Mind the Gap

A qualitative study framing the critical drivers for disruptive technology implementation in Swedish public agencies

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Bachelor Thesis

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Abstract

This study aims to investigate the critical drivers for disruptive technology (DT) implementation, and how these can be used to form a framework for Swedish public agencies. The critical drivers for DT implementation were empirically studied through the examination of artificial intelligence (AI) implementation, a contemporary DT. Primary data was collected through a qualitative approach from a sample of ten cases. The interviewees were employees at Swedish public agencies and had experience from their AI operation. In addition, secondary data was obtained from a report written by The Agency for Digital Governance.

The study found 39 critical drivers for DT implementation in Swedish public agencies. These findings were categorized into seven areas; *competence, technology, people, external environment, strategy, process* and *organizational culture*. The areas, in turn, partly overlapped with Scott Morton's framework for DT implementation in the private sector. However, considering the differences between public and private organizations, the study concludes that Scott Morton's framework should be restructured to apt the public agency context. Hence, the study presents a new framework, emphasizing the need of DT competence, during implementation. The developed framework contributes with guidance for managers and aims to diminish uncertainty and challenges of DT implementation in Swedish public agencies.

Keywords:
Artificial Intelligence, Change management, Disruptive technology, Implementation, Swedish public agencies, Swedish public sector.

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Definitions

Artificial intelligence is for the purpose of this study defined according to the EU commission's definition; "Artificial intelligence (AI) refers to systems that display intelligent behaviour by analysing their environment and taking actions – with some degree of autonomy – to achieve specific goals. AI-based systems can be purely software-based, acting in the virtual world /.../ or AI can be embedded in hardware devices /.../." (AI HLEG, 2019).

Change management is the approach of how to deal with a transition or transformation of an organization - what strategies to implement, how to control the change and how to adapt to change.

Critical drivers are key factors that have an impact on the outcome of a process.

Digital maturity is the ability to respond to a digitally competitive and changing environment.

Disruptive is in this study defined as a process that is groundbreaking in changing the traditional way that a system operates, to a new and effective one.

Implementation is the process of putting a decision or plan into action or starting to use something.

Innovation is in this study defined as a new idea or application of an improved solution to make the organization more efficient.

Private sector is the part of the economy that is not directly governed by the state.

Public sector is the part of the economy that is under direct state control.

1. Introduction

In a rapidly developing world, disruptive technology (DT) is becoming increasingly important to organizations in all sectors (Christensen, 2013). The concept of DT was first introduced by Christensen in 1995 and refers to groundbreaking innovations within technology that changes the way organizations operate by replacing outdated attributes to new and superior ones. Christensen argues that an organization will be outrivaled if managers do not know when and how to abandon traditional operational practices. Thus, the risk taking organizations are generally the pioneers in the implementation process. On the contrary, risk averse and traditional organizations, like the bureaucratic and hierarchical public agencies, tend to lag behind (ibid). Consequently, this study aims to investigate the critical drivers for DT implementation, and how these can be used to form a framework for Swedish public agencies.

1.1 Background

1.1.1 Disruptive Technology (DT)

DT aims to change traditional working processes in order to increase efficiency amongst organizations (Christensen, 2013). Examples of historic disruptive technologies include the internet, e-commerce and blockchain. For the purpose of this study, *artificial intelligence* (AI) is examined as a way to understand the implementation process of DT. It is thereby assumed that the process of implementing AI is a representable practice for any DT implementation.

AI can be defined in several ways, but an AI system is mainly intended to perform tasks that humans normally can do, to enhance their capabilities (AI HLEG, 2019). AI is adopted by organizations at an increasing rate (Girasa, 2020). Private sector organizations are in the front line, with over 37% employing some kind of AI solution (Costello, 2019). The public sector, however, lags behind but demonstrates progression towards certain technological advancement. More specifically, Swedish public agencies, which are the target for this study,

have begun to investigate AI in order to improve efficiency through eliminating drudge work (Viechnicki & Eggers, 2019). The estimated economic value of the increased efficiency caused by AI adoption in the public sector, on state, regional and municipal level, is 140 billion SEK yearly (The Agency for Digital Governance, 2020) (Appendix 1). It is further believed that appropriate AI implementation will bring indirect values such as social values and enhanced justice. The possible societal value is considerable, however, the challenges of employing AI solutions complicates implementation - notably in the public sector. Thus, Swedish public agencies progress at various pace, expressing uncertainty about the managerial aspects of an AI implementation. Consequently, the study aims to investigate the critical drivers for implementing DT, exemplified by AI, and their implications for Swedish public agencies.

1.1.2 Swedish Public Agencies and AI

The purpose of Swedish public agencies is to act on the goals set by the parliament and government (The Government Office, 2017). As of January 2020, there were 341 individual public agencies in Sweden (The Swedish Agency for Public Management, 2020). Each public agency is governed by a ministry and is thereby hierarchically state-controlled.

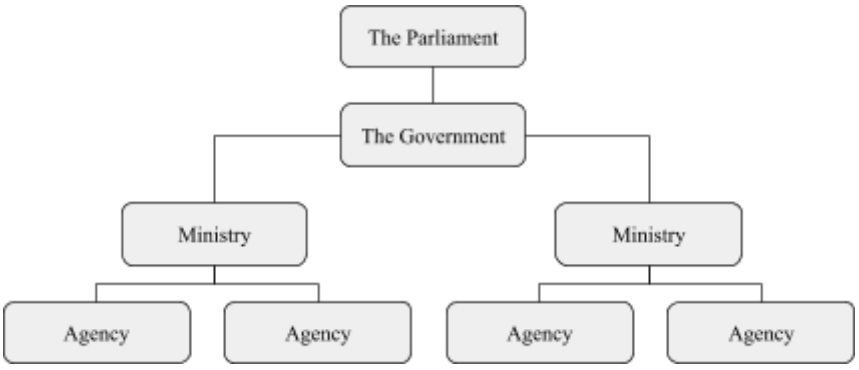


Figure 1 - the governance structure of Sweden.

The extent of decision-making within agencies is, therefore, limited to the governmental constraints. Since implementing AI solutions is an expensive practice, agencies are dependent on governmental support. In this present state, the Swedish government has not allocated money from the public budget towards AI practices. Instead, the private foundation, Wallenberg foundation, has invested 3 billions SEK in AI development in Sweden. In

contrast, the government of Finland has allocated 20 billions SEK of their public budget towards national AI investments (Ernkrans, 2019).

Despite no public budget allocation towards AI, the Swedish government has taken other initiatives to acknowledge the possible benefits of AI implementation in the public sector. Mainly, by formulating a goal stating that Sweden should be the leading country in utilizing the possibilities that AI may present, with the purpose of strengthening Swedish welfare and its competitiveness globally (The Agency for Digital Governance, 2020). In a step towards realizing the goal, they commissioned the Agency for Digital Development (SADG) to map the existing AI solutions which could be employed by the Swedish public sector in 2019.

Furthermore, the Swedish Agency for Economic and Regional Growth has started an initiative called the AI Network. The AI Network arranges seminars in order to gather people who work with AI projects at different Swedish agencies. Essentially, the goal is for public agencies to work more efficiently with AI projects, collectively. This is achieved through facilitating learning opportunities, thereby enabling public agencies to employ other's ideas into their operations. Hence, Sweden is showing a growing interest for AI progression, however, the organizational challenges of implementing AI remain - as does the question concerning how to overcome them.

1.1.3 The Distinction of Public Agencies Compared to Private Organizations

Change within public agencies is often triggered by the changing demands of the public interest or criterias in the governmental directions (Fottler, 1981). Private organizations, in contrast, initiate change in order to meet the demands of a more narrow group, i.e. customers. This contributes to the differing values of organizational success. Public management aims to act for the wellbeing of the public while private organizations act for the economic success of the firm (Dahl & Lindblom, 1953). In turn, public management holds greater accountability than private since the public scrutiny affects change management to a large extent. This contributes to the frame for leadership differing between private and public organizations. Given the high accountability of public managers, leaders tend to have large responsibilities but lacking authority to pursue change (Fottler, 1981).

1.1.4 Research Gap

DT is an exploited research area. Studies attempt to bring clarity to a complex field of study. However, only a limited amount have investigated the implementation of DT, even less in the public sector (Svärd, 2020; Gattami, 2020). A significant amount of previous research has covered the technological implications, however, limited research concerns the organizational aspects of DT implementation. When it does exist, it regards private organizations. Hence, no research examines critical drivers for DT implementation in the public sector, even less in the Swedish context and with emphasis on public agencies solely (ibid). Thus, change management frameworks concerning the implementation of DT in public agencies have not been developed, complicating beginners' navigation towards a successful DT implementation. This is the gap that this report aims to fill; how to successfully implement DT in Swedish public agencies.

1.2 Purpose and Research Question

The purpose of this study is to aid Swedish public agencies to reduce uncertainty and to overcome challenges of DT implementation. The thesis aims to achieve this by creating a framework based on the critical drivers and current challenges of DT implementation, exemplified by AI. The focus lies on what professionals, with experience of AI in public agencies, believe to be critical factors - explored through a qualitative approach supported by secondary data. The intention is that this framework can be widely used by public agencies in the implementation of any DT. The main research question with a following secondary question is thus;

> *What are the critical drivers for implementation of disruptive technology in Swedish public agencies?*
>
> *How can the critical drivers be used to form a framework for disruptive technology implementation in Swedish public agencies?*

1.3 Delimitations

In order to fulfill the purpose of this study within the scope of the bachelor thesis, several limitations are enforced. The first delimitation is with regards to the geographical area as the report only includes Swedish public agencies. This is because there are structural, organizational and regulational differences between public agencies in Sweden and abroad (The Government Office, 2017).

In addition, DT is empirically represented by AI technology solely. Hence, this may result in a misrepresentation of the critical driver for all DT implementations. Moreover, exclusively people working with-, or in charge of AI at their respective organization are subjects for interviews. This may result in potential bias as these people only constitute a small part of the organizational work with AI.

Ultimately, a delimitation is applied as to how far public agencies have come in their work with AI. This study attains perspectives solely from respondents working in organizations that have implemented or are planning to implement AI - the pioneers within public agencies. In other words, the study does not include the late adopters' views on the critical drivers for implementation.

