizational processes and decisions are fair and transparent, ensuring everyone is treated with dignity.

### - Habits

“How would you rate your organization in terms of employees’ awareness of digital tools and technologies, e.g. new versions of MS365?”

- A) Awareness Habits (Traditional): Employees regularly seek out information and stay updated about digital tools and trends.
- B) Adoption Habits (Middle Ground): Employees actively use and experiment with new digital tools in their daily work.
- C) Integration Habits (Digital Transformation): Digital tools and technologies are seamlessly incorporated into regular workflows and processes.

## Leadership

### - Emotional Intelligence

“How would you rate your organization's leadership in terms of emotional intelligence?”

- A. Self-Awareness (Traditional): Leaders recognize and understand their own emotions and how they affect their behavior and decision-making.
- B. Social Awareness (Middle Ground): Leaders understand and empathize with the emotions of others, recognizing social dynamics within the team.
- C. Relationship Management (Digital Transformation): Leaders effectively manage and influence their relationships with others, building strong teams and resolving conflicts.

### - Foresight

“How would you rate your organization's leadership in terms of foresight?”

- A. Appreciative Foresight (Traditional): Leaders explore hidden opportunities and potential future developments that are not immediately obvious.
- B. Instrumental Foresight (Middle Ground): Leaders set clear objectives and systematically work towards achieving them through strategic planning.
- C. Value Foresight (Digital Transformation): Leaders build consensus and align organizational goals with the values and needs of employees and stakeholders.

## Change Management

### - Change Readiness

“How would you rate your organization's readiness for change?”

- A. Low Change Readiness (Traditional): Significant misalignment between cultural norms and the proposed change, with high levels of resistance and insufficient resources.
- B. Moderate Change Readiness (Middle Ground): Partial alignment with cultural norms, mixed levels of resistance, and adequate resources but with some limitations.
- C. High Change Readiness (Digital Transformation): Strong alignment between cultural norms and the proposed change, low resistance, and ample resources to support the change.

### - Engagement

“How would you rate employee engagement in your organization during change initiatives?”

- A. Frozen Engagement (Traditional): Employees are resistant to the unfreezing process, hindering the change and maintaining the status quo.
- B. Changing Engagement (Middle Ground): Employees are actively involved in the transition, embracing new values, attitudes, and behaviors.
- C. Unfrozen Engagement (Digital Transformation): New practices are fully integrated into the organization, with employees fully committed to maintaining them.

### 3. *Validation of maturity model*

To enhance the robustness of the study and introduce an external validation factor, the validation phase will also be replicated at the municipality of the Utrechtse Heuvelrug. This approach enables a comparative analysis between two different municipalities, providing insights into the generalizability of the findings.

The primary aim of this validation is to confirm the theoretical soundness and relevance of the DTPMM's content, rather than developing a Version 2 (V2) of the model or validating its implementation. This validation process ensures that the DTPMM is conceptually robust and applicable to the contexts of local governments.

The municipality of Utrechtse Heuvelrug was selected for external validation due to its similar size to Soest, and the fact that both municipalities are associated with the “Regionale ICT-Dienstverlener” (RID). This ensures the comparability and relevance of the findings.

Interviews will be conducted with two team leaders from each municipality, resulting in a total of four team leaders. These interviews will be conducted with experts from two different domains/departments, IT and business operations (one from each municipality). This strategy will provide a means to identify differences and similarities between departments within and across municipalities.

The validation process for the municipalities of Soest and Utrechtse Heuvelrug is conducted independently. The combined findings from both validations are presented in the conclusion of this sub-research question.

To qualitatively validate various aspects of the DTPMM, four categories have been identified based on the framework provided by Im et al. (2019): Utility and Application, Completeness, Alignment with Real-World Practices, and Implementation Feedback. Each category was selected for its simplicity and understandability, ensuring that the interviewees could easily engage with and provide meaningful insights on the model.

### 1. Utility and Application

Mettler (2011) discusses the phases of maturity model development and their practical applications, highlighting the decision parameters needed to ensure the rigor and relevance of these models in real-world settings.

An appropriate validation question that can be derived from this information is:

**“Which aspects of the maturity model do you find most useful in practical applications? Can you provide specific examples?”**

### 2. Completeness:

De Bruin et al. (2005) outline the essential phases in developing maturity assessment models, including necessary dimensions and indicators. It is suitable for identifying any potential gaps in existing models and recommending additions. The following question can be created based on that information:

**“Are there any dimensions or indicators you feel are missing from the maturity model? If so, what would you recommend adding?”**

This question effectively requests input on improving the model based on the methodology discussed in the research.

