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Need for speed most wanted: red tape effect on procurement time

Andreas H. Glas, Michael Eßig, Maximilian Holzner and Dominik Oehlschläger
Department of Purchasing and Supply Management, Bundeswehr University Munich, Neubiberg, Germany

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Abstract

Purpose – Often, public procurement is perceived to be too slow. One prominent factor that impedes procurement time is the so-called "red tape" problem. Red tape represents formal or informal constraints to an organisation's freedom, i.e. rules and regulation but also influence on key stakeholders. These constraints can lead to procedural delay. This study aims to assess the effectiveness of counter-measures to red tape and their effect on public procurement speed and time.

Design/methodology/approach – This research is imbedded in the case of the German defence industry. Here, several legal and regulatory measures have been taken to reduce procurement time. Using time stamps from the public procurement system of roughly 40,000 procurement procedures in an ex ante /ex post comparison analysis, this study is able to assess different counter-measures and their effectiveness.

Findings – In this case, the overall duration of public procurement decreased by 36.6% over seven years. Findings show that this reduction in duration is correlated with the reduction of red tape as several measures have been taken to reduce regulatory burden. Furthermore, chi-square testing shows dependency between time and red tape.

Social implications – While it is not new that superfluous rules and regulations require critical assessment in public procurement, this study is able to demonstrate the effectiveness of top-down laws and directives which aim to reduce procurement durations. Beyond that, the study calls for the introduction of standardised speed metrics to better monitor performance−time relations in public procurement.

Originality/value – Previous research examined red tape predominantly from a perceptive point of view. In contrast, this study leverages empirical time stamps obtained from an actual procurement system.

Keywords Procurement duration, Public procurement, Defence industry, Red tape
Secondary data analysis, Tender data

Paper type Research paper

1. Introduction

When the COVID-19 pandemic struck in early 2020, public institutions across the globe scrambled to procure protective equipment, ventilators and vaccines, only to find themselves entangled in layers of bureaucratic procedure that slowed urgent action (Bundesrechnungshof, 2024; OECD, 2020). A similar dynamic emerged in the wake of the Russian invasion of Ukraine in 2022, where European defence ministries urgently sought to

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accelerate the procurement of defence material but were frequently hindered by rigid regulatory frameworks and internal compliance rules (Kortukova *et al.*, 2023; Schoeni *et al.*, 2023). These cases highlight a central dilemma in public procurement: the urgent need for speed and responsiveness during crises often clashes with the regulatory safeguards designed to ensure accountability, transparency and fairness (Haase, 2019). Even if unforeseen events like a pandemic or a severe national security threat allow for emergency procedures in public procurement, these striking examples point to the general problem that public procurement is perceived as acting in a system of several goal conflicts with the outcome of being tightly regulated and slow (Tátrai and Nyikos, 2013).

This tension has reignited a longstanding debate in public administration and procurement research regarding the role of red tape, commonly defined as excessive or burdensome regulation that impedes organisational performance (Bozeman, 1993; George *et al.*, 2021). While prior studies have acknowledged the performance implications of red tape, empirical investigations have predominantly relied on perceptual data, measuring stakeholders' subjective views on procurement time, rather than analysing objective procedural durations (Coursey and Pandey, 2007; Welch and Pandey, 2006). There are only few works that use actual procurement data (e.g. Čudanov *et al.*, 2018; He *et al.*, 2023). The content of research addressing the temporal dimension of procurement (i.e. how long it takes to fulfil demand) often focuses on the comparison of the duration of different procedures (Bagnasco, 2022; Čudanov *et al.*, 2018). He *et al.* (2023, p. 11), for instance, analysed the time duration of different public procurement procedures and found that "simpler versions of auctions and negotiations, i.e. the open and negotiated procedures, are better at saving time than their more complicated counterparts, i.e. the restricted procedure and competitive dialogue". Similarly, Čudanov *et al.* (2018) compared the duration of different public procurement procedure types and found that the procedure type explains around 23% of the duration variability. Vice versa, 77% of the variability is not explained by the procedure type. This points to another finding in the literature that "organisational factors, notably bureaucracy in administrating and coordinating different stages of more complicated award processes […], may better account for slow decision making in public procurement" (He *et al.*, 2023, p. 11). Overall, existing research neglects the regulatory context of procedures and focuses on comparing single procedures, while it is acknowledged that there are significant influential factors like bureaucracy and red tape.