2. Theoretical Framework

2.1 Motivation of Theoretical Framework

This section aims to provide a theoretical foundation to the issue studied prior to exploring the phenomenon in practice. The theoretical framework begins by examining the development of theory within change management during technological advancement. More specifically, how Leavitt's theory of change management emerged to become Scott Morton's framework, named the MIT90 framework, during the paradigm shift of the internet. The aim is to analyze the changes accompanying DT in the past in order to gain understanding of the current implications of it (Yates & Benjamin, 1991). Thus, the evolution in theory sheds light to how the MIT90 framework should further be adapted to DT implementations in public agencies. The second part examines MIT90's applicability on BIM implementations in the Singaporean construction industry. Thus, the study on BIM explores change management theory derived from private sector research and concerns a specific type of DT. In turn, the theoretical framework presents the implications of the organizational differences between private and public agencies. This theory is provided in order to understand how the distinction of public organizations may alternate the MIT90 framework. Ultimately, the purpose of the theoretical framework is to investigate the extent to which pre-existing theory can help Swedish public agencies manage DT implementations.

2.2 Change Management of Disruptive Technology

According to Durlak and Dupre (2008), an implementation is defined by the process of which an initiative is introduced in a particular context. Implementing DT in a public organization therefore requires a thoughtful and strategic course of action in order to take advantage of the opportunities and potential value it can offer (Mehr, 2017). Change management, the approach to transition organizations, teams and individuals to a desired state, is therefore crucial for DT implementation in complex organizations (Pardo-del-Val et al., 2012). Among the number of change management theories, Leavitt's theory and its extension were selected for this study. The reason for this is that it assesses the organization's current level of

functioning, and activities for designing better strategies of implementing new technologies (Dahlberg, 2016). This is consistent with the aim of examining critical drivers for DT implementation.

2.3 Evolution of Leavitt's Theory

The following section presents Leavitt's theory of change management and its development during the paradigm shift of the internet. By explaining the original, as well as the evolved theory, this section aims to aid the understanding of how theories can develop during technological advancements. This is examined through the following question.

> *To what extent has change management theories evolved during historical technological advancements?*

2.3.1 Leavitt's Theory

Harold Leavitt (1965) based the foundational thinking for many of the current theories within change management. His diamond-shaped framework of organizational systems helped people think of institutions as interdependent *multivariate* systems (Figure 2). This brings light to the importance for managers to acknowledge all four areas in change management, which are; *task* (the organization's purpose, e.g to provide a service or to manufacture a product), *people* (the people involved in carrying out the task), *technology* (the tools, computers, etc. needed) and *structure* (the workflow, decision-making authority, communications). Leavitt argues that all areas interact and are interdependent within the organization, meaning that a change in one area affects the others. However, the framework does not consider external forces. The model does not account for input or output but only represents throughput, the transformation process. In addition, the model considers that the organizational system has two components; a social (*people* and *structure*) and a technical (*technology* and *task*), and is therefore classified as a socio-technical system (Trist & Murray, 1993). The theory states that in order to create a successful organizational system, managers should put equal effort in developing both parts. However, as the technological aspect became more advanced, Leavitt's theory was extended through further research.

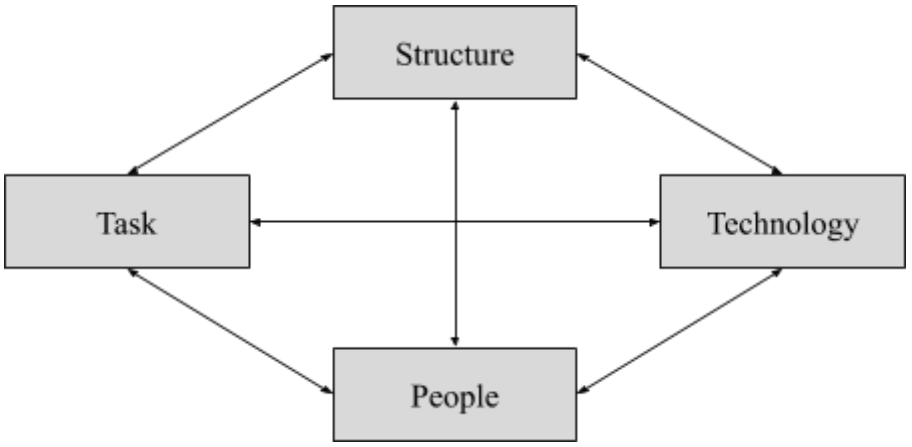


Figure 2 - Leavitt's diamond model of change (Leavitt, 1965).

2.3.2 The MIT90 Framework

To further extend Leavitt's theory during the technological advancement, Scott Morton studied DT implementations in private organizations, resulting in the MIT90 framework (Figure 3) (Scott Morton, 1995). The framework was developed to guide organizations through their adoption of technology as a strategic resource. Given its focus on technology-invoked change, as opposed to the focus in the original Leavitt's diamond, the MIT90 framework became central to many studies during the introduction of e-business (i.e data processing, computer integrated manufacturing and automated reporting) (ibid).

The foundational belief of the importance of organizational alignment in Leavitt's diamond does still remain in the MIT90 framework (Scott Morton, 1995). However, there are four distinct changes made in order to transform Leavitt's diamond. Firstly, the MIT90 framework refers to *strategy*, instead of *task,* since it is argued that *strategy* represents the summing of an organization's tasks. Secondly, Scott Morton situates *management processes* in the center of the framework, emphasising the importance of optimizing processes prior to digitizing them with the examined technology. Thirdly, Scott Morton takes into account the *external environment*, including the socio-economic and technological environment as these are believed to impact the change. Lastly, *organizational culture* is demonstrated as an integral part of the transitional process, rather than a dimension of the organizational system. Further argumentation of this is given in the following paragraph.

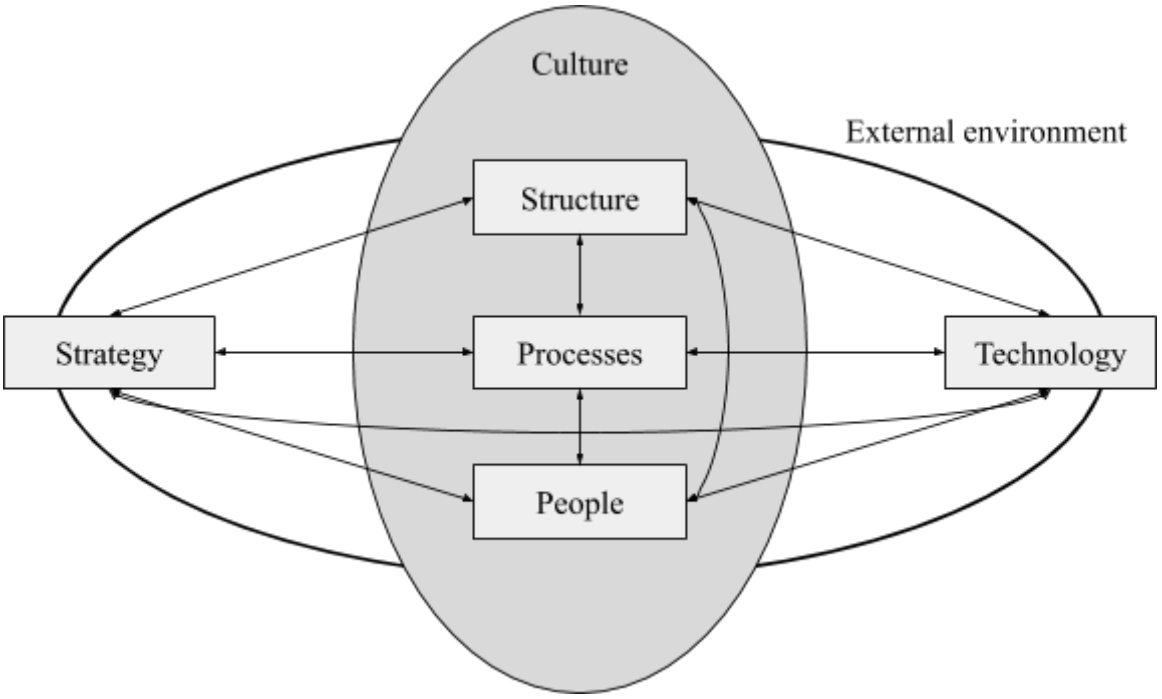


Figure 3 - Scott Morton's MIT90 framework of change (Scott Morton, 1995).

2.3.3 MIT90 and The Technology Acceptance Model

During the rise of the internet and prior to the publication of the MIT90 framework, a significant amount of studies regarding the general attitudes towards technology-lead change were published (Davis, 1989). It is argued that this research laid the foundation for the development of MIT90, considering its great emphasis on *culture* (Scott Morton, 1995). Davis (1989) examined general attitudes and organizational cultures during the rise of the internet and developed the technology acceptance model (TAM). This model builds on the notion that resistance towards technology-lead change amongst people will increase if they are not convinced that they will benefit from it. Davis further argues that people will only commit to change if they believe that the effort required to adopt is less than their future gains. In addition, once an initial impression of the change is formed amongst people, it will become difficult to increase their low level of commitment. Hence, it was found that technology must be introduced in a positive manner in order to accomplish an effective implementation (ibid). Thus, *culture* was proven to play a convincing role in implementation management, explaining its significance in the MIT90 framework (Scott Morton, 1995).

In relation to TAM, a posing challenge of DT implementation is employees' low understanding and general negative attitude towards it (Legg & Hutter, 2006). To illustrate this with an example, a study conducted by Gherhes (2018) shows that the low understanding of AI amongst employees results in negative attitudes and resistance towards an implementation. Approximately three-quarters of respondents (929 respondents) were resistant to AI due to the belief that fewer jobs would be available in the future. A third of the respondents saw scenarios of economic crises resulting from the emergence and development of AI entities, resulting in their scepticism towards the technology.

2.4 MIT90's Applicability

The MIT90 framework was developed in the 1990s, hence, both the technological and socio-economic environment have changed since then. The following section therefore examines MIT90's applicability to a recent case study of DT implementation in private organizations. Essentially, the aim is to answer the following question;

> *To what degree is the MIT90 framework applicable to implementations of disruptive technology in the modern world?*

The theory that examines MIT90's applicability concerns private organizations (Liao et al., 2017). With regards to this, the last part aims to answer the question;

> *What implications will the distinction between private and public organizations have on change management of disruptive technology implementation?*

2.4.1 MIT90's Applicability to Disruptive Technology Implementation

To some extent, the MIT90 framework has been proven to be an applicable change management model to specific DT implementations. This is demonstrated by Liao et al. (2017) at the National University of Singapore, who examine the critical drivers for building information modelling (BIM) in the Singaporean construction industry. Despite the fact that this study concerns the private sector, the nature of the technology implementation is

disruptive. This, as it considers groundbreaking socio-technical change which aims to make the organization more efficient.