### 3. Alignment with Real-World Practices:

Not only should a maturity model be theoretically sound but it should also be applicable to real-world practices according to Pöppelbuß and Röglinger (2011). They create a framework for assessing the alignment of maturity models with real-world practices.

**“Can you provide examples where the model aligns well or does not align with real-world digital transformation practices?”**

### 4. Implementation Feedback:

Paulk et al. (1993) present research that provides guidance on how to implement a capability maturity model in real organizational settings. It discusses the need for planning, resource allocation, and management support, which relates to assessing the feasibility of implementing the model. This leads to the interpretation of the following validation question:

**“How feasible is it to implement the model in a real organizational setting? What challenges do you foresee?”**

## Case Summaries

All specific information from the interviews is systematically documented in Table 6 on the following page.

- Case One: Municipality of Soest - Proces Informatie Management

The Department of Proces Informatie Management (PIM) at the Municipality of Soest, represented by an experienced PIM advisor, provided insights. According to the expert, change management is the most valuable aspect of the maturity model. While other aspects are important, change management, involvement, and readiness for change are deemed to have the most significant impact. The expert suggested that the model could be enhanced by assessing the maturity level of knowledge and collaboration within the organization.

*“Collaboration level would also be a good one to know. Then you, as a new employee, can see what you can expect.”*

Digital transformation should focus more on employee involvement rather than management, with specific policies added to support this shift. This quote from the interview clarifies that statement;

*“I don't think it's so much about leadership, they have different goals. You really have to be able to take the people with you.”*

- Case Two: Municipality of the Utrechtse Heuvelrug - Informatie & Gegevens

In the department of Informatie & Gegevens at the Municipality of the Utrechtse Heuvelrug, the Teamleider Informatie & Gegevens was interviewed to validate the DTPMM. While the model is considered beneficial, it was suggested that reviewing the questionnaire questions could enhance its understandability by a broader audience.

*“Questions are now very complicated for an employee who does not have much to do with this.”*

The model aligns well with practical applications, particularly in change management and cultural transformation. Implementation is feasible but requires comprehensive integration at all organizational levels to ensure success. Specifically, the model should have an ‘owner’ in the organization that ensures the use and outcome of the model is consistent.

*“You would need to have an owner of this topic.”*

- Case Three: Municipality of Soest - Bedrijfsvoering

The Manager Bedrijfsvoering at the Municipality of Soest stressed the importance of change management and corporate culture.

*“All of the factors are very important. Change management and corporate culture in particular are extremely necessary. There must be a willingness to change.”*

Digital means and adequate knowledge within the organization are necessary for the model's completeness.

*“What is available is also important, on the system side, the back end.”*

The department's focus on digitizing recruitment processes highlights the need for foresight both at the leadership and employee levels. The manager emphasized that sufficient ‘belief’ of digital transformation could also be an essential part of the model.

*“Belief in digital transformation can be an addition. Perhaps this belongs a bit under change management.”*

- Case Four: Municipality of the Utrechtse Heuvelrug - Regie & Faciliteren

The department of Regie & Faciliteren, led by the Teamleider Regie & Faciliteren at the Municipality of the Utrechtse Heuvelrug, provided insights emphasizing the importance of leadership. The expert pointed out that while the model is effective, it needs to include more aspects of digital transformation to be complete.

*“You should actually know what skills people have. But not essentially quantitative but qualitative. The soft skills”*

Implementation feedback highlights the need for clear ownership of this initiative and integrating into the overall organizational strategy.

*“Flow is very high. How do you secure this in the organization? It must also be decided at the highest level.”*

