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FRANKFURT UNIVERSITY OF APPLIED SCIENCES

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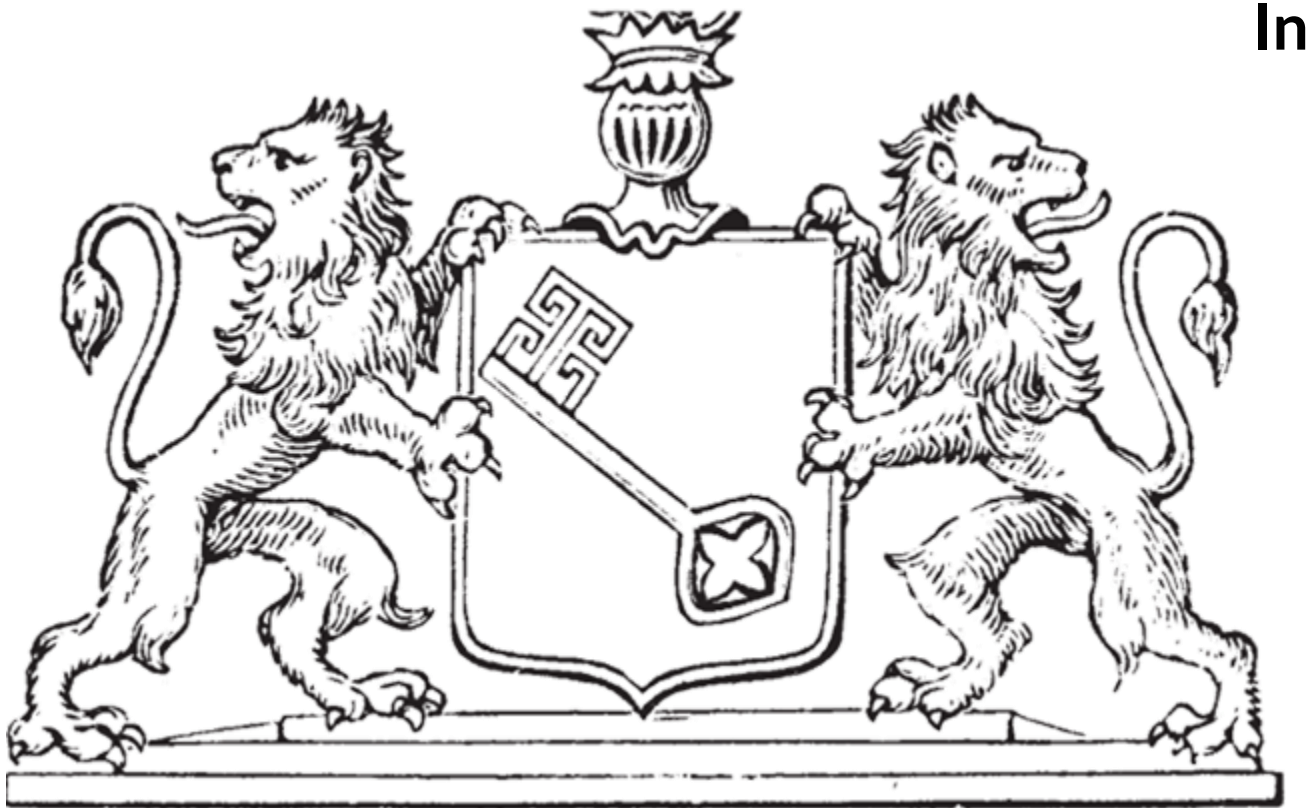
DISCOVER DIGITAL ADMINISTRATION 2025

Assessing Public Procurement through Design Science: Including the Practitioner's Viewpoint



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What is the German procurement volume?