Liao et al.'s (2017) study originates from the MIT90 framework in order to identify the critical drivers for implementing BIM. The purpose of the study was achieved through conducting a survey where 86 respondents, all professionals within the Singaporean construction industry, were asked to rank 31 critical drivers of change previously found in the context of BIM implementation. These concepts were thereafter categorized into the following four areas; *processes*, *people, technology* and *external environment.*

The area *processes* emphasizes management processes, meaning that they have to be optimized prior to digitizing them (Liao et al., 2017). Moreover, this area contains organizational strategy, in which the study argues that a full BIM implementation commence with executive vision and sponsorship. It thereafter results in an appropriate execution of the strategy.

Within the area *people,* the emprics emphasizes the importance of close collaboration between different departments (Liao et al., 2017). In particular, the design and construction teams have to cooperate in order to implement BIM solutions. Hence, the study underlines the importance to have different departments involved in the project group working with the implementation. Moreover, this area concerns the corporate culture and addresses the issue of people's willingness to change. Hence, the study emphasizes the importance of raising understanding of the advantages of BIM technology over the traditional drafting practices.

The study accentuates *technology* as a facilitating area for BIM implementation in the Singaporean construction industry (Liao et al., 2017). It underlines the importance of having an enterprise system which enables data sharing. This is referred to as "interoperability" since it allows parties to exchange data conventionally with each other.

Furthermore, the *external environment* is argued to push the internal components, such as *people*, *process* and *technology* towards organizational transformation (Liao et al., 2017). It

states that government support such as subsidizing training, software, and consultancy costs is of importance for BIM implementations.

Essentially, the study of BIM implementation concludes that the critical drivers within the *process* area are the most influential, followed by the *people* and *external environment* areas (Liao et al., 2017). However, given the interdependence between these concepts, all areas should be considered for the overall success of the organizational change, according to Liao et al.

To summarize, the overlap between Liao et al.'s empirical findings and Scott Morton's theory supports MIT90's applicability to BIM implementation (Liao et al., 2017; Scott Morton, 1995). Hence, it further motivates the use of MIT90 when examining DT implementation in public agencies. However, Liao et al.'s (2017) findings are, in contrast to this study, derived from interviews at private organizations. Hence, the following section distinguishes the difference between the private and public organizations.

2.5 Differences Between Private and Public Organizations

The typical distinction between public and private organizations is their ownership (Rainey et al., 1976). Public agencies are collectively owned by members of the political community whereas private firms are owned by entrepreneurs or shareholders. Unlike private firms, public agencies receive their funding predominantly from taxation (Niskanen, 1971). Moreover, since public agencies are generally controlled by political forces and not by market forces, their primary constraints are imposed by the political circumstances rather than the economic competition (Dahl & Lindblom, 1953).

Furthermore, Fottler (1981) explores the consequences of the organizational distinction related to environment, structure and goals. These variables create differences which influence the process of change management.

2.5.1 Organizational Environment

The organizational environment of public agencies is associated with an intricate context (Fottler, 1981). Complexity arises as public agencies face a variety of stakeholders, multiple requirements and conflicting demands. Moreover, public agencies are often influenced by external events contributing to permeability. Hence, instability tends to occur as frequent changes in policy is a consequence of the political constraint on public agencies. Ultimately, public agencies face low competition for the provision of their services. In cases where competition is present, public agencies tend to still enjoy a dominant market share.

2.5.2 Organizational Structure

Considering the organizational structure of public agencies, there are three distinct internal characteristics compared to private; more bureaucracy, more red tape and lower managerial autonomy (Fottler, 1981). In reflection to the lack of incentives for successful innovation and the penalties for violation of established procedures, public organizations have more formal processes for decision making. This makes them less flexible and more risk averse. Moreover, the association of bureaucratic structures may stem from the requirement of controlling bodies and accountability in the public sector. In turn, more red tape is induced meaning that organizations put a larger emphasis on processes and following rules, acting ethically, legally and morally correct. This further leads to lower managerial autonomy and less freedom to react.

2.5.3 Organizational Goals

The final distinction is the organizational goals. Fottler (1981) argues that public agencies tend to have multiple goals within the purpose of their sub sector. These stem from the common ownership, and attempts to control their behaviour in order to achieve collective purpose. Thus, public agencies act for the well-being of the Swedish welfare. There are numerous stakeholders involved with different interests which they have to satisfy. Furthermore, their goals are often more vague than the private counterparts as the organizational purpose is imposed by the political process, rather than by the managers themselves.

2.6 Conclusion of Theoretical Framework

To conclude and answer the theoretical questions, there is limited theory examining DT implementation in a public agency context. The evolution of change management theory during technological advancement emphasizes intangible aspects such as *culture* being an integral part of an implementation (Scott Morton, 1995; Davis, 1989). Moreover, the applicability of the MIT90 framework has to some extent been proven in a modern DT implementation in the private sector, supporting its use for this study (Liao et al., 2017). However, the fundamental differences between public and private organizations suggest inability to apply a universal change management framework in both contexts (Fottler, 1981; Niskanen, 1971; Rainey et al., 1976; Dahl & Lindblom, 1953). Hence, existing theory can to some degree, help understand the management of DT implementations in Swedish public agencies. The following section will justify the method for conducting empirical data to further test the theoretical framework.

3. Method

3.1 Research Approach

This study was conducted using an inductive approach - a process of drawing generalizable findings out of observations, in order for theory to be extracted from data (Bryman & Bell, 2015, p. 26). However, the study developed abductive elements since the empirical phenomenon was found to correlate with Leavitt's and Scott Morton's theories (Mantere & Ketokivi 2013). The qualitative method was chosen since there is a limited number of people who have knowledge within the currently implemented DT; AI, in Swedish public agencies. Hence, it is important to capture the full perspectives of the subject of the interview (Alvesson & Sköldberg, 2008). It is argued that qualitative methods are appropriate for exploited research areas, which is not the case for this study. However, qualitative research stresses the understanding of the individual perspectives and deepens the perception of their world (Bryman & Bell, 2015, p. 392). Hence, it allows for this unexploited research area to be critically examined.

3.2 Study Design

The study adapts a multiple case design, as it examines the implementation of the same DT; AI, in different Swedish public agencies (Yin, 2014). This design allows for similarities and dissimilarities to be found in a constant context of public agencies (Bryman & Bell, 2015, p. 68). The researchers aim to elucidate the unique features of individual Swedish public agencies and their DT progress. Moreover, the research employs a positivistic approach in which the goal is to extract variables, in this case critical drivers of implementation, from their context. This is done in order to derive generalizable propositions and build theory, a framework for implementation of any DT in Swedish public agencies (Yin, 2014; Eisenhardt, 1989). Common critique towards the positivistic approach is that it can limit the extent to which the researchers are flexible in their study (Bryman & Bell, 2015, p. 70). However, this study aims to increase flexibility despite a positivistic approach by using different originated data, in order to triangulate and improve validity.

3.3 Data Collection

Data was mainly collected through primary research on AI implementation in public agencies. This primary data was, more specifically, collected through in-depth face-to-face and telephone interviews. In addition, secondary data was collected in order to deepen the understanding of the primary findings and increase objectivity of the results (Jensen & Sandström, 2016). Moreover, it acts to create a triangular effect, which Webb et al. (1966) argue results in greater confidence in findings.

3.3.1 Case Selection

The case selection, for collecting the primary data, portrays *priori* purposive sampling (Bryman & Bell, 2015, p. 429). Hence, the cases were selected with regards to their relevance to the research question. In accordance to Stake (1995), the selection of cases was predominantly based on the anticipation of the opportunity to learn. However, the criteria for selection developed throughout the process, for example with the finding of the AI Network for public agencies. The selected cases were (1) public agencies with offices in Stockholm and (2) members of the AI Network. By ensuring their membership in the AI network, all selected cases had indicated progress within AI and were therefore relevant to the research question. Moreover, the interviewees had been responsible for, or involved with, the AI operation and had variable lengths of experience in that role.

According to Glaser and Strauss (1967), probability sampling is not appropriate to qualitative research because of its reliance on statistical rather than theoretical criteria. Hence, the study portrays theoretical sampling in which there was no set number of how many cases should be examined prior to the data collection. Instead, the data collection was carried out with the intention of reaching theoretical saturation, meaning that new data no longer stimulates further theoretical understandings (Charmaz, 2006). Due to the time constraints, however, the ultimate sample contained ten interviews, representing nine agencies and five sub sectors within the public administration (Table 1). Moreover, since the study aims to be relevant across different public agencies within the state administration, the agencies varied in sector and size as well as the interviewees attaining different titles.

Respondent	Title	Agency's sector	Size of agency (employees)
A	AI Section Manager AI Center	Social insurance and labour market	5 001 - 10 000
B	IT Strategist	Education and culture	501 - 1 000
C	Senior Advisor within Development & Promotion	Cross-sectionally (governmental support function)	100 -
D	Head of Department	Social insurance and labour market	- 10 001
E	Head of Innovation	Education and culture	101 - 500
F	Head of Research	Education and culture	101 - 500.
G	Chief Information Officer	General administration	101 - 500
H	Digital Program Manager	Infrastructure	5 001 - 10 000
I	Chief Technical Officer	Infrastructure	1 001 - 5 000
J	Chief Technical Officer	General administration	101 - 500

Table 1 - Interview subjects.

3.3.2 Interview Design

The multiple case design demands a rather standardized interview guide for gauging variation. However, the inductive approach claims less structure and presumptions in order for the researcher to keep an open mind (Bryman & Bell, 2015, p. 200). In order to meet the conflicting demands, semi-structured interviews were conducted. This allows for theories to emerge from the data, however, it still ensures cross-case comparability (ibid, p. 13). The interview schedule was therefore predefined as to theme, however, questions could be adjusted or specified during the interviews. The themes of the interviews were; (1) questions regarding their background and role (2) reflecting inquiries about their current situation and (3) their personal beliefs about critical drivers of change in AI implementation. Open questions allowed the respondents to answer in their own terms, helped allow unusual

responses, and prevented guided answers (ibid, p. 258). In order to receive detailed answers, the open questions were followed by more specific questions related to areas covered by the respondents, using the funneling technique (Kylén, 1994). This granted for the interviews to be adapted to each interviewee.

In an attempt to maximize the quality content during the last open questions, regarding critical drivers for implementation, the interview structure aimed to develop the respondent's thoughts throughout the interview (Appendix 2). In order to ensure that the interviewee had carefully thought about the drivers, questions regarding this topic were asked three times, but formulated in different ways; (1) what they believe their own organization can improve, (2) what they believe are critical drivers for implementation (3) what advice they would give to other public agencies starting their AI implementation. Hence, the interview object had three chances to extend their answer, and recall all critical drivers for implementation.