Understanding and explaining procurement duration and speed is also of analytical relevance. For instance, Migliaccio *et al.* (2010) found that longer procurement durations may positively influence supplier delivery times following contract award. However, the same study reported no significant effect of faster or slower procurement on costs incurred during the execution phase. In a related vein, Prier *et al.* (2021) criticised existing measures of public procurement speed within the European Union, arguing that they are often biased due to a lack of contextual information, the masking of critical underlying variations or the structural omission of key influencing variables. Consequently, the research gap extends beyond the relationship between red tape and procedural duration to include both the performance implications of procurement speed and the development of more robust, context-sensitive speed metrics.

This article addresses these gaps by empirically analysing how varying levels of red tape affect public procurement duration and speed. Using a large-scale secondary data set of more than 42,000 public procurement procedures conducted in Germany between 2018 and 2024, this study investigates whether and how regulatory intensity correlates with procedural efficiency. Red tape intensity is operationalised through discrete policy phases, including the

implementation of a procurement acceleration law and a subsequent directive to reduce internal rules, both aimed at enhancing supply responsiveness in the context of emerging geopolitical threats.

The central research question is thus:

RQ1. To what extent do reductions in red tape contribute to shorter procurement durations and higher procedural speed in public procurement?

Methodologically, this study applies both descriptive and inferential statistical analyses to actual tender data, capturing time stamps and performance metrics across multiple procurement procedures and regulatory phases. The findings reveal a statistically significant, albeit modest, association between lower red tape levels and faster procurement processes, measured both in terms of average duration and relative speed (bids or volume per day). These results contribute not only to the literature on red tape and procurement performance but also provide actionable insights for policymakers navigating the trade-off between regulation and responsiveness in times of crisis.

The remainder of this article is as follows: In the next section, the theoretical background on red tape as well as extant research on time and speed in public procurement is presented. That section also explains and depicts the study's analytical framework cumulating in the formulation of a hypothesis. This is followed by a methodology section that introduces the case setting, sampling procedure and a holistic description of the sample. Next, the findings section provides insights into the proper analysis of procedural time stamps. The findings are discussed and subsequently interpreted leading to several implications. The article ends with a brief conclusion that also highlights limitations and opportunities for future research.

2. Theoretical background

2.1 Theoretical background on red tape

Public procurement operates at the intersection of competing goals: efficiency, transparency, accountability, and increasingly, responsiveness to shifting political priorities (Schapper *et al.*, 2006). In times of crisis or geopolitical urgency, governments reprioritise speed over procedural rigour to ensure rapid delivery of critical goods and services (Harland *et al.*, 2021). This recalibration of objectives has direct consequences for procurement timelines. However, this shift towards speed raises important questions. While faster procurement may be desirable in situations of urgent need, particularly in health or defence sectors, acceleration can also entail risks. Shortened timelines may compromise due diligence, reduce competition or limit opportunities for oversight; thus, creating trade-offs between speed and quality, accountability or long-term effectiveness (Haase, 2019; Prier *et al.*, 2021). In the defence domain especially, the complexity, sensitivity and risk associated with procurement activities demand a careful balance between urgency and control. A failure to address this trade-off appropriately bears the risk of severe administrative inefficiencies.

In this light, red tape has long been a central concept in public administration, generally referring to excessive, overly rigid or burdensome regulations and formalities that hinder organisational performance (Bozeman, 1993). The origins of the term date back to the 16th century, when European bureaucracies used literal red ribbons to bind administrative documents (Dickson, 2014). This symbolic gesture that still survives in some modern administrations, such as in Spain. At its core, red tape represents regulatory complexity that impedes timely and efficient action. This may manifest as redundant documentation requirements, prolonged approval chains or rigid compliance rules that limit managerial discretion.

Early research identified red tape as a symptom of institutional inertia, often emerging from well-intentioned accountability mechanisms that eventually become counterproductive (Bretschneider, 1990). Subsequent scholarship has expanded the concept to explore its effects on public service delivery, innovation, performance and organisational behaviour (George *et al.*, 2021; Scott and Pandey, 2005). A key distinction has also been made between internally perceived red tape (as seen through the eyes of bureaucrats) and objectively observable regulatory burdens. In both cases, however, red tape is increasingly linked to negative outcomes, higher costs, longer processing times, lower innovation capacity and diminished responsiveness (Bozeman, 2012).