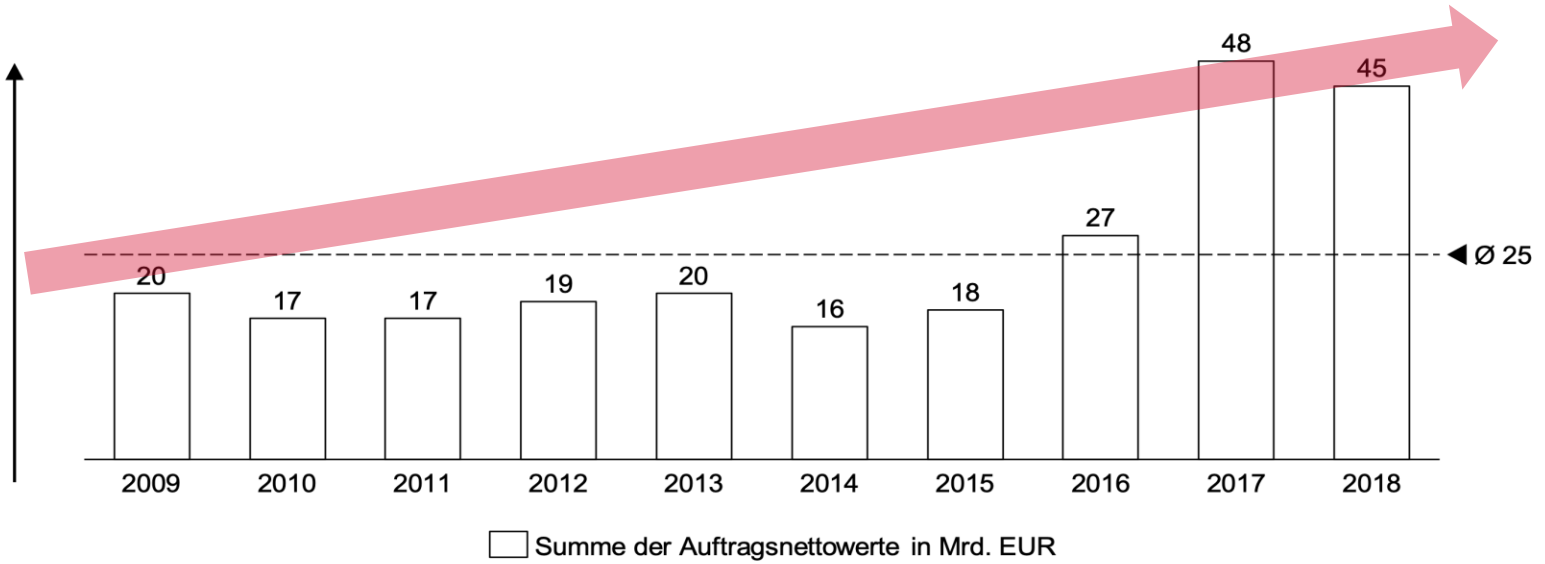
500 bn.

Euro in 2022

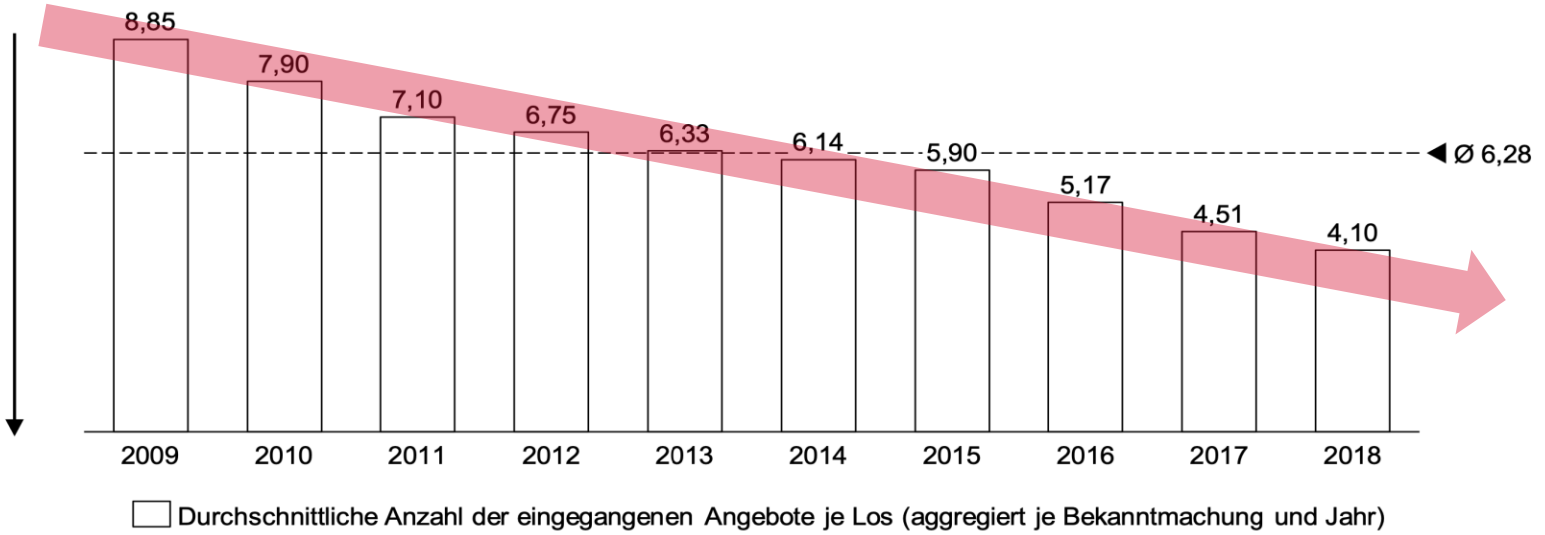
How high are the expenses for the costs of the award process?