	Case one	Case two	Case three	Case four
<b>Organization</b>	Municipality of Soest	Municipality of the Utrechtse Heuvelrug	Municipality of Soest	Municipality of the Utrechtse Heuvelrug
<b>Department</b>	“Proces Informatie Management”	“Informatie & Gegevens”	“Bedrijfsvoering”	“Regie & Faciliteren”
<b>Type (Internal/External)</b>	Internal	External	Internal	External
<b>Expert interviewee (Role)</b>	PIM Adviseur	Teamleider Informatie & Gegevens	Manager Bedrijfsvoering	Teamleider Regie & Faciliteren
<b>1. Utility and Application</b>	Change management is the most important critical success factor. Change readiness and engagement are the most important metrics. No chance of success without those.	Change management is the most important critical success factor. Change readiness is the most important metric.	Change management and corporate culture as the most important critical success factors. Change readiness is the most important metric.	Leadership is most important critical success factor. Foresight is the most important metric.
<b>2. Completeness</b>	Add “digital means” as a metric.	Add “digital means” as a metric.	Add “digital means” and “believe in digital transformation” as metrics.	Add “soft skills” as a metric, specifically under corporate culture.
<b>3. Alignment with Real-World Practices</b>	More specific elements are needed: “Level of knowledge”, “policy control”, “regional cooperation” and “internal cooperation”.	Ride the momentum of the metrics, and play to your strengths.	Unsure if all metrics are equally important; change readiness should be emphasized more.	The model helps leverage organizational strengths and can be a stop-sign for new projects.
<b>4. Implementation Feedback</b>	Focus more on employees rather than managers.	Make the questionnaire easier to understand.	Assign responsibility to individuals or teams for securing the model in the organization.	Ensure the model is secured in the organization.

Table 7, Multi-case study DTPMM



To understand how similar departments in different municipalities approach the DTPMM, a comparison of their strategies and priorities is made. This section highlights both common and unique approaches. The comparisons that are made are as follows:

- "Proces Informatie Management" (Soest) and "Informatie & Gegevens" (Utrechtse Heuvelrug)
- "Bedrijfsvoering" (Soest) and "Regie & Faciliteren" (Utrechtse Heuvelrug)

### **Comparison of “Proces Informatie Management” and “Informatie & Gegevens”**

"Proces Informatie Management" (Soest) and "Informatie & Gegevens" (Utrechtse Heuvelrug) both highlight the importance of change management and organizational readiness in their strategies. They agree on incorporating "digital means" as a key metric for evaluating information management processes. However, their approaches diverge in significant ways.

- **Soest's Approach**

Soest emphasizes the internal capabilities of the organization, wanting a detailed evaluation framework. They propose adding specific elements such as the knowledge level of employees and the robustness of policy control mechanisms. By focusing on employee knowledge, Soest ensures that staff are well-equipped to handle changes effectively. Additionally, strong policy control is seen as essential for maintaining consistency and compliance within the organization. This employee-centric approach aims to create a resilient environment capable of managing information efficiently through periods of change.

- **Utrechtse Heuvelrug's Approach**

Utrechtse Heuvelrug goes for leveraging existing organizational strengths and simplifying evaluation methods to enhance clarity and usability. They recommend streamlining questionnaires to make them more understandable, which facilitates better engagement and accurate assessments. By building on established workflows and existing technological infrastructure, Utrechtse Heuvelrug aims to implement changes smoothly and with minimal disruption. This pragmatic approach prioritizes efficiency and practical improvements, ensuring a seamless transition to new digital tools and methods.

- **Conclusion**

Both Soest and Utrechtse Heuvelrug recognize the role of digital tools in modern information management. However, their methods to achieve this are different. Soest's model emphasizes internal capability building and stringent policy control, while the Utrechtse Heuvelrug focuses on simplifying processes and leveraging existing strengths.

### **Comparison of “Bedrijfsvoering” and “Regie & Faciliteren”**

"Bedrijfsvoering" (Soest) and "Regie & Faciliteren" (Utrechtse Heuvelrug) both prioritize securing their operational models and leveraging organizational strengths. However, their approaches differ significantly in focus and methodology.

- **Soest's Approach**

Soest places a strong emphasis on change management and digital transformation. They recommend incorporating "digital means" as a key metric, reflecting a firm belief in the importance of digital transformation. Soest's strategy is centered on the idea that embracing digital tools and technologies is essential for modernizing operations and staying competitive. This approach involves not only the adoption of new technologies but also a cultural shift towards valuing and integrating digital solutions throughout the organization.

- **Utrechtse Heuvelrug's Approach**

In contrast, Utrechtse Heuvelrug emphasizes leadership and foresight in their strategy. They suggest focusing on "soft skills" within the corporate culture, recognizing that effective leadership and strong interpersonal skills are crucial for guiding the organization through changes. Additionally, Utrechtse Heuvelrug advocates for using their operational model strategically to initiate new projects, leveraging existing strengths and foresight to drive innovation and progress. This approach underscores the importance of visionary leadership and a proactive stance in project management and development.

- **Conclusion**

Both Soest and Utrechtse Heuvelrug agree on the importance of securing their operational models and leveraging organizational strengths. However, their methods diverge in significant ways. Soest emphasizes digital transformation and change management, believing that digital tools are key to future success. Utrechtse Heuvelrug, on the other hand, focuses on leadership and foresight, highlighting the importance of soft skills and strategic use of their operational model to drive new initiatives.