3.3.3 Secondary Data Collection

The purpose of the secondary data is to complement the primary data with a large-scale perspective on the studied subject (Donnellan & Lucas, 2013). The secondary data is a report conducted by the Swedish Agency for Digital Governance (hereinafter SADG), concerning AI implementation in the Swedish public sector - including state, regional and municipal level (The Agency for Digital Governance, 2020). The report explores the challenges for the Swedish public sector to employ AI in 2019 and does also suggest preferable actions in order to resolve them. In contrast to the primary data interviews, which explore the subject in public agencies solely, SADG explores the subject within the full public sector. This secondary research helps validate the findings of this study with its extensive data sample.

3.3.4 Execution

Prior to data collection, a rigid literature review was required in order to gain understanding about the function of DT, specifically AI, in Swedish public agencies. The literature review was of importance when writing the interview guide and enabled a professional analysis of the empirical data. Contact regarding interviews was initiated by email and was sent out to the participants of the AI Network in late February 2020. This email specified the purpose of

the study and how it could contribute to their operation. All interviews were thereafter held between March 5th and March 22nd 2020. Initially, all interviews were thought to be held face-to-face, however, given the current situation with the Covid-19 pandemic, some interviews were held over telephone. In alignment with Frey's theory, these telephone interviews were in general shorter than the ones held in person (Frey, 2004). Apart from that, no other limitation was observed related to conducting telephone interviews, that could have had an impact on the empirical result. Moreover, in order to reduce error due to inter-interviewer variability, one researcher executed all interviews while the other took notes (Bryman & Bell, 2015 p. 212). This further allowed the interviewer to focus solely on the follow-up questions. Further, all interviews were transcribed in order to facilitate data interpretation and analysis throughout the process.

3.4 Data Analysis

The inductive study incorporates features of a grounded theory approach in its data analysis. This framework is appropriate for organizational research since it captures complexity and is strongly linked to practice (Locke, 2002). In accordance with grounded theory, the process of collecting data, analyzing, and theorizing stood in close relationship throughout the execution (Strauss & Corbin, 1990). Hence, the data analysis was an iterative process which began as the data collection was initiated. During the initial stage, data was processed through open coding to find common themes of critical drivers for DT implementation (Strauss, 1987). However, as the higher-level categories were formed, the theoretical overlap with the MIT90 theory became evident. The areas were thereby named according to Scott Morton's framework where it was applicable. Hence, the data analysis deviated from the grounded theory during the categorization.

Common criticism of open coding is the risk of losing context and the narrative flow to what is being said when data is fragmented (Coffey & Atkinson, 1996). In order to prevent this, constant comparison between findings and theory was carried out to ensure that the correspondence between concepts and areas was not lost (Bryman & Bell, 2015, p. 585).

3.5 Quality of Research Design

To evaluate the research design, this section aims to analyze the credibility of the findings of the study. According to Yin (2014, p. 45), the following tests are appropriate for case study quality assurance; construct-, external- and internal *validity* as well as *reliability*.

3.5.1 Validity

The construct validity refers to the accuracy and relevance of the measures used to study the objectives of the research (Yin, 2014 p. 46). In order to increase the construct validity, the research continuously acknowledged and attempted to reduce the subjectivity of the interviewees. This was done by seeking corroborating data from the secondary source, the SADG report, which could validate the findings.

The external validity, the degree to which findings can be generalized across social settings, is often difficult to achieve in a case study given the non-randomized sample (Yin, 2014, p.41). However, considering that this study contains cases from different sub sectors within the public administration, generalizability of the research is higher than, for instance, a single case study. Furthermore, Lee et al. (2007) suggest that particularization rather than generalization constitutes the main strength of case studies. Hence, the study emphasizes the uniqueness of findings in the context of public agencies in comparison to private organizations. Moreover, as results deviated from the trend secondary data was used to explain the divergence (Eisenhardt, 1989).

Considering the internal validity, LeCompte and Goetz (1982) argue that qualitative studies tend to have a distinct connection between researchers' observations and the theoretical ideas they develop. In accordance, the anonymous interviews allowed for prolonged participation in the social life, and honest answers in return, which ensured a high level of congruence between concepts and observations. During the process of data analysis, patterns and trends were found, which further supports causal inferences and strengthened internal validity (Yin 2014, p. 45).

3.5.2 Reliability

It is impossible to “freeze” a social setting and it is therefore difficult to achieve external reliability in qualitative research (LeCompte & Goetz, 1982). However, in order to decrease the potential biases and errors in the process, the study contained detailed documentation of sampling specifications, interview procedures and the method for data analysis. Moreover, since the interviews were recorded and transcribed, they can be followed to the best possible extent. Considering the internal reliability, there were specified guidelines and memos for data analysis in order to increase inter-observer consistency. According to Jenkins et al. (1983), inter-observer consistency decreases over time, hence, guidelines were continuously updated to bring common understanding. In essence, the study portrays an acceptable level of validity and reliability.

4. Empirics

4.1 Current AI State and Challenges

This section presents the empirical findings of the study. It is introduced with a description of the current state and challenges, followed by a presentation of the stated critical drivers for AI implementation in Swedish public agencies.

The research demonstrates that public agencies exhibit varying progress in their AI implementation (Appendix 3). While some agencies are performing pilot projects of their AI solutions or experimenting with potential usage areas, others have put into practice completed solutions. Likewise, agencies demonstrate varying approaches to their work with AI - some have distinct AI project groups, separate innovation hubs, or are working with AI within the IT function.

To gain a better understanding of the scope of the problem, the respondents were asked to describe the current challenges that they experience when implementing AI. These challenges are presented below.

4.1.1 Lack of Competence

There is a common conception among the respondents that competence within AI is currently lacking. Competence, in this study, refers to the understanding of the specific technology, awareness of its implications, limitations, and the ability to realize it in practice. In other words, competence is the combination of knowledge and motivation to apply it. However, the internal employees hold little knowledge within the area and to acquire external knowledge, in terms of consultants, is difficult given public agencies' financial constraints. Moreover, public agencies experience a challenge with hiring consultants with AI expertise.

> *"You of course need consultants, but to be honest, they did not know this. /.../ The large consultancy firms have a lot of competence within their organizations, but the most knowledgeable people within AI are not the ones we get to meet." - D*

Furthermore, public agencies face a difficulty to attract new talent due to low salary incentives, lack of growth opportunities and employer image. The lack of AI knowledge is apparent at all levels of the organization - both amongst managers who have to initiate and set the strategy of the implementation, and amongst the operational employees which enables execution. This is also supported by the secondary data. Respondent F states;

> *"As it is now, we do not have the knowledge within AI to develop the solution and we cannot recruit the competence either." - F*

4.1.2 Insufficient Data and Data Quality

It is argued that the access to the right data, lack of high quality data and insufficient competence in understanding the data is a challenge. SADG shares this finding, highlighting the current low level of digital maturity and its barrier for successful AI implementation in Swedish public agencies (The Agency for Digital Governance, 2020).

> *"Looking at what other organizations have done wrong, it is clear that they do not understand their data." - E*

4.1.3 Ethical-, Security- and Legal Aspects

Respondents B, C, F and I express the importance of operating correctly when working in a public agency. Public agencies are constantly under observation by the state and individual citizens. Respondent I further indicates that to manage and share data is a challenge in public agencies due to ethical-, safety- and legal aspects.

> *"Then you may ask, what is stopping us? Well, not much except the juridical, moral and ethical areas." - I*

The aforementioned statement is further supported by the secondary data, SADG, which argues that AI systems rely on large amounts of data in order to make correct decisions and to perform well. The data influences the decisions and behavior of the AI system and if the data

is biased or unbalanced it may lead to unfair outcomes. This may result in ethical concerns as decisions can favor one group over others.

4.1.4 Lack of Support

An additional challenge is the lack of support in AI implementation from the organization as a whole - both from managers and operational employees. Respondent A, argues that there is an unwillingness to implement AI since people are afraid of losing their jobs as the organization becomes more efficient. The respondent further believes that resistance towards AI stems from the lack of competence and ignorance towards the potential benefit it may bear. Respondent A states;

> *"Most of our support has come from the management team. But that is almost the only support we have experienced. On the contrary, we have met quite a resistance since we are doing things that intrude on other people's domains." - A*

4.1.5 Lack of Resources

Insufficient resources include both the limited financial capital available in order to execute an AI implementation, and the lack of work time allocated to execute the potential projects. The secondary data supports this allegation, further arguing that AI technology is costly and involves investments in several different areas, such as technology, knowledge, systems and restructuring.

> *"We do not have the money /.../ It is really hard because this is an area that is speeding up, simultaneously as we, in the traditional organization, are hitting the brake." - F*

4.1.6 Value and Prioritization of Implementation

A final challenge brought to light by respondent D and H is how to justify the value of an AI solution. It has to be justified that the AI solution aligns with the long-term objectives of the agency, since they are not driven by profits.

> *"It is easier in a private organization since your main objective tends to be to increase the profit. If you can show that you can make money on an innovation it is easier to get it through. For us it is about creating a more efficient organization or to enhance the value for the customer, but this is always a difficult question to evaluate." - D*

To conclude, there are several challenges with AI implementations in public agencies. They reflect the uncertainty and adversity which professionals face in their work with AI. In order to overcome them, the following section presents the critical drivers of AI implementation.

4.2 Critical Drivers of AI Implementation

The data presents 39 critical drivers for AI implementation in Swedish public agencies. 33 of them originate from the primary data and six from the secondary data. Each individual driver is presented in Table 2 with the check marks representing each time it was highlighted by the respondent. A row with marks in each column has thus been covered by every respondent and can be argued to be of extra importance. The combined result of the similarities and differences in the primary and secondary data form seven areas of critical drivers. These are; *competence, technology, people, external environment, strategy*, *process* and *organizational culture.*

Competence										
Primary data	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**
The ability to recruit the right AI competence.	✓	✓		✓		✓		✓		✓
AI competence on the floor, to be able to deliver upon directions.		✓			✓		✓	✓	✓	
Have internal AI knowledge	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Bring in/buy external AI knowledge.	✓	✓			✓		✓			✓
AI competence within the management team.		✓	✓	✓		✓				
Promote internal AI education, at all levels.		✓	✓				✓	✓	✓	
Secondary data										
Competence within AI.										

