

Identified Key Factors in Information System Procurement in the Public Sector in Sweden

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Abstract

Before the pandemic, many public sectors in Sweden relied heavily on American cloud services. The pandemic's onset necessitated remote work, highlighting the need for secure and legally compliant communication systems. The dSam project (Digital Collaboration Platform for the Public Sector) evaluated the market for such solutions, completing its report in autumn 2022. The project's main purpose was to investigate, analyze, and present factors influencing the procurement of digital information systems within the public sector in Sweden, and to understand the interaction between people and technology. This understanding aims to optimize behaviors and attitudes for successful procurement. The empirical material includes semi-structured interviews with authorities and supplementary observations. The study identifies ten key factors affecting the procurement of digital information systems in the Swedish public sector and highlights a significant research gap in theories related to IT artifacts.

Keywords: public procurement, digital collaboration platform, remote work, sociomateriality, IT artifact.

1. Introduction

In Sweden, as in several countries, public authorities allocate substantial funds annually for essential societal services like healthcare and education, in Sweden 2018's procurement totaling over 780 billion kronor, approximately 18.3% of the nation's GDP (SNS, 2022). Despite this, inefficiencies, and lack of competition lead to a substantial shortfall, estimated between 70-100 billion kronor. The government's digitalization ambition for public services aims for global leadership but faces challenges, including a slower development pace compared to the private sector and other EU nations. Digitalization is crucial for improving public service efficiency and addressing societal needs, yet its full potential remains untapped in Sweden. The public sector's transformation through digitalization is vital for enhancing citizen services and operational efficiency. However, this transformation is complex, requiring not only technological upgrades but also significant investments in skills, infrastructure, and integrating human and organizational aspects.

Standardized operational systems, such as those used in eHealth and social care, offer benefits like improved efficiency and data management but may also hinder

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organizational innovation. The effective implementation of IT in the public sector goes beyond technology selection and involves considering human factors like training and work process adaptation. Failure to do so can result in resistance and productivity loss.

Research shows that a key factor in the failure of the development and implementation of digital systems in the public sector is how these systems are procured (Thai, 2001; Moe, 2014). Studies highlight challenges such as opportunism from consultants, who specify requirements too early, payment models, and standardized public contracts that inhibit interest from suppliers (Moe & Päivärinta, 2013), and a lack of insight into procurement being a process with many stakeholder aspects that are often overlooked (Moe & Newman, 2014).

A foundational aspect of this research area is Orlikowski's (1992) exploration of the sociomateriality of technology in organizational contexts. Orlikowski's work emphasizes the interplay between technology and organizational structures, illustrating how technological tools and organizational practices are mutually constitutive (Orlikowski, 1992). This perspective is crucial for understanding the dynamic nature of technology implementation in the public sector.

Building upon these insights, Henfridsson (2000) and Lewis et al. (2003) examine the influence of individual beliefs and organizational culture on the adoption and use of technology. Their research highlights the importance of understanding the human element in technology implementation, including factors such as personal innovation, perceived self-efficacy, and management support (Henfridsson, 2000; Lewis et al., 2003).

The public sector's unique organizational context is further explored in research focusing on policy, regulatory, and governance structures. This body of literature delves into how these factors specifically impact technology procurement decisions and implementation strategies in public organizations. The challenges posed by bureaucratic processes and regulatory compliance are often highlighted as key differentiators from private sector practices (Heeks, 2002; Moe & Päivärinta, 2013).

Additionally, literature on project management and change management within the public sector provides insights into effective strategies for technology implementation. This includes considerations of stakeholder management, risk assessment, and the development of organizational readiness for technological change (Davenport, 1998). In sum, the academic discourse surrounding digital information system procurement in the public sector is informed by diverse research, encompassing sociomateriality, individual and organizational behavior, public administration peculiarities, and project management strategies. These studies collectively contribute to a nuanced understanding of the challenges and considerations unique to technology procurement and implementation in governmental settings.