The present study defines the red tape concept in relation to excessive bureaucratic regulation within state institutions. This manifests itself in the form of internal regulations, processes and bureaucratic obstacles aimed at regulating institutional activities. A concrete example is the often-lengthy approval procedure for projects or decisions in state authorities. While the intention is to ensure transparency and accountability, bureaucratic red tape can often lead to delays and tie up resources. Moreover, the extensive reporting and documentation required by government agencies can also be examples of red tape. While this is intended to create transparency, the high administrative burden can significantly impair efficiency. Red tape therefore represents an unnecessary organisational burden (Cooke *et al.*, 2019), as it limits the performance of both private and public organisations (Jovanović *et al.*, 2022).

Within public procurement, red tape plays an especially critical role. Procurement processes are heavily formalised, often involving multiple stages of planning, budgeting, tendering, contracting and oversight. These steps are embedded in legal and administrative frameworks designed to promote fairness, transparency and the efficient use of public funds. Yet empirical research shows that these same rules can result in significant procedural complexity and rigidity (Davis and Stazyk, 2014; Jovanović *et al.*, 2022). In some instances, the procurement function itself becomes a key driver of red tape, with internal procedures, documentation requirements and formal reviews extending timelines beyond what is necessary for effective control.

Supplier-side barriers to public procurement are well-documented in the "barriers" literature. Small and medium-sized enterprises (SMEs) often face disproportionate burdens when engaging with public tendering processes, including excessive documentation, resource-intensive qualification procedures and a perceived bias towards larger suppliers (Loader, 2007, 2010, 2015). For example, extensive prequalification requirements, such as high insurance thresholds, lengthy track record demands and overly complex specifications, can deter SMEs from bidding or render them uncompetitive (Hoekman and Taş, 2022; Loader, 2015). Furthermore, collaborative procurement strategies, supplier rationalisation and the bundling of contracts to achieve scale economies have been shown to marginalise smaller suppliers by increasing both the volume and complexity of contracts (Loader, 2007). Even where SMEs are willing to engage, the procedural demands and lack of feedback often lead to frustration and disengagement (Loader, 2015), preventing lean and efficient business practices (Loader, 2010).

Procurement red tape is typically operationalised through individual perceptions of procedural restrictiveness. Survey data capture how managers or stakeholders assess the rules governing procurement activities (Coursey and Pandey, 2007; Scott and Pandey, 2005). While useful, these perception-based measures limit analytical precision, particularly when studying time-dependent outcomes. Moreover, some scholars have highlighted that procurement red tape can lead not only to inefficiency, but also to resource waste and corruption risks, as complex procedures may obscure transparency or create bottlenecks that

are selectively bypassed (El Benni *et al.*, 2022; Guriev, 2004). One important subdimension is budgeting red tape. This refers to regulations that constrain financial flexibility. Budgetary red tape has been shown to inhibit timely spending or reallocation, even in urgent contexts (Coursey and Pandey, 2007), and thus may further interact with procurement time.

In general, several specific consequences of red tape in procurement settings have been documented in the literature:

- *Cost inflation.* Time-consuming regulatory procedures increase transaction costs on both the government and supplier side (El Benni *et al.*, 2022).
- *Reduced competition.* SMEs, in particular, may be discouraged from participating due to the complexity of compliance, thus lowering market diversity (Welch and Pandey, 2006).
- *Inefficiency.* Excessive administrative demands may require more personnel and time, creating inefficiencies and delays (Bozeman, 1993).
- *Delays.* Lengthy processes, especially during the pre-award phase, have been identified as a key symptom of procurement red tape (Coursey and Pandey, 2007; Jovanović et al., 2022).