Technology										
Primary data	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**
Map out the data and potential with it in order to do something that . makes a difference.	✓	✓		✓	✓	✓	✓	✓		✓
Make tests based on real data, rather than on hypothetical data sets.	✓								✓	✓
Good data quality, understand the data, collect the right data.	✓	✓				✓		✓	✓	
A decent architecture for the AI solution (systems).	✓	✓	✓							
Secondary data										
Management of data and access to data.										
Architecture for AI solutions.										
People										
Primary data	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**
Involve people who are passionate about AI.	✓			✓		✓	✓			
Involve the legal department from the start.	✓	✓		✓	✓				✓	✓
Involve people who are concerned about the IT department and the organization.		✓		✓		✓				✓
Involve the management team, for resource allocation towards AI (time and money).				✓	✓	✓	✓		✓	✓
Cooperate with the analytics department.				✓						
Involve data scientists.		✓			✓					✓
Take into account ethical aspects and safety issues.		✓								✓
Secondary data										
Involve the legal department.										
Involve the ethics department.										
External environment										
Primary data	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**
Cooperate externally, with other organizations and public agencies.	✓	✓	✓		✓		✓		✓	✓
Government involvement, to promote education.		✓				✓			✓	
Government involvement, in order to set aside resources.	✓			✓			✓			✓
Government involvement, to develop a central AI group.		✓				✓				✓

Strategy										
Primary data	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**
Set a clear direction, vision and goal from the management team.	✓	✓		✓				✓	✓	✓
Set a timeframe for the AI implementation.								✓		
Put up a separate innovation group/centre.		✓				✓				
Create a horizontal plan, involve everyone.	✓						✓	✓		
Secondary data										
Management and government strategy.										
Organizational culture										
Primary data	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**
See opportunities with AI, rather than challenges.	✓	✓		✓		✓	✓		✓	
A drive to implement AI, from above and from below.		✓					✓			
Support from the other departments/employees.	✓	✓		✓	✓		✓		✓	
Management's support and will for digital development.	✓	✓	✓	✓				✓		✓
Process										
Primary data	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**	**J**
Work proactively, not reactively.			✓							✓
Ensure transparency in the implementation process.		✓							✓	
Present evidence of the value of AI to be able to prioritize and to compare the effects between projects.								✓		
Perform pilot projects on the AI solution.		✓			✓	✓	✓	✓	✓	✓

Table 2 - A compilation of the critical drivers for AI implementation in Swedish public agencies. Based upon primary and secondary data.

4.2.1 Competence

The first, and most stated category of critical drivers for AI implementation is competence. This is primarily achieved through increased knowledge, i.e the understanding of AI and its use. Furthermore, as one finds motivation to apply their knowledge within AI into practice, one portrays competence, according to this study. Hence, knowledge by itself does not equal

competence. The need for internal and external competence within AI is emphasized in both the primary and secondary research. Respondents express a need to acquire technical competence, which facilitates for the building of digital infrastructure and algorithms. Moreover, there is a need to develop a general understanding of AI across the organization in order to decrease resistance. Further, competence related to the understanding of the possible benefits that AI can bring is considered important. Respondents B and I state;

> *"Knowledge is the foundation." - B*

> *"The resistance is based on ignorance." - I*

In addition, respondents emphasize the importance of managers' understanding of AI in order for initiatives to be pushed forward. However, another respondent emphasizes the need to have knowledgeable employees on the operational level in order for workers to be able to deliver upon directions and execute the implementation. Respondents argue that this is achieved through internal education which is appropriated to fit the different organizational levels, to deepen and broaden the understanding of AI.

> *"Even if they are in the management team, they have a surprisingly low level of competence and understanding of AI. If they do not understand it, they will have a difficult time getting all people onboard. /.../ It is really crucial that the agency provides education to create understanding at all levels." - C*

The interviews present conflicting arguments regarding the origin of competence. Some respondents believe that cultivating internal knowledge within AI is preferable in the long term. In turn, the majority believe that this will be difficult and argue that external competence should be acquired. However, this further raises the concern of attracting consultants who are not familiar with the agencies' systems. Hence, it is crucial to develop the ability to recruit the competence needed.

> *"I think it is important to acquire external competence that helps us going forward. I believe AI is a strategic area for us which makes it important to build some kind of*

internal core which at least has the competence to order proper services. But, AI is a very immature external branch as well - there are many fortune-hunters out there who advertise their AI solutions that may not actually be as good or reliable as would have been hoped. So, I strongly believe in building internal knowledge as well." - B

4.2.2 Technology

The majority of respondents in the primary research consider the quality of data as a necessary factor for successful AI implementation. To have correct and representative data internally, or access to it externally, is a critical factor which is commonly argued for. However, to get access to external data can be a challenge for public agencies due to legal constraints. Considering the internal data, respondents highlight the gravity of mapping out the currently accessible data, and the potential with it in order to implement an AI solution that makes a difference.

"There are two parts in this which I believe to be extra important. One is which data we can access and the other is what quality the data has - in other words, where the potential of AI is." - H

In order to manage and store the data, agencies further need mature digital architecture, but exactly what that means is neither commented on in the primary, nor secondary study. Respondent C comments;

"There is a strong correlation between digital maturity and AI - there is no shortcut to working with AI. It builds upon digitized processes and until you have that you cannot use AI solutions fully. You cannot start building without a solid ground." - C

4.2.3 People

Respondents accentuate the importance of an appropriate project group during an AI implementation. Interviews indicate that managers' involvement in the project group is crucial for the resource allocation towards working with AI projects. The legal department is further needed to apply the current regulations and to provide advice for how to overcome the

uncertainty connected to the legal constraints accompanying AI implementation. The results show that the legal constraints vary between public agencies and their specific solution and thus have to be adapted to each organization and their AI solution.

> *"The most important thing when working with AI in a public agency is the legal department. They are not just there to assist the development, but to control that we do the right things instead of stuff that we are not allowed to do."* - *D*

Moreover, respondents argue that public agencies have to ensure safe data management and transparency, to prevent bias and discrimination. In turn, this makes the ethics and safety department crucial in order to prevent mistakes.

> *"It is important to manage ethical aspects and bias related to the decisions made by algorithms."* - *B*

Furthermore, people with a combined understanding of IT and the organization, need to be involved. This, in order to receive an overall picture of the implementation. Lastly, to involve people who are passionate about AI is emphasized, no matter their work role - in order to push and drive the implementation.

> *"It is not just about IT, you have to work much broader. Mainly with organizational competences, analytics and the legal department /.../ People who are interested and passionate about AI is also a crucial part."* - *D*

4.2.4 External Environment

Respondents demonstrate that the external environment has a high impact on the speed of development and implementation of AI. Respondent A comments on why they have come so far in their AI implementation as a result of external competition, an external force which is rarely seen in public agencies;

> *"We are more competitively challenged than other public agencies. We are compared to external, non-public, parties. Technology drives them, which makes it necessary for*

us to be at the same level to meet the demand and expectations from the society and citizens. This makes us have to rise in a way that other public agencies do not." - A

Respondent F, on the contrary, sheds light on the differences between operating in a public and private organization;

"Us public agencies are traditionally grounded so we are not pioneers when it comes to innovations. We are steered by government directives and the instructions we get from the ministry. So, there is some inertia in public agencies since directions usually are not rewritten every year." - F

Furthermore, the majority of the respondents highlight the need for collaboration with other agencies and organizations to share knowledge and discuss AI use areas. Thus, highlighting the need for government support and directions within AI. In detail, government focus should be on promotion of AI education, allocation of resources to facilitate implementation, and development of a central AI controlling group. All of which aim to overcome challenges related to competence, uncertainty and information sharing.

"The first thing that I believe is important is for us to collaborate between public agencies. There are so many people trying to invent the wheel by themselves, which is a waste of taxpayers' money. That is where I miss some kind of central control, where the government supports us in the AI work, but there is none in the Swedish public agency world." - J

"We are undersized in working with innovation and AI, and the ministry has not said that we should do it at large. But, simultaneously it feels as if we are expected to keep up with the technological development anyways. We are instead supposed to apply for financial support from Vinnova, because that is where the government allocates its money instead of giving it straight to us." - F

4.2.5 Strategy

The importance of good leadership throughout a complex implementation has been mentioned continuously in the interviews. The arguably most important part is for managers to establish a clear strategy and vision for the AI use to ensure that the maximum potential is utilized. Respondent B puts it as follows;

> *"I believe that managers should give directions which make possible the allocation of resources for AI projects. This is an incredibly important starting point to get going at all." - B*

A clear direction is believed to make the employees aware of what is expected from them and helps to motivate their work. The strategy should aim to show the employees that there is a long term goal with the AI implementation and that new work opportunities arise with the new solutions. Hence, it is important to create an understanding of the purpose of the pilot project, and portray a vision of the greater good. This is argued should be achieved by employing an innovation strategy related to AI, providing appropriate resources and a time frame for the implementation. Respondents claim that this includes opening up separate innovation hubs for AI development to be able to experiment with and try solutions.

> *"/.../ putting up a timeframe for when to realize the investment and not just seeing an AI pilot. It is important to have a strategy that eventually can be rolled out at large to reach benefits in the long run." - H*

> *"/.../ try to create a lab where it is okay to fail and where you can test things outside the box." - F*

4.2.6 Process

The aforementioned critical drivers within *strategy* constitute what the management team should do strategically to implement AI. This section specifies how the organization should execute the strategy at an operational level, according to the respondents. Firstly, the majority

of respondents argue that pilot tests are important to execute prior to rolling out the final project. By doing this, mistakes and bugs can be detected and solved at a much lower cost than if the AI solution would be implemented fully from start. Moreover, pilot projects based on organizational data enable the employees implementing AI to present evidence and justify the value of the solution.

> *"I would, first and foremost, give the advice to start by testing. Make a specific application and try it out." - H*

Moreover, it is argued that it is of importance to be transparent throughout the AI development process. This enables the organization to follow the progress and therefore build confidence that the testing will result in an actual implementation.

> *"If we do not ensure transparency in our AI progress towards the rest of the organization, they will lose faith in us and believe that what we do is not useful. We therefore have regular meetings and presentations of our progress for our colleagues." - G*

4.2.7 Organizational Culture

Organizational culture is a critical factor of AI implementation as it acts as the internal drive towards change. Culture, in this study, concerns the organizational support, which consists of perceptions and attitudes, both from managers and other employees. Respondents argue that the degree of innovative culture affects the perceived resistance towards AI implementation. To illustrate this with an example, respondent A perceives a supportive and innovative culture and faces a positive attitude towards AI implementation. In contrast, respondents E and F experience a conservative culture contributing to a resistance towards AI amongst the other employees;

> *"People at our agency like to do things the way they have always done them. They do not see a purpose in simplifying processes." - E*

Moreover, respondents mention that the drive for AI implementation has to come from above as well as below in the hierarchical organization simultaneously. One part cannot drive the change itself. Further, managers' support plays an important role in supporting the AI process to get the entire organization on board of the AI implementation. This is important in order to make people less resistant to change and seeing the possibilities rather than challenges it might bring.