### Sub-conclusion

This chapter validated the maturity model matrix developed in SRQ3 through practical applications, focusing on its relevance and practicality. The validation involved selecting an appropriate format, transforming concepts into questionnaire questions, and conducting a multi-case study.

1. Format Selection: The "Digital Transformation Progress Maturity Model" (DTPMM) is created for clear visualization.
2. Questionnaire Translation: Key performance indicators are translated into clear questions in the Dutch B1 language level.
3. Multi-Case Study: Validation from Soest and the Utrechtse Heuvelrug, gathering insights on utility, completeness, alignment, and feasibility.

### Key Findings

- Soest - Proces Informatie Management: Emphasized change management, and suggested knowledge and collaboration metrics.
- Utrechtse Heuvelrug - Informatie & Gegevens: Recommended simplifying questions and having a model owner.
- Soest - Bedrijfsvoering: Highlighted change management, digital means, and belief in digital transformation.
- Utrechtse Heuvelrug - Regie & Faciliteren: Focused on leadership, foresight, and soft skills.

Both municipalities emphasized change management and readiness but differed in focus areas, with Soest advocating for more specific elements and Utrechtse Heuvelrug emphasizing leveraging strengths and simplifying the questionnaire.

While both sets of departments share some common goals, their unique focuses and recommendations reflect their specific needs and priorities.

The feedback gathered from expert interviews highlighted areas for enhancement that would ensure the model's completeness and alignment with real-world practices. The comparative analysis provided insights into the adaptability of the DTPMM across different organizational contexts. Moving forward, the recommended enhancements, such as simplifying questionnaire questions and ensuring clear ownership of the model, will further refine its applicability and effectiveness.

**SRQ4: “How can the set of key performance indicators developed in SRQ3 be validated through real-world applications?”**

- By performing a multi-case study across different departments and municipalities, which resulted in proposed improvements as well as the validation of the DTPMM's strengths.

## 5 DISCUSSION

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The results from this research provided several insights that are different from the initial expectations. These differences, uncovered through the literature reviews, expert interviews, and the multi-case study, have important implications for understanding this research.

### **Broader maturity model scope**

During the expert interviews, it was clear that the Digital Transformation Progress Maturity Model (DTPMM) required a broader focus than initially anticipated. Experts emphasized the need for an overarching organizational perspective rather than concentrating solely on individual digital transformation initiatives.

On the other hand, the multi-case study revealed a pressing need for more focused metrics and success factors tailored to specific situations. This finding underscores the complexity and diversity of digital transformation projects within local governments. While a broad organizational view is necessary, it must be complemented with precise, initiative/situation-specific metrics to capture the unique challenges and progress of more specific aspects.

### **Unfreezing, not refreezing**

A significant difference from the literature was found in the concept of organizational change stages. Literature states that after a change is implemented, the organization should be 'refrozen' to stabilize the new way of working (Mack & Gilmartin, 2024). However, this stage should be considered as 'unfreezing.' Change should be seen as a continuous process where the organization remains agile and adaptable rather than 'freezing' new practices. This perspective aligns with the characteristics of digital transformation, where constant evolution and flexibility are critical for sustained success.

### **Difficulties with the questionnaire**

The implementation of a questionnaire to gather quantitative data was expected to proceed smoothly, providing clear results on the metrics for evaluating the defined critical success factors. However, this was not feasible due to the cultural aspects inherent in the organization. Measuring elements like corporate culture through a questionnaire proved to be challenging. These cultural dimensions are deeply ingrained and difficult to quantify accurately through standard survey methods. The expectation that the questionnaire would be straightforward was not met.

## 6 CONCLUSION

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This study explored the theoretical and empirical aspects of digital transformation in local governments, focusing on the municipality of Soest. The findings highlight the complex interaction between local government characteristics and digital transformation, revealing unique challenges faced by local governments.

### **Key findings and their implications**

The results of SRQ1 emphasized adaptability, collaboration, security, and transparent governance as critical to Soest's digital transformation strategy. These characteristics enhance service delivery, and operational efficiency, and foster an inclusive digital environment. For instance, Soest's alignment with the EU's 2030 Digital Decade initiative underscores the need for proactive approaches in adopting new technologies, reshaping organizational cultures, and engaging the community.