30.8 Billion Euro

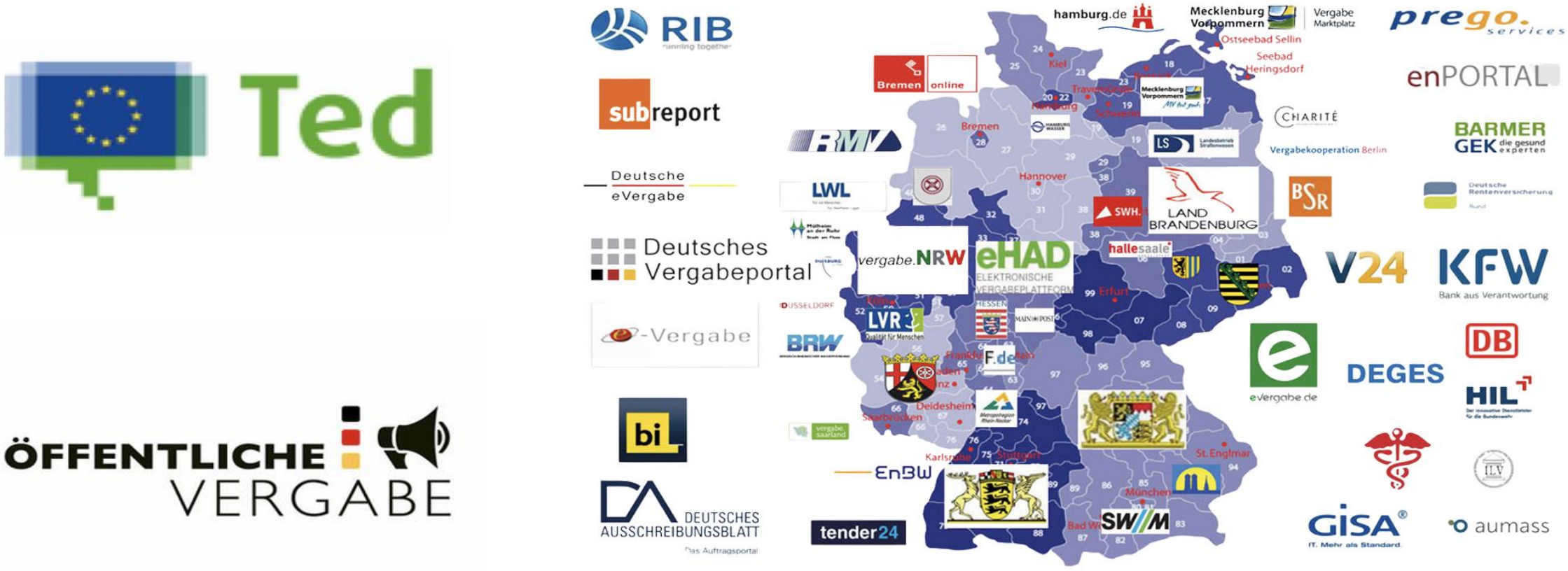
INCREASE IN PROCUREMENT VOLUME

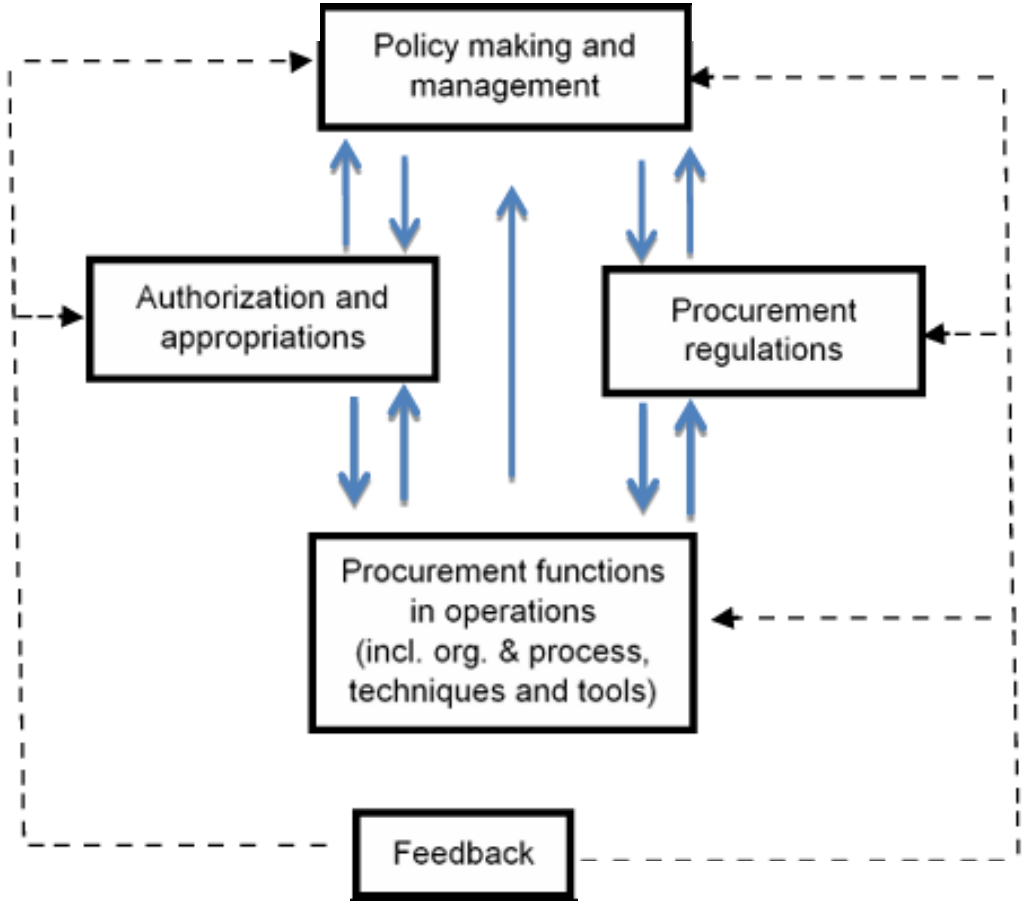


DECREAS OF BIDDER NUMBERS



Announcement Portals vs Procurement Portals





- **Complex process**:
  Public procurement functions as an iterative cycle linking political guidelines, legal frameworks, budget allocations, and operational execution.
- **Multi-level governance**:
  Procurement is shaped by EU law, national regulations, and administrative layers, requiring coordination across institutional levels.
- **Strategic procurement**:
  In addition to regulatory compliance, procurement integrates overarching policy goals such as sustainability, resilience, or digital sovereignty (e.g. GovTech).

Thai, K. V. (2001). Public procurement re-examined. Journal of Public Procurement, 1(1), 9-50..

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ProcurDat

- **Open data platform** for procurement data.
- **Data-driven services** become possible through comprehensive and interoperable procurement data.
- **Matching** of Tenders & Buyers
- Research Project **funded by the BMFTR**

Research Objective:

Overall objective

Identify requirements and functionalities for a procurement tool that ensures practical adoption in public procurement by addressing real-world challenges.

Approach

Apply design science principles as a framework to capture and analyze practitioner perspectives.