> *"There are mainly AI enthusiasts driving the work, but at the same time the management team wants us to work more with these kinds of questions. So, I still believe that we have strong support from above as well, which is extremely important." - H*

4.3 Summary of Empirical Findings

In short, most respondents highlighted similar challenges and critical drivers for AI implementation in Swedish public agencies. The stated drivers share common characteristics and were therefore categorized into seven areas, closely related to the secondary findings.

The most prominent findings within the areas of critical drivers include the importance of *competence* in a public agency context. Conversely, it was found to be a current challenge in public agencies. Moreover, *processes* showed the least significance based on the number of respondents highlighting this area. However, important to note, *processes* and all other drivers covered by the respondents are considered important. The meanings and implications of these findings are further analyzed below.

5. Analysis

This section interprets and analyzes the empirical findings through the application of the theoretical framework. Assuming that the study on AI implementation is representative for any DT, the aim is to evaluate how the critical drivers can be used to derive a framework for DT implementation in Swedish public agencies. Hence, the empirical findings will be compared to the areas of the MIT90 framework while considering the differences between private and public organizations, as MIT90 was originally developed for private organizations.

5.1 A Framework for Disruptive Technology Implementation

The empirical insights and theoretical framework support an extension and restructuring of the MIT90 framework. During the data collection, it appeared evident that there is a need for a change management framework within this field since the respondents expressed common challenges and uncertainty regarding their work with DT, exemplified by AI. In contrast to the development of the MIT90 framework which aims to help guide the whole of the private sector, the hereby called the *DT framework*, aims to be a customized model for Swedish public agencies.

The empirical findings present 39 critical drivers of change, a sample of which the majority fall into the areas of the pre-existing MIT90 framework. However, the empirical data exposes one categorizational misfit with the application of MIT90 on DT implementation in Swedish public agencies. Hence, rather than six areas, this framework adds a seventh, *competence* (Figure 4). The areas of the DT framework is therefore; (1) *competence*, (2) *technology*, (3) *people*, (4) *external environment*, (5) *strategy*, (6) *process* and (7) *organizational culture*.

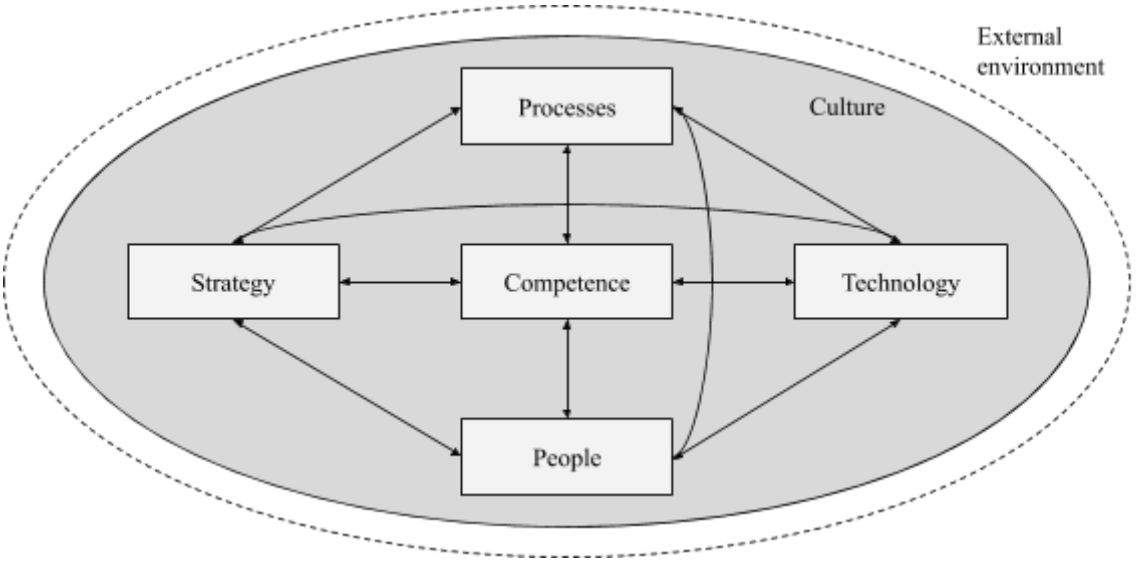


Figure 4: *The DT framework* for DT implementation in Swedish public agencies.

5.1.1 Competence

The central area of the DT framework is *competence* Leavitt and Scott Morton argue that competence is embedded within the *people* area of their respective frameworks (Leavitt, 1965; Scott Morton, 1995). However, the research on AI found that competence is essential in order to act upon the other critical drivers of the DT framework, connecting back to respondent B's saying; "*Knowledge is the foundation*". Hence, it is argued that *competence* should be independently and centrally presented in the context of public agencies since it was the most frequently answered critical driver, proven to affect all the other areas of the framework.

Furthermore, similar to the historic development of MIT90, which added *culture*, the DT framework adds the intangible aspect; *competence*, in order to further deepen the function of the framework. Compared to the other areas of the framework, *competence* contains the sole critical driver that was brought to attention by every respondent; *the need for having internal AI competence* (Table 2, section 4.2). Thus, indicating its importance.

Further, the evolution of change management theory portrays the relevance of antagonizing resistance towards change. In accordance, respondents shedded light to this challenge, further supporting Gherhes' (2018) claim of high resistance towards AI, amongst the general public. Thus, in accordance to Legg, Hutter (2006) and Davis' TAM model (1989) respondents

argued that by raising the general understanding of the potential benefits of AI, people will demonstrate less resistance towards implementation. This aligns with the findings from the application of MIT90 on BIM implementations. The study emphasizes the importance of bringing understanding of the advantages with BIM instead of the traditional drafting practices. Apart from that competence helps reduce resistance, it facilitates actions and initiatives within DT. Furthermore, competence enables public agencies to act on the other areas in the DT framework, building on Leavitt's and Scott Morton's theories on alignment (Leavitt, 1965; Scott Morton, 1995).

Competence is an interdependent area to all other areas. It can be argued that it is always of importance for implementation - no matter if the organization is public or private. Respondents claimed that AI competence is unique and crucial in order to execute an implementation, the same must be assumed for other types of DT. It is required in order to employ a strategy, administer processes, build project groups, and access appropriate data. However, the interviews demonstrated that the implications of the public context contributes to a greater need of internal competence. Liao et al. (2017) argue that employing consultants is the most efficient method of gaining knowledge for BIM implementation in the private sector. However, acquiring consultants is difficult given the financial constraints and lack of ability to understand what to outsource given the agency needs. Moreover, respondents experienced difficulties in recruiting new internal AI talents due to low salary incentives, employer attractiveness and lack of growth opportunities. Hence, in contrast to the private sector, it is increasingly important for public agencies to develop knowledge within DT organically through internal education.

5.1.2 Culture

Organizational culture is an underlying area of the DT framework. The intangible aspect; *culture* is previously emphasized by Scott Morton in response to Davis' finding of it helping to overcome the resistance towards technological change (Scott Morton, 1995; Davis, 1989). Even though Scott Morton acknowledges culture as a part of MIT90, he does not consider it to affect or be affected by the *strategy* or the *technology* aspects in the framework (Scott Morton, 1995). In contrast, the DT framework considers the cultural influence on all areas, including *structure* and *technology*, and not solely *people* and *processes*. This is being argued

since there is empirical evidence of dependency between (1) *strategy* and *culture* and (2) *technology* and *culture*.

The empirical findings demonstrated interdependence between *strategy* and c*ulture*. The respondents and Fottler (1981) argue that the bureaucratic and hierarchical culture hinders innovation and DT implementation. The respondents further stated that culture affects the frequency of innovation initiatives across all levels. Leaders, as well as operational employees, tend to be influenced by the formal rules and standards which contributes to the lack of innovative strategies within public agencies. This is further supported by Fottler (1981), who extends the argument saying that formal culture contributes to less managerial freedom to pursue innovative strategies. Additionally, respondents contrarily argued that an agency's strategy affects the organizational culture. This implies that leaders have the power to design a strategy which shapes an innovative culture, as well as vice versa - indicating alignment between these areas in the DT framework.

Moreover, the dependency between *technology* and *culture* is evident based on the empirical findings. The organizational culture shapes the technology department's circumstances and possibilities. Respondents argued that in agencies with less innovative cultures, the technology departments face challenges in the cooperative work of collecting and sorting data for DT implementations. This is supported by Liao et al. (2017) who find interoperability, the sharing of data, critical for DT implementations. A resisting culture will disincentivize the technology department to find new solutions to existing data processes. Hence, the alignment between *technology* and *culture* is also evident.

The interdependence of *culture* with *strategy* and *technology* can further be reflected in TAM as Davis (1989) argues that the foundation to acceptance of new technology is, amongst other factors, inventive culture. Thus, *culture* covers these areas in the DT framework.

5.1.3 External Environment

The external environment is an important area for successful implementations of DT in public agencies. The development of the MIT90 framework indicates its importance, however, the DT framework emphasizes it to an additional extent given the public setting.

The external environment is a critical area to consider given public agencies' interdependence with governmental directions and lack of competitive landscape.

Public agencies' interdependence with governmental directions makes it evident that the *external environment* plays an active, yet underlying, role in affecting the other internal areas. Liao et al. (2017) argue that private organizations are also dependent on government support to drive technology implementation. In accordance with Fottler's (1981) theory, the empirics demonstrated increased dependency on government support in public agencies given that they operate on their directives. Hence, for DT implementation in public agencies, governmental directions are alleged to have a direct effect on agencies' progression relating to all other areas - focusing on education, innovation and strategy. Still, the empirical findings showed that there is currently limited governmental directions and support regarding the work with DT. The prevailing lack of ownership in public agencies results in the tendency of awaiting governmental directions before initiating projects, contributing to the hindrance of DT innovation (Fottler, 1981). Getting the government to change the way they operate and support DT is, nevertheless, an area that is hard for independent public agencies to influence. Therefore, the external environment is given an underlying placement in the DT framework.

Furthermore, public agencies tend to lack exposure to external competitive pressure, making them slow in their innovation work and implementation (Fottler, 1981). Respondents argued that private organizations are exposed to competition to a higher degree than public, resulting in them having to be more innovative and efficient to survive. One of the respondents was exposed to external competition and this interviewee argued that the competitive pressure was crucial for their successful AI implementation. Thus, the government could play an important role in creating other types of competition and incentives for innovation within the public agency context. This is further elaborated on in section 5.2.1.