SRQ2 identified critical success factors such as corporate culture, leadership, and change management as more significant than basic technical qualifications. This highlights the complexity of digital transformation, where organizational elements play a larger role than technical skills. For example, leadership and corporate culture received high importance ratings of 4.2 and 4.4 respectively, emphasizing their important role in driving digital transformation initiatives.

Insights from SRQ2 provided a foundation for designing an effective maturity model for digital transformation progress, addressed in SRQ3. By focusing on the most critical factors, a comprehensive set of key performance indicators (KPIs) was developed. This framework, supported by interviews and literature review, is called the "Digital Transformation Progress Maturity Model" (DTPMM). The validation of this model through expert feedback from Soest and Utrechtse Heuvelrug highlighted its practical utility and areas for improvement.

SRQ4 continued with the maturity model by converting it into an actionable model accompanied by a questionnaire. This model and the questionnaire were validated by local government officials, focusing on utility, application, completeness, alignment with real-world practices, and implementation feedback. For example, both municipalities emphasized the importance of change management and suggested adding metrics for knowledge and collaboration to enhance the model's applicability and effectiveness.

### **Answering the main research question**

The main research question (MRQ), "How can critical success factors for digital transformation be identified, measured, and evaluated to assess the progress of digital transformation in an M50 local government setting?", aimed to explore how local governments can successfully plan and execute digital transformation. The findings indicate that strategic alignment with broader digital agendas, such as the EU's Digital Decade, combined with a focus on critical organizational factors like corporate culture, leadership, and change management, is essential for success. The developed DTPMM provides a practical roadmap for other local governments aiming to achieve successful digital progress by addressing these critical factors. This research successfully validated the content, and not the implementation, of the DTPMM, shown again in Figure 17 below, through expert interviews in four different case studies.

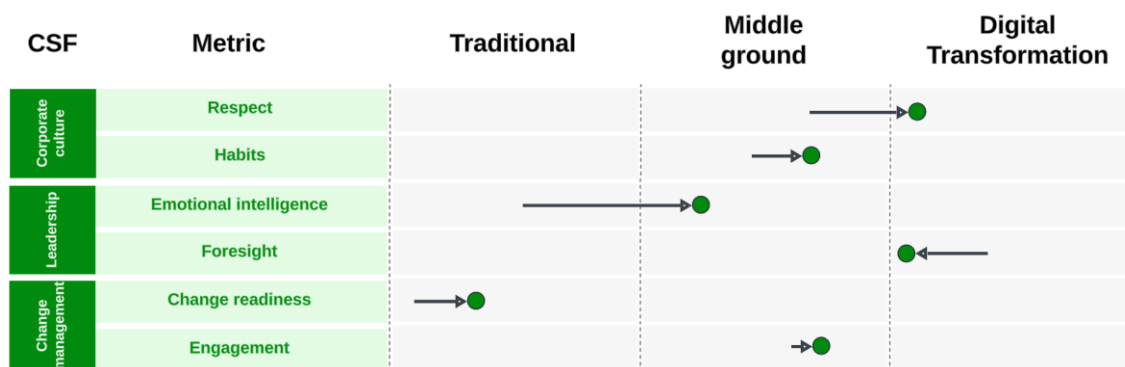


Figure 18, Digital Transformation Progress Maturity Model (DTPMM) with fictional content

### Addressing problem statements through SRQs

The problem statements identified at the start of the research highlighted the challenges in understanding and implementing effective digital transformation in local governments. The connected sub-research questions (SRQs) provided a way to better deal with these challenges:

**Multiple competing priorities:** SRQ2 identified key critical success factors, such as corporate culture and leadership, which can help local governments prioritize their digital transformation efforts amidst multiple competing priorities.

**Satisfaction with the status quo:** SRQ1 provided a detailed understanding of the characteristics of local governments and digital transformation, helping to uncover the underlying reasons for satisfaction with the status quo and suggesting ways to address them.

**Lack of organizational agility:** SRQ3 developed a comprehensive set of KPIs to measure the success of digital transformation initiatives, offering a way to enhance organizational agility by providing clear metrics for success and areas for improvement.

**Legal or regulatory restrictions:** While not directly addressed, the insights from the SRQs offer strategies to better navigate these constraints through improved planning and alignment with broader digital agendas.

While the problem statements themselves are not, and cannot be, entirely resolved, the insights gained from the SRQs offer a structured approach to address them effectively, providing a framework for ongoing and future digital transformation efforts in local governments.

### Insights and contributions

Reflecting on this research, we have learned that the success of digital transformation in local governments depends more on cultural and organizational factors than on technological factors. Key elements such as corporate culture, leadership, and change management are critical, emphasizing the importance of human aspects in the process.