2.2 Time and speed analysis in public procurement

The dimension of time in public procurement has historically received less empirical attention than cost or quality. Yet procurement performance is closely linked to time, especially when policy priorities demand accelerated delivery. Delays in major public projects. Examples such as the Berlin Brandenburg Airport [originally planned for 5 years, completed in 14 (Kersting and Neuerer, 2020)] or Stuttgart 21 [delayed by at least 7 years (Menzel, 2023; Ministerium für Verkehr Baden-Württemberg, 2023)] illustrate how time overruns affect not just efficiency, but also political credibility and public trust. Delays can also have a significant impact on other types of projects, such as the development of the Boeing 787. The development time for the plane had already been delayed by three years, but the aircraft delivered now appear to be experiencing repeated problems. Production has been repeatedly halted and delivered aircraft have been withdrawn (The New York Times, 2013; Paul, 2018).

Other research disciplines have a more profound conceptual understanding of time than public procurement. In operational management, for instance, the concept of the "right time" is foundational. The 4-R principle (Grochla, 1973, 1992) emphasises the availability of the right product, in the right quantity and quality, at the right time and place. Procurement planning integrates multiple time-based indicators, including requirements determination, budgeting time, awarding time, delivery time and contract execution periods (Holoubek, 2009; Thommen *et al.*, 2020). However, real-world dynamics, such as uncertainty, risk, market volatility, often hinder strict optimisation of time. Differently phrased, theoretical optimisation of time seems possible, but active management of time is far more complicated.

Nonetheless, the performance management literature tries to conceptualise time. With respect to Holoubek (2009), Kortendieck and Stepanek (2019), Kroeber-Riel (1966), Lödding (2016), Tempelmeier (1983) and Thommen *et al.* (2020), numerous different procurement durations are measured such as:

- *Requirements determination time*. Duration of the determination of the optimal type of goods, order quantity and quality of the goods of the required quantity, procurement quantity (total) and order quantity (per call-off).

- *Budgeting time*. Duration of the budgeting process for a project.
- *Awarding time*. Duration of the awarding procedure.
- *Delivery time*. Duration until the physical distribution of the goods to be procured from the time the order is placed.
- *Contract duration*. Duration of the contract, which depends on the supplier's characteristics or material requirements. Contracts for individual requirements or framework agreements with a longer term are created here.
- *Order time*. Duration of the decision to place an order until it is placed.
- *Administration time*. Duration for creating the replenishment order.
- *Transport time*. Delivery time from the supplier until they arrive at the customer.
- *Procurement time*. Duration of the period between placing the order and delivery of the goods; it occurs as soon as goods are required that are not kept in stock.
- *Replenishment time/demand coverage time*. Is the sum of the lead time of the supplier's production, the procurement time, the delivery time and the administration time.
- *Procurement lead time*. Includes several time spans, such as information or material lead times. These are sometimes decisive for basic procurement decisions, such as a make-or-buy analysis.
- *Goods acceptance time*. Time between the arrival of the goods at the ordering party and their availability for production.

A related concept often discussed in the literature is *procurement cycle time*, defined as the total time elapsed from the initiation of the sourcing process to the final delivery and payment for goods or services (Olupot, 2023). It includes multiple stages, such as needs assessment, tendering, contract award and contract execution. Procurement cycle time functions as a comprehensive process-level indicator that spans both pre- and post-award phases (Olupot, 2023). While useful as a diagnostic metric, it is not easily decomposable or attributable to specific actors or procedural steps, as it is heavily shaped by exogenous factors such as institutional pressures, legal reviews or contractor behaviour (Olupot, 2023; Yeo and Ning, 2006). For this reason, the present study does not address the entire procurement cycle. Rather, focusing on a specific section of the procurement process allows for an in-depth analysis of two analytically tractable time dimensions: duration and speed. In doing so, the study aims to complement the extent research on procurement time by providing more granular evidence on where and how time is consumed or accelerated in public procurement procedures.

Furthermore, recent literature distinguishes between duration and speed as two analytically separate dimensions of performance. Duration refers to the absolute length of time that elapses between two defined points in a process, for example, the number of days between the initiation of a tender and the awarding of a contract. In contrast, speed is a relational metric that captures the amount of output or activity achieved within a given time span, such as the volume of procurement handled per day or the number of bids processed over a specific period. This distinction is important because increasing speed is not synonymous with simply reducing duration. A procurement process could be shorter in time but still inefficient in output, whereas an increase in speed implies both time compression and a proportional increase in performance (Vinton, 1992). Studies such as Prier *et al.* (2021) have introduced this distinction in the context of decision-making processes, particularly in