Higher demands are placed on organizations, leaders, and managers to have the ability to manage change. Davenport & Westerman (2018) argue that digital services are not just something that can be introduced into an organization. It is a complex and diffuse process that involves more than just technology. Fundamental investments in skills and infrastructure are required, and it involves collaboration between people, information technology, and business processes. Moreover, continuous monitoring and actions from the management are required to ensure that appropriate decisions are made.

Information technology does not have an inherent value, and the pursuit of sustainability is likely not to have a technological basis, but rather be based on the structure of

the organization itself. Successful implementation of IT is not just about choosing the right technology and implementing it correctly. It is also about considering the human and organizational aspects of the change, such as training, communication, and adaptation of work processes. Ignoring these factors can lead to resistance, incorrect use of the system, and decreased productivity, which in turn can affect the organization's ability to achieve its goals. Therefore, it is important for organizations to take a holistic perspective when implementing modern technology and ensure that both technical and human factors are considered (Galliers & Leidner, 2009).

Technology's impact is determined by its use. Incorrect or unintended use can lead to resistance and organizational conflict (Orlikowski, 2000). This underscores the importance of aligning technology with operational needs and user understanding, ensuring that technology implementation is not only technically sound but also organizationally and humanly integrated. According to Wade & Shan (2020), the error rate for digital transformation is as high as 87.5%, which means that only one out of eight digital transformation projects were considered successful in terms of expected value.

The study of digital information system procurement in the public sector draws upon a substantial body of related research, which provides valuable insights into the complexities of integrating technology within governmental organizations. This research spans several key areas, including information systems, organizational behavior, and public administration.

2. Research question

The purpose of this study is to examine and understand the factors that affect the procurement of digital information systems within the public sector. The study also aims to understand how people and technology interact, which can contribute to insights on how behaviors and attitudes can be optimized for successful procurement, the following research question was formulated:

- Which factors affect the procurement process of an information system in the public sector?

3. Theory

In the research a foundational theoretical basis is employed to guide the analysis and interpretation of the data. This theoretical underpinning is crucial for providing a structured approach to understanding the complex phenomena observed in the study.

Orlikowski (1992) presented a critique and adaptation of Giddens' structuration theory, particularly in its application to technology. She addressed limitations in the theory by proposing the *structuration model of technology*, which led to the development of the concept known as the: *duality of technology*. Orlikowski emphasized the dynamic interaction between technology and human actions, highlighting how technology both shapes and is shaped by these actions. This process of construction and reconstruction is ongoing and recursive, underscoring the fluid relationship between technology and human agency. This construction and reconstruction are continual and recursive. Orlikowski (1992, p. 398) argued:

“Technology is both shaped by and shapes human action (the duality of technology); and that the interaction between people and technology is ongoing and dynamic (the interpretive flexibility of technology)”

Orlikowski demonstrated that technology serves as both a tool for human actions and a product shaped by these actions. This reciprocal relationship creates structures through a dynamic interplay between technology and human agents (referenced in Fig. 1 and Table 1 through arrows a and b).

This means that while technology is born from human actions, it simultaneously aids humans in performing their activities (also indicated by arrows a and b in Fig. 1 and Table 1).

Additionally, the interplay between technology and humans is influenced by institutional factors, such as financial resources and human effort (shown by arrow c in Fig. 1 and Table 1).

Furthermore, technology can impact an organization's institutional properties, leading to modifications in its structure, including its rules and resources (illustrated by arrow d in Fig. 1 and Table 1).

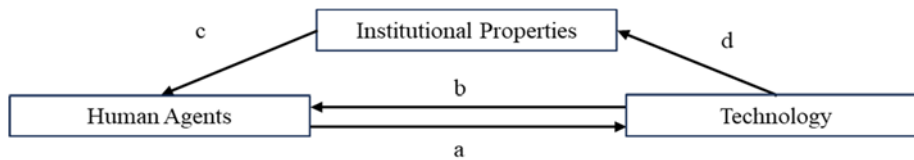


Figure 1: Structuration Model of Technology (Orlikowski, 1992, p. 410)

Table 1

Explanation of Structuration Model of Technology (Orlikowski, 1992, p. 410)