Moreover, the challenge of digital transformation may not solely lie in the digital aspect but in the overall magnitude of the transformation itself. This is because the critical success factors identified in this research are not solely digital; they encompass broader cultural and organizational dimensions.

Local governments can greatly benefit from the DTPMM, as it has the potential to enhance service delivery, operational efficiency, transparency, and community engagement if implemented correctly. Successful implementation depends heavily on how management presents the DTPMM to their employees and acts on the results.

This research highlights that the overall success of digital transformation is deeply intertwined with human factors. The DTPMM not only provides a pathway for progress but also ensures that digital transformation efforts are sustainable and impactful. By adopting a supportive organizational culture and effective leadership, local governments can leverage the DTPMM to make significant improvements in their operations and community engagement.

### Summary of key insights

To provide a clear and concise reference, all the sub-research questions are listed below, in Table 8, along with their respective, concrete answers. These answers are provided without additional context to directly address the core questions of the research:

Sub-Research Question	Concrete answer																		
SRQ1.1: "Which characteristics define a (local) government?"	<ul style="list-style-type: none"> <li>Effectively Innovative</li> <li>Flexible and Agile</li> <li>Together</li> <li>Safe and Transparent</li> </ul>																		
SRQ1.2: "Which characteristics define a digital transformation?"	"Digital transformation: to emphasize the cultural, organizational, and relational changes that are highlighted in the outcomes section in order to differentiate better between different forms of outcomes" (Mergel et al., 2019).																		
SRQ1: "What are the main characteristics of digital transformation with (local) governments?"	Digital transformation in local government involves integrating digital technologies across all areas, emphasizing adaptability, collaboration, security, transparent governance, and, most importantly, alignment with broader initiatives like the EU's 2030 Digital Decade.																		
SRQ2.1: "What are the key critical success factors (CSF) that contribute to the success of digital transformation initiatives?"	<ul style="list-style-type: none"> <li>Corporate Culture</li> <li>Implementation of a Digital Mindset</li> <li>Unified Digital Corporate Strategy/Vision</li> <li>Leadership</li> <li>Top Management Support</li> <li>Change Management</li> <li>Digital Talent in Leadership Positions</li> <li>Qualification</li> </ul>																		
SRQ2: "Which critical success factors are important in digital transformation initiatives within local government applications?"	<table border="1"> <caption>Average Importance of Each Critical Success Factor</caption> <thead> <tr> <th>Critical Success Factor</th> <th>Average Importance Rating</th> </tr> </thead> <tbody> <tr><td>[1]</td><td>4.4</td></tr> <tr><td>[2]</td><td>3.6</td></tr> <tr><td>[3]</td><td>3.8</td></tr> <tr><td>[4]</td><td>4.2</td></tr> <tr><td>[5]</td><td>3.6</td></tr> <tr><td>[6]</td><td>4.2</td></tr> <tr><td>[7]</td><td>3.4</td></tr> <tr><td>[8]</td><td>2.6</td></tr> </tbody> </table>	Critical Success Factor	Average Importance Rating	[1]	4.4	[2]	3.6	[3]	3.8	[4]	4.2	[5]	3.6	[6]	4.2	[7]	3.4	[8]	2.6
Critical Success Factor	Average Importance Rating																		
[1]	4.4																		
[2]	3.6																		
[3]	3.8																		
[4]	4.2																		
[5]	3.6																		
[6]	4.2																		
[7]	3.4																		
[8]	2.6																		
SRQ3: "Which set of key performance indicators can be used to measure critical success factors associated with local governments in digital transformation?"	<ul style="list-style-type: none"> <li>Respect</li> <li>Habits</li> <li>Emotional intelligence</li> <li>Foresight</li> <li>Change readiness</li> <li>Engagement</li> </ul>																		
SRQ4: "How can the set of key performance indicators developed in SRQ3 be validated through real-world applications?"	Performing a multi-case study across different departments and municipalities, which resulted in proposed improvements as well as the validation of the DTPMM's strengths.																		

Table 8, SRQ answers summarized

## 7 LIMITATIONS

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While this study provides valuable insights into the digital transformation of local governments, it is essential to acknowledge several limitations that arise from the research methodology and context. These limitations should be considered when interpreting the findings and their applicability to other settings.