5.1.4 Technology, Strategy, People & Process

The empirical findings support, to some degree, the roles and meanings of the original MIT90 areas *technology, strategy, people* and *process*. The following section aims to extend and specify themes of importance within these areas in a public agency context.

The DT framework acknowledges the importance of *technology* in DT implementations. The critical drivers of change within *technology*, in particular, are related to data access, data quality, digital maturity and systems. These are drivers that can be implied to be important for all organizations related to any type of DT implementation. However, the challenges related to collecting, storing and sharing appropriate data differs between private and public organizations. For instance, an issue for public, compared to private organizations, is the access to- and sharing of external data (Fottler, 1981). Liao et al. (2017) discuss the importance of having systems that support interoperability, i.e. sharing of data between parties, in the context of private organizations. Fottler (1981) and the empirical findings, likewise acknowledge the importance of data sharing, but argue that it is difficult in public agencies due to the extensive safety restrictions they face. Hence, a cloud based system that fits a private organization is not necessarily appropriate in a public agency context. Accordingly, utilizing the potential of the data and systems that can be accessed or built internally, is essential for public agencies as a starting point for implementing DT. This, once again, sheds light on the importance of internal competence as a ground for technology, in order to employ the appropriate systems and data.

The meaning of *strategy* is broadened in the DT framework to include *structure*, from the MIT90 framework. This is because *structure,* in particular, did not result as a common critical driver, and if mentioned, it was closely connected to the management strategy. This is further supported by Fottler's theory (1981) which argues that the organizational structure is more rigid in public organizations. Hence, it is complicated to change them, making *strategy* and *structure* less highlighted by respondents. The critical drivers that were covered by respondents are related to the need for clear directions and goals, which is a commonly lacking theme in public organizations, as proposed by Fottler (ibid). Moreover, due to the differences between public and private organizations, *strategy* has not been included in the *processes* part of the framework, contrary to what Liao et al. (2017) argue in private context. The reason being that the critical drivers in *strategy* relates to what an agency should do, whereas the *process* area reflects how to do it. Hence, the areas cover different aspects resulting in Liao et al.'s categorization not being followed with regards to *strategy* in a public agency context.

Furthermore, the DT framework specifies the importance of involvement of people from different departments within the organization. Liao et al. (2017) propose that the same goes for BIM implementation in the private sector, but limit their argument to include people with a background in construction and design. The empirical findings and Fottler (1981), however, highlight the importance of involving people working with the legal-, ethical- and safety aspects in a public context. People responsible within these areas have an influence on DT implementation in public agencies. This further aligns with Fottler's (1981) description of the more bureaucratic structure of public agencies, compared to private organizations, associated with rigid regulations related to ethics, law, and security. Further, private organizations are argued to be less observed by the public since they are not funded by taxation (Niskanen, 1971). Hence, Fottler argues that private organizations can operate more freely, focusing less on legal-, ethical- and safety concerns. This may explain the low emphasis on these aspects in the study of BIM in the private sector context. To conclude, the DT framework proposes that a project group within DT implementation in a public agency has to involve employees from the legal-, safety- and ethical departments, as well as developers and managers to execute the idea.

Lastly, *processes* was the least brought up area out of the seven areas of critical drivers covered in the interviews. Hence, *processes* has been given less emphasis in the DT framework than in the MIT90, where it is centrally located. Scott Morton argues that *processes* is central since the procedure of the implementation has to be decided upon prior to digitizing them (Scott Morton, 1995). This is further supported by the study on BIM implementation in the private sector, making the MIT90 framework applicable to that scenario (Liao et al., 2017). However, Fottler (1981) states that public agencies are used to carrying out the decisions taken on a superior level, making them less prone to develop their own ways of executing the strategy. Further, he argues that the extent of red tape makes agencies less free than private organizations in making and executing their own strategies. In addition, respondents argue that public agencies lack the competence to build the processes which are necessary for DT implementation. Hence, Scott Morton's framework should be challenged in a public agency context, since the initial *processes* has to be built through *competence*. *Processes* has, thus, been moved away from the center to give space for *competence*.

5.2 Conclusion and Discussion

The following section presents the conclusion and discusses its implications and limitations. Moreover, the section provides proposals for future research.

To answer the primary research question, the study found 39 critical drivers for DT implementation in Swedish public agencies (see Table 2 in section 4.2 for full list). The drivers could, in turn, be categorized into seven areas necessary to consider when managing DT implementations; (1) *competence*, (2) *technology*, (3) *process*, (4) *strategy*, (5) *people*, (6) *culture* and (7) *external environmen*t.

The seven areas make up the foundation of the framework for DT implementation in Swedish public agencies, answering the secondary research question (Figure 4, section 5.1). The DT framework originates from the MIT90 framework, but has been extended and redesigned to align with the organizational challenges of implementing DT in public agencies. The framework contributes to the understanding of how to implement disruptive and innovative change in the hierarchical and bureaucratic Swedish public agencies.

5.2.1 Implications

The following section presents the implications of the DT framework for Swedish public agencies. The framework provides an understanding of the interdependent areas involved in a DT implementation and contributes with guidance for managers. With this contribution, the study aims to diminish uncertainty amongst employees and to reduce the organizational challenges of implementing DT. Suggestively, the DT framework should be used by managers at public agencies during the initial stage of an implementation for successful execution.

Since the DT framework emphasises the importance of *competence,* this area should be given prime focus. The managerial implications include putting time and effort into specific DT education, about its use and potential, at every level of the organization to overcome resistance and unwillingness to change. Thereafter, as DT understanding increases, the other

areas will be easier to manage, improving the overall process for DT implementation. Moreover, respondents argued that they are in need of external competence, in terms of consultants and new talent. Hence, public agencies should aim to increase their workplace attractiveness for talent through employer branding. Given the financial constraints, improving the salary incentives may be difficult. However, public agencies may improve their talent acquisition by providing better growth opportunities.

Moreover, public agencies are unable to reach success solely by themselves. The Swedish government plays an important role in decreasing uncertainty by providing common directions along with facilitating collaboration and competence sharing between agencies.

The DT framework holds implications for managers at Swedish public agencies and to some degree for the Swedish government. In addition, the DT framework may apply to other organizations within the swedish public sector, but that are outside the scope of this thesis. Essentially, the aim with the DT framework is to facilitate smooth DT implementation.

5.2.2 Limitations and Critique

The researchers acknowledge that there are limitations to this study. Firstly, the empirical study examines AI solely, as a representation of any DT implementation within the public agency context. Hence, the critical drivers, derived from the interviews, may be influenced by AI as a specific technology, impacting the outcome of the DT framework.

Further critique is that all interviewees were experienced within AI at their respective agency, which may have skewed the results. Moreover, the respondents were members of the AI Network and had therefore shown interest in this area. Their bias towards AI may have affected the empirical findings, resulting in them having an overly-positive view of AI, in comparison to other employees (Svärd, 2020).

Moreover, the choice of theory may have influenced the empirical findings and categorization of answers. Despite using the inductive approach, the adaptive elements were strengthened as the theoretical framework was established. The application of Leavitt's

theory and the MIT90 framework may have affected the presentation of empirical findings. This limitation implies that the use of another theory may have resulted in different findings.

Lastly, given the time frame of this study, the sample did not include respondents from each sub sector within the Swedish administration. Hence, it can be argued that the sample of the study is not an adequate representation of the Swedish administration. Moreover, despite the specified procedures for analysis, the researchers acknowledge the limitation of their personal biases when executing data analysis.

5.2.3 Future Research

Proposedly, future research could study several different DT implementations in Swedish public agencies, along with their critical drivers, in order to strengthen or criticize the findings of this study. Furthermore, this study may also include perspectives from different employees, not solely professionals working with the specific technology.

In addition, future research could explore the effect of the structural differences, such as size, digital maturity and task, to a larger extent. Hence, it could examine the relationship between structural variables and the DT implementation. This study would help DT professionals navigate their implementation based on their agency's structure.

Moreover, this thesis does solely focus on Sweden, given the scope of the bachelor thesis. Suggestively, future research could explore the national differences in governing DT implementations in public agencies. On a final note, a comparative study could specify the differences amongst countries with the aim to find the correlating variables related to successful DT implementation.

6. References

AI HLEG. (2019). *A Definition of AI: Main Capabilities and Disciplines.* Brussels: The European Commission.

Alvesson, Sköldberg. (2008). *Tolkning och reflektion: Vetenskapsfilosofi och kvalitativ metod* (2nd edition). Lund: Studentlitteratur.

Bryman, Bell. (2015). *Business Research Methods* (4th edition). Oxford: Oxford Univ. Press.

Bryman, Gillingwater, McGuinness. (1996). *Leadership and organizational transformation*, International Journal of Public Administration, 19:6, 849-872.

Charmaz. (2006). *Constructing Grounded Theory: A Practical Guide through Qualitative Analysis*. London: Sage Publications.

Christensen. (2013). *The Innovator's Dilemma: When New Technologies Cause Great Firms to Fail (Management of Innovation and Change).* Harvard Business Review Press.

Coffey, Atkinson. (1996). *Making sense of qualitative data: Complementary research strategies.* Sage Publications.

Costello. (2019). *Gartner Survey Shows 37 Percent of Organizations Have Implemented AI in Some Form.* Gartner. Retrieved 2020-04-20 https://www.gartner.com/en/newsroom/press-releases/2019-01-21-gartner-survey-shows-37-percent-of-organizations-have.

Dahlberg. (2016). *The creation of inter-organisational IT governance for social welfare and healthcare IT-lessons from a case study*. International Journal of Networking and Virtual Organisations. 16(1):38–71.

Dahl, Lindblom. (1953). *Politics, Economics and Welfare*. Chicago: University of Chicago Press.

Davis. (1989). *Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology*. MIS Quarterly,13(3), 319-340.

Durlak, Dupree. (2008). *Implementation matters: A review of research on the influence of implementation on program outcomes and the factors affecting implementation.* American Journal of Community Psychology, 41(3–4), 327–350.

Eisenhardt. (1989). *Building Theories from Case Study Research.* The Academy of Management Review, Vol. 14(4), 532-550.

Ernkrans. (2019, November 21). AI podden.

Fottler. (1981). *Is management really generic?*. Academy of Management Review, 6,1–12.

Frey, Bruno. (2004). *Social Comparisons and Pro-social Behavior: Testing "Conditional Cooperation" in a Field Experiment.* American Economic Review, 94 (5): 1717-1722.

Gattami. (2020, February 4). Brainstorming thesis ideas within AI.

