

From Manual to Intelligent Procurement: A Case Study on the Early-Stage Adoption of AI in Purchasing Operations

Introduction

The number of **industries adopting AI technologies** is increasing substantially. However, many industries are still uncertain about AI capabilities and functions.

Integrating advanced technology such as AI into **traditional procurement systems** is complex.

Technical issues will arise, and **users must learn** and adapt to new workflows, procedures, and responsibilities.

Consequently, it **hinders the implementation of AI-driven** procurement projects.

Understanding the relationship between the **technical and human** elements usually requires a socio-technical perspective that examines the evolving nature of both systems during the digital transformation.

STS (socio-technical systems) theory is a structured framework **for assessing, controlling, balancing, managing, and directing** the interdependent **relationship between technology and humans** within an organization.

Research Methodology

(1) Research question:

“How does the implementation of AI-enabled automation of the procurement processes influence the interaction between the social and technical subsystems at the early stages? “

(2) Research design:

Real-world **case study** and **qualitative design** to comprehend the nature of implementing automation in procurement using AI tools, how procurement professionals felt during the process, how the project affected their daily work, how easy it was to adapt to the changes, how optimistic they were about the new system.

Research Methodology Cont.

(3) Research site:

The organization's name and business domains are kept confidential, general information is shared, with the organization's consent.

(4) Research theoretical framework:

Socio-Technical Systems (STS) Theory suggests that organizations comprise two interdependent subsystems: the **technical subsystem** encompasses the technologies, workflows, equipment, tools, etc, and the **social subsystem** encompasses the people, structures, values, cultures, etc. According to STS, organizations can achieve optimal business outcomes by the **joint optimization of the two subsystems** rather than maximizing the benefits of one subsystem at the expense of the other

Research Methodology Cont.

(5) Data Collection

1. Interviews: 8 semi-structured interviews
2. Document Analysis and Contextual Information: Internal reports, email communication, and SOP
3. Sampling: Senior and executives procurement professionals

(6) Data Analysis

1. Familiarization
2. Thematic coding: Inductive and deductive coding
3. Developing themes
4. Reviewing themes
5. Defining themes
6. Triangulation

Results

- ▶ A **software** called “QualCoder” was used to code the collected interview data.
- ▶ **Thematic tables:** were used for coding.
- ▶ **Eight subthemes:** were developed to reflect the impact of the AI-automated procurement systems on the social, technical, and the interplay between the two subsystems.
- ▶ **Three main themes:** social subsystems, technical subsystems, and the joint optimization of the two subsystems.
- ▶ **Thematic diagram:** Illustrates the results of data analysis.



Results Cont.

► **Main Theme (1): Technical Subsystems**

- Subtheme (1) Effective system design
- Subtheme (2) Managing technical issues
- Subtheme (3) Data protection and information flow

► **Main theme (2): Social Subsystems**

- Subtheme (1) System flexibility and its impact on users
- Subtheme (2) Clear roles and responsibilities
- Subtheme (3) Information sharing among stakeholders

► **Main theme (3): Joint Optimization of the two subsystems**

- Subtheme (1) The alignment of the technical and social subsystems
- Subtheme (2) System design and human values

In general, themes related to the joint optimization of the technical system and social components are rarely shown in the analysis. Whereas technical and social themes appeared equally in the analysis.

Discussion

(1) Technical Subsystem

1. The adoption of AI was planned to be implemented in phases. Starting with “**direct PO**” purchase orders that are frequently placed with the same suppliers, with fixed quotations and minimal variation.

End user places order > assigned to buyer > send request to supplier > receive quotation > share it with end user > verify by end user > get management approvals > place purchase orders.

60% of the items were direct PO, with AI automation 60% of the orders are reduced.

2. The **system design** with effective and achieved cost reductions and operational efficiency.

Discussion Cont.

3. **Managing technical issues:** In-house expertise, close coordination between the IT and procurement teams, constant feedback, periodic performance reports, all supported the adoption of AI.

4. **Data Protection and information flow:** data protection and confidentiality requirements were discussed among the procurement professionals. Since it includes critical financial statements, customers' and suppliers' details.

(2) Social subsystem

1. **System flexibility & its impact on users:** the system was very flexible, and was designed for frequent updates.
2. **Clear roles and responsibilities:** Roles were clearly communicated to users. However, the work structure remained the same.
3. **Information sharing among stakeholders:** including internal and external stakeholders. Information sharing with suppliers was more challenging.

Discussion Cont.

(3) Joint optimization

System design and human value: the objective was to empower employees and ensure their well-being by reducing workload and enhancing work efficiency

The alignment of technical and social subsystems: This theme was poorly discussed among the participants. While discussing the technical aspects, participants were either entirely focused on enhancing the system's functions and capabilities or merely focused on workload and employees' well-being.

Contribution

(1) Theoretical contribution:

The findings of this study reveal that practically aligning the technical system with the social structure is neither perfect nor feasible.

The available STS literature is outdated and explains the implementation of traditional information technology systems and their interactions with users.

STS literature on the adoption of artificial intelligence and automation is inadequate.

This study presents empirical findings and extends research on STS theory to examine the adoption of artificial intelligence to automate procurement processes.

The findings refine some principles of the STS theory within the context of implementing AI-automated systems. **For example**, the findings show that the adoption of AI-automation may not require restructuring or redefining roles at the early stages,

Contribution Cont.

(2) Practical contribution

This study supports managers, AI-enabled system designers, and practitioners involved in the adoption of artificial intelligence to understand the interaction between AI-enabled system and operational staff within the procurement industry.

First, system designers should implement pilot projects. **Second**, redefining roles and responsibilities, **third** restricting may be required, **forth** managers should deal with fear of job replacement by emphasizing on human values.