Analytical Steps

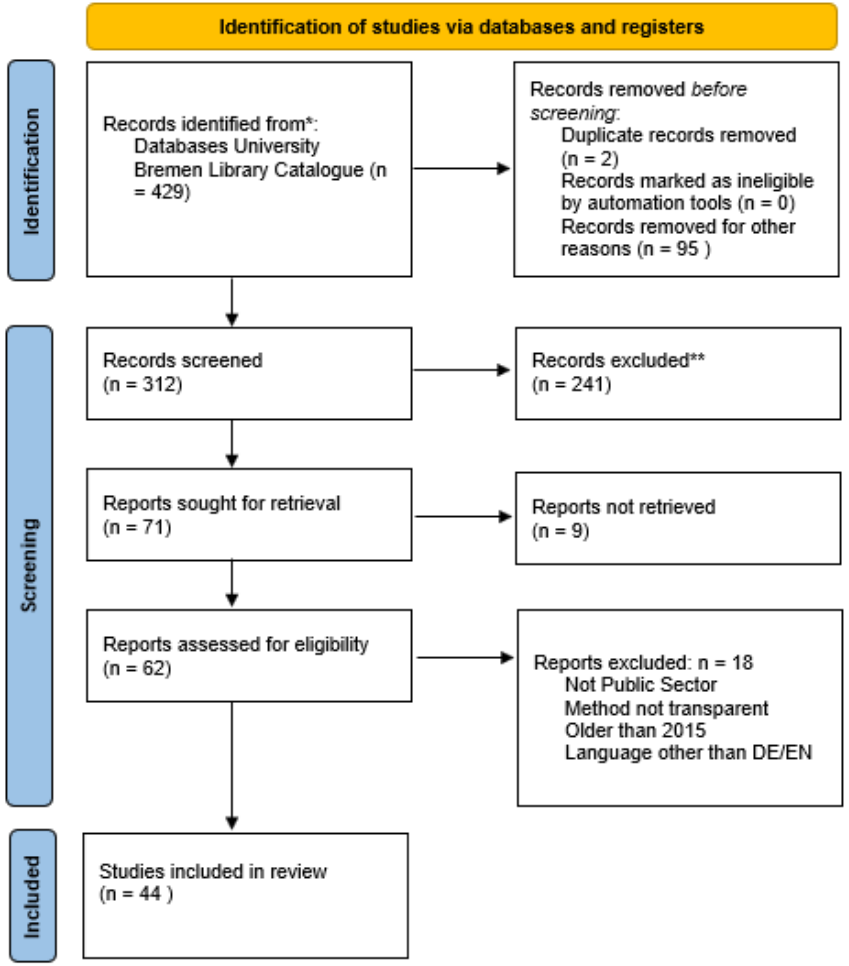
- Conduct and evaluate expert interviews with public procurement practitioners.
- Cluster recurring themes and prioritize them according to user relevance.
- Derive design implications for an artefact that supports practitioners and reduces transaction and process costs.

Design Science Principles

- **Foundation**: Design of artifacts based on real practice problems, with utility and field evaluation (Hevner et al., 2004; Gregor & Hevner, 2013).
- **Goal**: Create and assess IT artifacts (constructs, models, methods, instantiations) that address relevant real-world challenges.
- **Dual mandate**: Ensure both *utility* (practical effectiveness) and *rigor* (theoretical grounding, transparent methodology).
- **DSRM process**:
  1. Problem identification & motivation
  2. Define objectives of a solution
  3. Design & develop the artifact
  4. Demonstrate in context
  5. Evaluate (metrics, experiments, case studies)
  6. Communicate results

Gregor, S., & Hevner, A. (2013). Positioning and presenting design science research. *MIS Quarterly, 37*(2), 337–355; *Hevner, A., March, S., Park, J., & Ram, S. (2004). Design science in information systems research. MIS Quarterly, 28(1), 75–105* .

Systematic Literature Review as Basis for Interview Guide Design



- **Scope**: IT sourcing, e-procurement, and decision support systems.
- **Identification**: 429 records retrieved from databases.
- **Screening**: 312 records assessed; 241 excluded as irrelevant.
- **Eligibility**: 62 reports reviewed in depth; 18 excluded due to quality criteria.
- **Inclusion**: 44 studies retained as evidence base.

→ Extracted criteria informed the design of the interview guide.

Conducting the Interviews

→ Derive challenges and requirement clusters from transcripts of nine expert interviews with procurement professionals in German municipalities.