Arrow	Type of Influence	Nature of Influence
a	Technology as a Product of Human Action	Technology is an outcome of such human action as design and development, appropriation, and modification
b	Technology as a Medium of Human Action	Technology facilitates and constrains human action through provision of interpretive schemes, facilitates and norms
c	Institutional Conditions of Interaction with Technology	Institutional properties influence humans in their interaction with technology, e.g., intentions, design standards, professional norms, state of the art in materials and knowledge, and available resources (time, money, skills)
d	Institutional Consequences of Interaction with Technology	Interaction with technology influences institutional properties of an organization, through reinforcing or transforming the structures of signification, domination, and legitimation

3.1. Application of Structuration Theory to This Research

Orlikowski's framework is particularly valuable in this study for its emphasis on the sociomateriality of technology in organizational settings. It posits that technology is not merely a tool used by individuals in an organization but is deeply intertwined with the organizational structures, practices, and processes. This perspective is instrumental in understanding how digital information systems are not just implemented in the public sector but are also shaped by and shape the organizational practices and policies.

The theoretical approach used in this study leverages Orlikowski's framework to provide a comprehensive and nuanced understanding of the procurement of digital information systems in the public sector. This approach not only aids in exploring the specificities of public sector procurement but also contributes to the broader discourse on the role of technology in organizational settings, underlining the interconnectedness of Technology, Organizational characteristics, and Human Agents.

4. Method

This study employs a qualitative research strategy, utilizing semi-structured interviews and observations to find the key factors in the empirical data. As in most qualitative studies the strive has been to gather perspectives from the informants to better understand the complexity and contextuality of these phenomena.

4.1. Data collection and informant sampling

Data collection included detailed interviews and observations, focusing on participants' experiences in various aspects like background, procurement, implementation, and use. The selection process involved a snowball sampling, where initial selected respondents recommended others, ensuring a comprehensive coverage of relevant informants. This approach was particularly suitable for the study's focus on agencies involved in the procurement and implementation of the dSam project. Interviews were conducted via telephone or video calls, and the respondents' consent was obtained for recording.

To ensure the quality of the selection, authorities have been chosen that use dSam as a basis for the procurement of services, or that have implemented a working system based on the dSam project. The goal was to involve individuals who are directly involved in the decisions making process during procurement and implementation, as well as the use of the current system. Table 2 below presents information about the conducted interviews.

Table 2
Respondents.

Authority	Title	Interview form	Date	Duration (min)
Authority 1	Unit Manager	Phone Meeting	May 2, 2023	42
Authority 2	Department Manager	Video Meeting	May 2, 2023	30
Authority 3	Strategist	Video Meeting	April 28, 2023	45
Authority 4	Business Analyst	Video Meeting	April 28, 2023	50
Authority 5	Security Manager	Phone Meeting	April 26, 2023	40
Authority 6	Administration Manager	Phone Meeting	April 28, 2023	30
Authority 7	Project Manager	Phone Meeting	May 5, 2023	41

4.2. Data analysis

The data analysis in this study employed directed content analysis, guided by Orlikowski's theoretical framework. This approach facilitated the identification of key themes and patterns within the data (Hsieh & Shannon, 2005). According to Hsieh and Shannon (2005), directed content analysis is suitable when existing theory or prior research on a phenomenon is incomplete and requires further description to validate or extend a theoretical framework.

The analysis process began with the transcription of the interview recordings. This meticulous process involved converting verbal exchanges into written text, capturing nuances and subtleties crucial for maintaining the integrity of the data. The transcriptions were then subjected to thematic analysis, a method widely used in qualitative research for identifying, analyzing, and reporting patterns within data. Thematic analysis was chosen for its flexibility and its ability to align with the study's theoretical framework, making it an appropriate choice for the research objectives.

The thematic analysis followed several stages: The first stage involved thoroughly reading and re-reading the transcriptions to gain an in-depth understanding of the content. This familiarization process was essential for identifying initial ideas for coding (Creswell & Poth, 2018). The next stage involved systematically coding interesting features of the data in a methodical and consistent manner. This coding process organized the data into meaningful groups, which was crucial for structuring the subsequent analysis and ensuring that all relevant aspects of the data were captured.