### **Contextual**

The study focuses primarily on the municipality of Soest, a specific local government in the Netherlands. The findings, including the development and validation of the Digital Transformation Progress Maturity Model (DTPMM), are heavily influenced by the unique characteristics, organizational culture, and specific challenges of Soest. While the case study approach offers in-depth insights, it may limit the generalizability of the results. Other municipalities with different organizational structures, cultures, and digital transformation challenges might require further adaptation and validation of the model.

### **Research scope**

The research scope was constrained by time and resources, which required focusing on a limited number of critical success factors (CSFs) and key performance indicators (KPIs). While the chosen CSFs and KPIs were rated as highly important by the interviewees, this selection process might have overlooked other relevant factors that could impact digital transformation in different contexts.

### **Methodological limitations**

The study utilized qualitative methods, including expert interviews and literature reviews, to identify and validate CSFs and KPIs. While these methods provide detailed insights, they also come with limitations such as potential biases in interview responses and the subjectivity involved in interpreting qualitative data. Also, the reliance on a small sample size from a single municipality does not capture the full diversity of experiences and perspectives present in other local governments.

### **Validation**

The validation of the DTPMM highlighted areas for improvement, such as the need for a simplified questionnaire and additional metrics for knowledge, collaboration, and digital means. These suggestions indicate that while the model is useful, it requires further refinement to enhance its effectiveness and applicability. Future work should focus on incorporating these enhancements and testing the model in diverse local government settings to ensure its robustness and adaptability.

## 7.1 FUTURE WORK

Future research should investigate whether local governments specifically struggle with digital transformation or if they face broader challenges with transformation in general. This means examining if the issues are uniquely digital, such as technology integration and digital skill development, or if they reflect deeper, more systemic obstacles to organizational change. Understanding this distinction will help tailor more effective strategies and support mechanisms for local governments, ensuring they are equipped to handle both digital-specific and general transformation challenges. Longitudinal studies could provide valuable insights into these dynamics, revealing whether the underlying issues are persistent and how they evolve over time.

The following topics are recommended for future research to deepen the understanding of digital transformation challenges in local governments:

1. Additional analysis across multiple municipalities:

Conduct studies at different municipalities to validate and refine the DTPMM. This will help ensure that the model can be applied effectively in different local government settings, each with unique characteristics, organizational structures, and challenges.

2. Broader validation:

Involve a wider range of stakeholders in the validation process, including frontline employees, middle management, and external partners. This broader engagement will provide a more comprehensive understanding of the critical success factors and their impact on digital transformation efforts.

3. Refinement of measurement tools:

Develop and refine measurement tools, including the questionnaire used in this study, to ensure they accurately capture the presence and impact of critical success factors. This involves iterative testing and feedback loops to improve the tools' reliability and validity.

4. Exploration of Additional Critical Success Factors:

Identify and explore additional critical success factors that may influence digital transformation in local governments. This could include factors related to technological advancements, policy frameworks, and citizen engagement strategies.

5. Shifting maturity level

As the digital era evolves, what is now considered the highest level of "Digital Transformation" may shift. Future research should anticipate and adapt to these changes, potentially redefining maturity levels to include more advanced stages beyond the current digital transformation. This ongoing evolution will require continuous assessment and updates to the maturity model to stay relevant and effective.



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## APPENDIX

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### APPENDIX A. CONSENT FORM

#### Toestemmingsformulier voor 'Informed consent'

Lees dit document zorgvuldig door voordat u besluit deel te nemen aan het onderzoek.

#### Onderzoeker

Telefoon:

06-48523668

E-mail:

J.f.kemper@students.uu.nl

Instelling: Utrecht University

#### Informatie over het onderzoek

Het doel van mijn onderzoek is om te analyseren hoe lokale overheden, zoals de Gemeente Soest, digitale transformatie inzetten en evalueren om hun dienstverlening te verbeteren. Ik focus mij op het identificeren van kritieke succesfactoren die bepalen wat effectief werkt binnen digitale transformatie, met als doel lokale overheden te ondersteunen bij het optimaliseren van hun digitale strategieën. Het uiteindelijke doel is het ontwikkelen van een raamwerk dat zowel de Gemeente Soest als andere middelgrote lokale overheden kunnen gebruiken om hun digitale transformatie te meten en te verbeteren.