Gherheş. (2018). *Why Are We Afraid of Artificial Intelligence (Ai)?*, European Review Of Applied Sociology, 11(17), 6-15.

Glaser, Strauss. (1967). *The discovery of grounded theory: strategies for qualitative research* (1st edition). New York: Adline.

Girasa. (2020). *AI as a Disruptive Technology.* Palgrave Macmillan, Cham.

Jenkins. (1983). *MIS Design Variables and Decision Making Performance,* UMI Research Press, Ann Arbor, Michigan.

Jensen, Sandström. (2016). *Fallstudier* (1st edition). Lund: Studentlitteratur.

Kylén. (2004). *Att få svar: intervju, enkät, observation*. (1. uppl.) Stockholm: Bonnier utbildning.

Leavitt. (1965). *Applied organisational change in industry: Structural, technological and humanistic approaches.* In J. G. March (Ed.), Handbook of organisation. Rand McNally and Company. Chicago, Illinois.

Lecompte, Goetz. (1982). *Problems of Reliability and Validity in Ethnographic Research.* Review of Educational Research.

Lee, Collier, Cullen. (2007). *Reflections on the use of case studies in the accounting, management and organizational disciplines.* Qualitative Research in Organizations and Management, 2(3), 169-178.

Legg, Hutter. (2006). *A formal measure of machine intelligence*. In Proc. 15th Annual Machine Learning Conference of Belgium and The Netherlands (Benelearn 2016), 73–80.

Liao, Ai Lin Teo. (2017). *Critical Success Factors for enhancing the Building Information Modelling implementation in building projects in Singapore,* Journal of Civil Engineering and Management, 23:8, 1029-1044.

Locke. (2002). *The grounded theory approach to qualitative research.* In F. Drasgow & N. Schmitt (Eds.), The Jossey-Bass business & management series. Measuring and analyzing behavior in organizations: Advances in measurement and data analysis (p. 17–43). Jossey-Bass.

Lucas, Donnellan. (2013). *Improving the replicability and reproducibility of research*. Journal of Research in Personality, 47(4), 453–454.

Mantere, Ketokivi. (2013). *Reasoning in Organization Science.* The Academy of Management Review, 38(1), 70-89. Retrieved 2020-04-12 www.jstor.org/stable/23416303.

Mehr. (2017). *Artificial intelligence for citizen services and government*. Cambridge, MA: Harvard Kennedy School, Ash Center for Democratic Governance And Innovation. Retrieved 2020-04-10 https://ash.harvard.edu/files/ash/files/artificial_intelligence_for_citizen_services.pdf.

Nader. (2020, February 13). Ideas related to the AI Network.

Niskanen. (1971). *Bureaucracy and Representative Government.* Transaction Publishers.

Pardo-del-Val, Martınez-Fuentes, Roig-Dobon. (2012). P*articipative management and its influence on organizational change*. Management Decision. 50(10):1843–1860.

Scott Morton. (1995). *The corporations of the 1990s*. New York: Oxford University Press.

Stake. (1995). *The art of case study research*. Sage Publications, Inc.

Strauss, Corbin. (1990). *Basics of Qualitative Research: Grounded Theory Procedure and Techniques.* Sage Publications, Newbury Park London.

Strauss. (1987). *Qualitative analysis for social scientists*. Cambridge University Press.

The Agency for Digital Governance. (2020). *Främja den offentliga förvaltningens förmåga att använda AI.*

The Government Office. (2017). *Myndigheter*. Retrieved 2020-03-30 https://www.regeringen.se/lattlast-information-om-regeringen-och-regeringskansliet/myndigheter/.

The Swedish Agency for Public Management. (2020). *Fakta om statsförvaltningen*. Retrieved 2020-03-30 http://www.statskontoret.se/var-verksamhet/forvaltningspolitikens-utveckling/arliga-uppfoljningar/.

Trist, Murray. (1993). *The Social Engagement of Social Science, Volume II: The Socio-Technical Perspective*. Philadelphia: University of Pennsylvania Press. Retrieved 2020-04-01 http://www.moderntimesworkplace.com/archives/archives.html.

Rainey, Backoff, Levine. (1976). *Comparing public and private organizations*. Public Administration Review, 36, 233–44.

Viechnicki, Eggers. (2019, April 26). *How much time and money can AI save government?* Retrieved 2020-04-29: https://www2.deloitte.com/us/en/insights/focus/cognitive-technologies/artificial-intelligence-government-analysis.html.

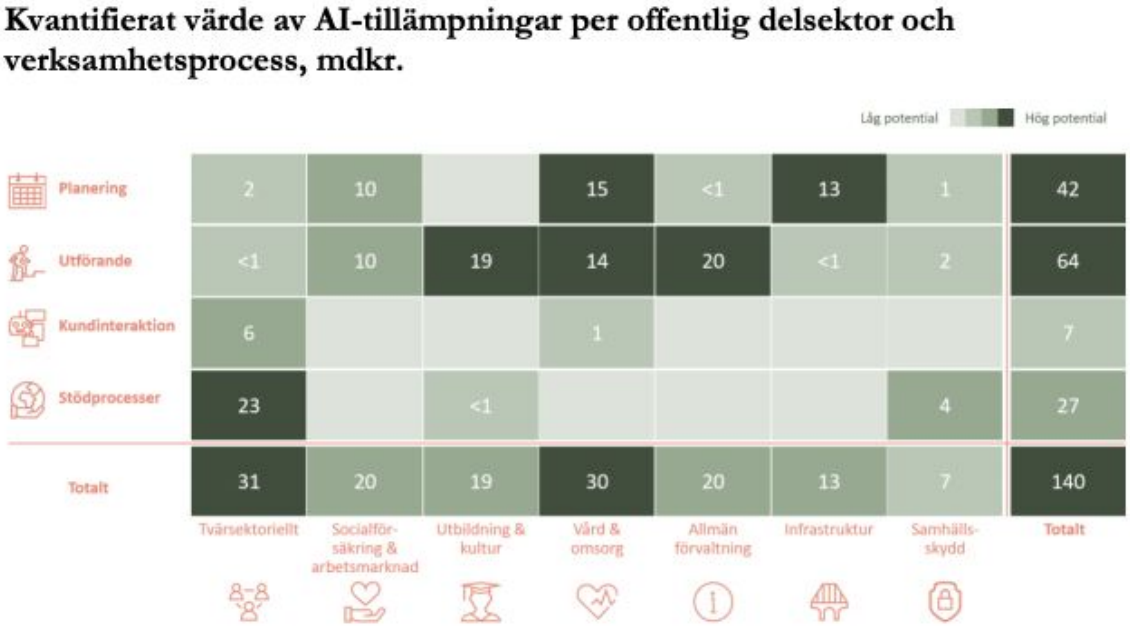
Webb, Campbell, Schwartz, Sechrest. (1966). *Unobtrusive measures: Nonreactive research in the social sciences.* Rand Mcnally.

Yates, Benjamin. (1991). *The Past and Present as a Window on the Future*. In the Corporation of the 1990s: Information Technology and Organizational Transformation, edited by Michael S Scott Morton, 61 - 91. New York: Oxford University Press.

Yin. (2014). *Case Study Research: Design and Methods* (5th edition). Thousand Oaks, California: Sage Publications.

7. Appendix

Appendix 1 - AI in Sweden



Picture 1 - The Economic Value of AI in The Swedish Public Sector, Per Sub Sector And Operational Area, Billion SEK. Light green = low potential, dark green = high potential. (The Agency for Digital Governance, 2020).

Appendix 2 - Interview Guide

Note that this guide presents the overall subjects discussed in the interviews, in line with the semi structured qualitative approach. It does not cover supplementary questions asked in the actual interviews.

Background

- Could you tell us a little bit about the agency and your role?
- Could you tell us about how you work with AI today?
- How do you structure your work around AI?
- According to yourself, what are the reasons for the small/large investment in AI within your agency?

Challenges

- What are some challenges in your work with AI?
- How do these challenges take expression in your work with AI or in the organization as a whole?
- Why do you think your agency is facing these challenges?
- How do you work in order to overcome these challenges?

Critical drivers of change

- What do you believe that the agency could do better in order to work more efficiently with AI?
- What factors do you believe are the most important for a successful AI implementation?
- What advice would you give to someone who is working with AI at another public agency?

Appendix 3 - Overview of Current Situation

An overview of the current situation of AI implementation in the studied public agencies.

Respondent	Agency's sector	Size of agency (employees)	Respondent's work role	Extent of implementation	Origin of the implementation initiative	Organizational structure in the AI work (people involved, allocated resources etc)
A	Social insurance and labour market	5 001 - 10 000	AI Section Manager AI Center	Completed pilot project.	Driven by operational need and data access.	Has an AI function, within IT, but that is operating individually.
B	Education and culture	501 - 1 000	IT Strategist	Using AI from existing cloud services, but is envisioning a proof of concept in the near future.	Do not know, but neither from above nor below.	So far only students and a supervisor is included in the AI work, as a part of school work.
C	Cross-sectionally (Governmental support function)	-100	Senior Advisor within Development and Promotion	Currently little AI, but is examining the possibilities.	From below, as a rule of thumb.	Will probably buy external solutions in the future.
D	Social insurance and labour market	10 001 -	Head of Department	Has an AI solution/project that is fully implemented and used.	The initiative originates from the IT department, and the visionaries there.	Has an innovation center where new technology is tested. The IT department is responsible for building solutions.
E	Education and culture	101 - 500	Head of Innovation	Has an overall AI structure and strategy, but is planning pilot projects as a next step.	From AI enthusiasts, the respondent themself.	Has worked with AI since 2017, with 50-80% work time allocated towards AI. A small team, consisting of internal people.
F	Education and culture	101 - 500	Head of Research	Completed pilot project.	From AI enthusiasts, the respondent themself.	Involving scientists from Swedish universities in the development process.
G	General administration	101 - 500	Chief Information Officer	N/A	N/A	N/A
H	Infrastructure	5 001 - 10 000	Digital Program Manager	Operating some pilot projects in AI.	From enthusiasts, from below in the organization.	Many separate projects that are synced via an analysis program that values the projects. There is also a development function within the agency.
I	Infrastructure	1 001 - 5 000	Chief Technical Officer	Not much A yet, but is planning pilot projects in the near future.	Initiative from below.	Has an innovation hub and a strategic group working with development. Driven as an organizational project, not as an IT project.
J	General administration	101 - 500	Chief Technical Officer	Completed pilot project.	The initiative originated in employee surveys showing a will for AI.	Various departments involved, with the respondent acting as a bridge between the organizational unit and the IT department.