After generating initial codes, the research focused on identifying themes by collating these codes into potential themes. This stage involved gathering all data relevant to each potential theme, focusing on identifying patterns and relationships between codes to form a coherent narrative. Once potential themes were identified, they were reviewed, refined, and modified to ensure they accurately represented the dataset and addressed the research questions. This process included splitting, combining, or discarding themes to arrive at a set of coherent, meaningful themes that provided insight into the procurement process.

Finally, the themes were defined and named, followed by a detailed analysis of each theme and the overall story they told about the data. This involved going back to the dataset to validate the themes, ensuring they were supported by the data and accurately represented the participants' experiences and perspectives. Additionally, the study investigated functions based on the tools included in the digital collaboration platform for the public sector, such as Video Conferencing, Document Storage, Fixed Chat Rooms, Kanban, and Whiteboard.

5. Findings and Discussion

This study operationalizes Orlikowski's (1992) theory on the duality of technology to explore the interplay between technology and organizational practices. The theory posits that technology is both shaped by and shapes human actions within organizations. From the analysis, four main themes (a-d) emerged, aligning with Orlikowski's conceptual framework:

a) Human Actors and Technology: This theme explores how individuals within organizations influence and are influenced by technology. The decisions, actions, and interactions of human actors play a pivotal role in shaping technological choices and implementations. For example,

the initiative to explore alternatives to traditional communication tools, as seen in the dSam project, underscores the proactive stance organizations are taking in response to technological and legislative changes.

b) **User Experiences of Functionality and Efficiency:** Reflecting on the practical and operational aspects of technology use, this theme highlights the importance of aligning technological tools with user needs and expectations. The emphasis on user-friendly solutions and the quest for efficient digital collaboration tools illustrate the direct impact of technology on daily work practices and the overall user experience.

c) **Rules, Routines, Norms, and Cultural Aspects:** This theme delves into the regulatory, normative, and cultural frameworks that govern technology procurement and use within organizations. The adherence to legal requirements, such as GDPR, and organizational norms around technology use, exemplify the complex landscape within which technology decisions are made.

d) **Organizational Consequences:** This theme examines the broader implications of technology on organizational structures, processes, and cultures. The transition towards new digital platforms and the adoption of open-source solutions signals significant shifts in organizational practices, necessitating a reevaluation of existing routines and the development of new competencies.

These themes, grounded in Orlikowski's theory, provide a nuanced understanding of the dynamic relationship between technology and organizational practices. They underscore the multifaceted nature of technology implementation and the critical role of human agency, organizational contexts, and cultural factors in shaping technological trajectories.

To answer the research question, the identified factors, listed in Table 3, are presented in relation to Orlikowski's (1992) theoretical framework. These factors were identified during the data analysis, which was based on frequently occurring words or expressions that emerged during the interviews and observations.

Table 3
Identified factors.

#	Factor Name	Description
1	Complexity in Requirements Management	Highlights the influence of human actors on technology through the complex process of managing and negotiating requirements.
2	User Participation	Emphasizes the crucial role of user involvement in shaping technology that meets their needs for functionality and efficiency
3	Security Compliance	Security requirements illustrate how regulatory and normative frameworks influence technology decisions and implementations
4	Organizational Expertise	Reflects the necessity of aligning technology with user competence and organizational knowledge for effective use.
5	Sociomaterial Dynamics	Explores how technology is both shaped by and shapes the social and material aspects of organizational life, including rules, routines, and cultural norms.
6	Perceptions of Technology	Shows how individuals' perceptions and beliefs about technology influence its adoption and utilization.

7	Organizational Flexibility	Highlights the impact of technology on organizational structures and the need for adaptability in response to technological changes.
8	Digital Transformation Journey	Reflects significant shifts in organizational practices towards new digital platforms, necessitating the development of new competencies.
9	Contextual Variability	Acknowledges the diversity in organizational contexts and the impact of different conditions on technology adoption and adaptation.
10	Collaborative Development with Users	Points out the importance of actively involving users in the development process to ensure the technology's functionality and efficiency.