#### De deelnemer stemt in met;

- Ik begrijp dat mijn deelname aan deze studie vrijwillig is.
- Ik begrijp dat mijn interview zal worden opgenomen d.m.v. een geluidsopname.
- Ik begrijp dat de audioregistraties na afloop van het onderzoek zullen worden gewist.
- Ik begrijp dat ik het recht heb om mijn toestemming op elk moment zonder gevolgen in te trekken.
- Ik begrijp dat ik een week na het interview mijn toestemming om mijn gegevens te gebruiken kan intrekken.
- Ik begrijp dat ik me op elk moment uit dit onderzoek kan terugtrekken.
- Ik begrijp dat het doel van het onderzoek en de onderzoeksvraag kunnen veranderen.
- Ik bevestig dat mijn naam niet zichtbaar zal zijn in enige onderzoeksdata.

## APPENDIX B.

- Bedrijfscultuur

### Respect

"Hoe zou je je organisatie beoordelen op het gebied van onderling respect tussen medewerkers en management?"

- Erkenningsrespect (Traditioneel): Medewerkers worden gezien en gewaardeerd als individuen.
- Waarderingsrespect (Middenweg): De vaardigheden, inspanningen en bijdragen van medewerkers worden erkend en gewaardeerd.
- Procedureel respect (Digitale transformatie): Beslissingen en processen in de organisatie zijn eerlijk en transparant, waardoor iedereen met waardigheid wordt behandeld.

### Gewoonten

"Hoe zou je je organisatie beoordelen op het gebied van het bewustzijn van digitale hulpmiddelen en technologieën door medewerkers, bijvoorbeeld met nieuwe versies van MS365?"

- Bewustzijngewoonten (Traditioneel): Medewerkers zoeken vaak informatie en blijven op de hoogte van digitale hulpmiddelen en trends.
- Adoptiegewoonten (Middenweg): Medewerkers gebruiken en proberen actief nieuwe digitale hulpmiddelen in hun dagelijkse werkzaamheden.
- Integratiegewoonten (Digitale transformatie): Digitale hulpmiddelen en technologieën zijn volledig opgenomen in de normale workflows en processen.

- Leiderschap

### Emotionele intelligentie

"Hoe zou je het management van je organisatie beoordelen op het gebied van emotionele betrokkenheid?"

- Zelfbewustzijn (Traditioneel): Het management herkent en begrijpt hun eigen emoties en hoe deze hun gedrag en beslissingen beïnvloeden.
- Sociaal bewustzijn (Middenweg): Het management begrijpt en voelt mee met de emoties van anderen en herkent sociale dynamiek binnen de organisatie.
- Relatiemanagement (Digitale transformatie): Het management beheert en beïnvloedt effectief de relaties met anderen, bouwt sterke teams en lost conflicten op.

### Vooruitziendheid

"Hoe zou je het management van je organisatie beoordelen op het gebied van vooruitziendheid?"

- Waarderende vooruitziendheid (Traditioneel): Het management herkent verborgen kansen en mogelijke toekomstige ontwikkelingen die niet direct duidelijk zijn.
- Instrumentele vooruitziendheid (Middenweg): Het management stelt duidelijke doelen en werkt systematisch aan het bereiken daarvan door middel van strategische planning.
- Waardevooruitziendheid (Digitale transformatie): Het management bouwt overeenstemming en stemt organisatorische doelen af op de waarden en behoeften van medewerkers en belanghebbenden.

- Verandermanagement

### Veranderingsbereidheid

"Hoe zou je de veranderingsbereidheid van je organisatie beoordelen?"

- A. Lage veranderingsbereidheid (Traditioneel): Groot verschil tussen de huidige cultuur en de voorgestelde verandering, met veel weerstand en te weinig middelen.
- B. Gematigde veranderingsbereidheid (Middenweg): Gedeeltelijke overeenstemming met de huidige cultuur, gemengde niveaus van weerstand, voldoende middelen maar met enkele beperkingen.
- C. Hoge veranderingsbereidheid (Digitale transformatie): Sterke overeenstemming tussen de huidige cultuur en de voorgestelde verandering, weinig weerstand en voldoende middelen om de verandering te ondersteunen.

### Betrokkenheid

"Hoe zou je de betrokkenheid van medewerkers in je organisatie beoordelen tijdens veranderingsinitiatieven?"

- A. Bevroren betrokkenheid (Traditioneel): Medewerkers verzetten zich tegen verandering, wat de verandering belemmert en de huidige situatie in stand houdt.
- B. Veranderende betrokkenheid (Middenweg): Medewerkers zijn actief betrokken bij de overgang, omarmen nieuwe waarden, houdingen en gedragingen.
- C. Ontvroren betrokkenheid (Digitale transformatie): Nieuwe veranderingen zijn volledig geïntegreerd in de organisatie, met hoge niveaus van acceptatie en betrokkenheid van medewerkers.