Challenges from the Practitioner‘s Viewpoint:

Challenge: Neutral formulation of requirements

- Departments struggle to describe needs through performance-based criteria, but often specify concrete products instead.

Interview examples

- Frequent product references (e.g., Windows as operating system, specific hardware).
- Requirements expressed as product names rather than functional needs.
- Reliance on outdated templates containing non-neutral product descriptions.
- Hidden favoritism in requirement formulation.

Derived requirement

→ **Product mandate detector / neutrality control** to ensure performance-based and legally compliant requirement descriptions.

Challenges from the Practitioner‘s Viewpoint:

Challenge: Plausibility across tender documents

- Information is scattered across multiple documents, making consistency checks difficult.

Interview examples

- Deadlines appear in several documents; changes in one file must be updated manually in all others.
- Inconsistent information between summaries and detailed forms (e.g., required attachments).

Derived requirement

→ **Cross-document plausibility checks and automated change log** to ensure consistency and reduce manual errors.

Challenges from the Practitioner‘s Viewpoint:

Challenge: Law & procedure

- Strict legal requirements and procedures leave no room for formal errors.

Interview examples

- Missed deadlines or procedural errors due to inconsistent information across documents.
- High workload from filling in e-forms (several hours per tender, depending on complexity).
- Risk of bid protests triggered by minor formal mistakes.

Derived requirement

→ **Compliance / forms assistant** to reduce workload, ensure consistency, and prevent formal errors.

Challenges from the Practitioner‘s Viewpoint:

Challenge: Time constraints

- Sensitive procurement processes involving many stakeholders are difficult to complete within strict timelines.

Interview examples

- Lengthy and error-prone procedures applied even to time-critical services (e.g., administrative IT, printing equipment, school transportation).

Derived requirement

→ **Deadline notifications and early screening tools** to support timely completion and reduce risks in urgent procurements.

Challenges from the Practitioner‘s Viewpoint:

Challenge: Organizational competences

- Decentralized structures and uneven skill availability hinder efficient procurement processes.

Interview examples

- Varying levels of know-how lead to frequent corrections and process interruptions.
- Fragmented setup across municipal, regional, and national levels prevents sharing of best practices and systematic knowledge exchange.

- **Derived requirement**

→ **Guided workflows and best practice repository** to support consistent quality and organizational learning.

Challenges from the Practitioner‘s Viewpoint:

Challenge: Market & vendors

- Limited market research mechanisms restrict diversity and innovation in procurement.

Interview examples

- Lack of knowledge and time prevents prior market research.
- Large vendors dominate tenders, while start-ups are rarely considered due to low visibility.

Derived requirement

→ **Market navigator / matchmaker** to broaden market overview and facilitate access for innovative suppliers.

Challenges from the Practitioner‘s Viewpoint:

Challenge: Interoperability & lock-in

- Heterogeneous and highly specialized procurement infrastructures create dependency and reduce flexibility.

Interview examples

- Proprietary interfaces hinder interoperability and require repeated retraining of staff.

Derived requirement

→ **Interface openness via APIs** to enable integration, reduce lock-in effects, and support flexible procurement processes.

Challenges from the Practitioner‘s Viewpoint:

Challenge: UI / UX

- Complex interfaces hinder effective use for both procurement experts and bidders.

Interview examples

- Evaluation relies on complex matrices for grading tenders.
- Interfaces are difficult to navigate and create unnecessary barriers in the process.

Derived requirement

→ **Standardized user interface with multiple scoring modes (simple vs. advanced)** to improve usability and inclusiveness.

Preliminary Results:

- **Systematic analysis** of practitioner interviews reveals recurring challenges across law, organization, market, technology, and usability.
- **Challenges are diverse**: from legal compliance and time pressure to interoperability, market access, and user experience.
- **Derived requirements** highlight the need for digital support tools:
  - Neutral and consistent requirement formulation
  - Cross-document plausibility and compliance checks
  - Workflow guidance and knowledge sharing
  - Market navigation and vendor diversity
  - Open interfaces and improved UI/UX

Next steps

- Complete the evaluation of all interview transcripts.
- Validate and refine preliminary findings with additional feedback.
- Integrate validated requirements into the design and development of the *ProcurDat* solution.

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Many thanks for your attention!

Looking forward to your questions and inspriration on how to proceed from here!