Below is the connection between themes, factors, and supporting citations.

a) Human Actors and Technology

1. Complexity in Requirements Management: Highlights the influence of human actors on technology through the complex process of managing and negotiating requirements.

"There can be disagreement between business managers and suppliers on how detailed specifications should be."

6. Perceptions of Technology: Shows how individuals' perceptions and beliefs about technology influence its adoption and utilization.

"Individuals' belief in technology's potential to improve work. Processes influences how organizations adapt and implement technology."

b) User Experiences of Functionality and Efficiency

2. User Participation: Emphasizes the crucial role of user involvement in shaping technology that meets their needs for functionality and efficiency.

"Users' needs and interests, and a pursuit towards user-friendliness, contribute to shaping technology development."

4. Organizational Expertise: Reflects the necessity of aligning technology with user competence and organizational knowledge for effective use.

"The implementation of new technologies requires training of staff, highlighting the importance of organizational knowledge and skills."

10. Collaborative Development with Users: Points out the importance of actively involving users in the development process to ensure the technology's functionality and efficiency.

"By actively involving users, technology can be tailored to their specific needs and expectations."

c) Rules, Routines, Norms, and Cultural Aspects

3. Security Compliance: Security requirements illustrate how regulatory and normative frameworks influence technology decisions and implementations.

"Security and privacy remain a critical aspect. These can affect the organization's choice of technical solutions."

5. Sociomaterial Dynamics: The concept of sociomateriality explores how technology is both shaped by and shapes the social and material aspects of organizational life, including rules, routines, and cultural norms.

"Technology's development and use shape and are shaped by social factors, legal and organizational frameworks, and users' needs and preferences."

d) Organizational Consequences

7. Organizational Flexibility: Highlights the impact of technology on organizational structures and the need for adaptability in response to technological changes.

"The ability to adapt to new technologies and work methods, change organizational culture, and manage legal issues are all significant factors."

8. Digital Transformation Journey: Reflects significant shifts in organizational practices towards new digital platforms, necessitating the development of new competencies.

"Organizations have had to restructure and reconsider their digital collaboration, marking a significant change in work methods."

9. Contextual Variability: Acknowledges the diversity in organizational contexts and the impact of different conditions on technology adoption and adaptation.

"Large organizations with multiple distributed operational sites may have different conditions, affecting the introduction of technology and work methods."

These mappings illustrate the complex and dynamic relationship between technology, human actors, and organizational structures, practices, and culture, underscoring the multifaceted implications of technology in organizational contexts.

The findings from the study effectively utilize Orlikowski's (1992) duality of technology framework to explore the intricate dynamics between technology and organizational practices. By analyzing the interactions and influences between human actors, technology, and the organizational context, the research uncovers four main themes that contribute to our understanding of technology procurement in the public sector. These themes highlight the significant role that human actors play in shaping technology, the critical importance of aligning technology with user needs for functionality and efficiency, the impact of rules,

routines, and cultural norms on technology decisions, and the broader organizational consequences of technological adoption and adaptation.

In the discussing of these findings, it becomes apparent that technology procurement and implementation are far from straightforward processes; they are deeply embedded in the social and organizational fabric. The active role of human actors in navigating complex claims management and their beliefs about technology underscore the personal and subjective dimensions of technology decisions. Similarly, the emphasis on user involvement and organizational skills reflects a nuanced appreciation for the practicalities of technology use, where efficiency and user-friendliness are paramount.

Furthermore, the study reveals how organizational practices and technological choices are influenced by broader regulatory, normative, and cultural frameworks. The adherence to security requirements and the concept of sociomateriality illustrate the intricate ways in which technology is both shaped by and shapes these contexts. Lastly, the discussion on organizational adaptability and the development journey highlights the transformative potential of technology, signaling significant shifts in organizational structures, processes, and cultures.

This rich tapestry of interactions and influences not only affirms Orlikowski's theoretical framework but also extends it by providing detailed insights into the specific factors affecting technology procurement in the public sector. The nuanced understanding of the dynamic relationship between technology, human agency, and organizational contexts underscores the multifaceted implications of technology in organizational settings. It points to the need for a comprehensive approach to technology decisions—one that considers the complex interplay of human actors, technological capabilities, and organizational practices.

6. Conclusion

Public sector organizations in Sweden face several prominent challenges in procuring digital information systems. Key challenges include finding technology solutions that meet legal requirements and are user-friendly, managing resistance to change, and preparing the organization for new ways of working. Additionally, organizations need to find the right expertise to implement and maintain these technological solutions. Ensuring that the technology is accessible and inclusive for all employees is another critical challenge, necessitating consideration of diverse user needs and abilities. Accessibility and usability are central aspects in this context.

Despite these challenges, organizations have learned valuable lessons from implementing new technological solutions. They have realized the importance of careful planning and change management to ensure successful implementation. Engaging and involving employees in the change process has also proven crucial. A key takeaway is that merely introducing innovative technologies is not enough; organizations must be prepared to change their work routines and adapt to innovative technologies, which may involve modifying old practices. The pandemic has brought significant changes to work routines and technology use in public organizations, presenting both challenges and opportunities. By adapting to new technological solutions and implementing effective change management, organizations can leverage the benefits of digitalization and collaborative tools. It is essential for organizations to continue learning and adapting to innovative technologies and work methods to remain flexible and efficient in a digitalized world.

In summary, this study has explored the organizational impacts of introducing new tools and technologies, focusing on procurement. The pandemic and legal requirements have compelled organizations to restructure their work methods and find alternative solutions. Challenges such as resistance to change, the need for technical expertise, and ensuring usability and accessibility have been identified. Despite these challenges, organizations have also gained valuable insights and can benefit from innovative technologies by engaging and involving their employees and implementing effective change management.

This study provides insights that can benefit both organizations and suppliers in future procurement processes. Understanding each other's perspectives can improve the interaction between customer and supplier. Additionally, identifying and avoiding potential obstacles early increases the chances of successful procurement. This aspect is of utmost importance as the procurement process manages taxpayers' money, which could be at risk if the procurement is not managed correctly.

Contribution to Practice:

The results, reviewed and discussed in light of relevant theory, previous research, and observations, have identified ten factors to consider when procuring information systems. These factors are detailed in Table 3.

Contribution to Research:

In the academic sphere, this study confirms established factors influencing the procurement of information systems. Several factors identified in the study are significant for the procurement process, with "varied conditions" being particularly noteworthy. Larger organizations with multiple dispersed units may have different conditions, potentially affecting the introduction of technology and work methods. This can also be reflected in an authority with various types of responsibilities. Orlikowski (1992) refers to this phenomenon as the "duality of technology," indicating that technology is shaped by its social context.

The research is guided by the assumption that the academic community has encountered limitations in understanding the comprehensive effects of IT artifacts—both intentional and unintentional—on individuals, groups, organizations, and society at large, as these are often taken for granted. To fully understand these consequences, theoretical development is required regarding the meanings, capabilities, and uses of IT artifacts, as well as their multidimensional, expansive, and dynamic nature, and the cyclical changes occurring in the various social environments in which they exist (Orlikowski, 1992).

A significant gap identified in the research field is the lack of theories on IT artifacts: their emergence, evolution over time, and how they intertwine with socioeconomic contexts and practices. These unresolved questions risk becoming even more challenging in an era characterized by dynamism and innovation (Orlikowski and Iacono, 2001). This challenge becomes more pronounced in the procurement of IT systems, where understanding these aspects is crucial for successful implementation and use.

As dependence on a range of pervasive and intrusive technological artifacts increases in the future, researchers have both the opportunity and responsibility to influence the future shaped by these technological artifacts. To achieve this, a deepening engagement with the artifacts central to the future is required. Without this engagement, there is a risk of becoming passive

spectators to the technological and social changes taking place, thereby affirming the most 'feared' assumptions about technological determinism (Orlikowski, 1992).

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