examining how quickly decisions are made under different governance structures. However, despite its relevance, the application of this distinction to public procurement remains underdeveloped. Most procurement research continues to focus on absolute time measures without linking them to output or efficiency metrics, leaving a gap in understanding how procurement systems perform under time pressure. In this study, procurement speed is operationalised as a relational performance metric, calculated by dividing a defined output variable by elapsed time. This approach contrasts with simple duration measures, which reflect the total time between two events but do not account for the level of activity completed within that period. In the context of public procurement, typical performance outputs include the procurement volume (i.e. the total monetary value of procured goods and services) and the number of tenders processed. Accordingly, this study uses two distinct speed metrics:

(1) procurement volume per time unit; and

(2) tenders processed per time unit.

These indicators reflect not only how long procedures take, but how intensively procurement systems operate within a given time frame.

This distinction is especially important, as faster procurement, understood as higher procurement process speed, has tangible benefits beyond administrative efficiency. From an end-user perspective, accelerated procurement processes enable quicker access to critical goods, services or infrastructure, which is especially vital in sectors relying on responsive operations (OECD, 2020). In emergency contexts, delays in procurement can translate into severe social costs, including unmet medical needs or compromised public safety (Harland *et al.*, 2021; Vecchi *et al.*, 2020). From an institutional perspective, faster procurement also supports improved resource utilisation by aligning procurement timelines more closely with planning, budgeting and implementation cycles (Flynn and Davis, 2017). This reduces idle time, avoids stockouts and prevents costly last-minute interventions or contract amendments (Rutkowski *et al.*, 2022). Moreover, compressed timelines may reduce administrative overhead and monitoring costs, freeing up organisational capacity for strategic functions (McCue and Prier, 2008; Prier and McCue, 2009).

2.3 Hypotheses development

Altogether, while there is an existing and growing body of literature linking red tape to organisational performance, few studies have examined its relationship with objective procurement timelines. To the best of the author's knowledge, the existing research relies on subjective perceptions of time, typically gathered through surveys, rather than on actual procedural data. This study seeks to fill that gap by providing a rare empirical insight into the temporal dynamics of red tape, using an extensive data set of public procurement procedures to analyse how regulatory intensity correlates with procurement duration and speed.

First, delays of several kinds are a key symptom of procurement red tape (Coursey and Pandey, 2007; Jovanović *et al.*, 2022). Hence, red tape and public procurement duration should have significant statistical relation to each other:

H1. Red tape and public procurement duration are interdependent.

Second, as outlined above, there is a conceptual distinction between procurement duration and procedural speed (e.g. Prier *et al.*, 2021). Consequently, delays attributed to red tape (Coursey and Pandey, 2007; Jovanović *et al.*, 2022) are expected to affect not only the duration but also the speed of public procurement processes. Speed is contemplated as a

relational metric, reflecting the volume of output or activity achieved within a defined time span. This study uses two distinct speed indicators: one based on procurement volume and the other on the number of tenders completed over time. It is assumed that red tape is significantly associated with both speed metrics, reflecting its potential to constrain procedural throughput:

H2a. Red tape and public procurement speed, measured in procurement volume per time unit, is interdependent.

H2b. Red tape and public procurement speed, measured in number of tenders processed per time unit, is interdependent.

3. Methodology

This research investigates the relation between red tape and time in public procurement. For this purpose, the methodology is based on a secondary data analysis. First, methodological procedures, data source and the case study setting are presented. Thereafter, the operationalisation of red tape is explained, a research hypothesis is phrased and activities to test this hypothesis are explained.

3.1 Secondary data analysis of a major public procurement organisation in Germany

The use of secondary data remains relatively uncommon and methodologically underutilised in public procurement and supply chain research (Busse, 2010). Nevertheless, secondary data analysis can offer substantial advantages, particularly in terms of scale, objectivity and unobtrusiveness. In the context of digital transformation and datafication of public services, data sets capturing actual organisational behaviour (e.g. system-generated time stamps) are increasingly accessible and valuable (Calantone and Vickery, 2010). Still, such data often originate from operational systems rather than academic research designs, making it essential to consider potential biases and cross-validate internal consistency and contextual accuracy.

Unlike many prior studies that rely on perceptual data collected via surveys (e.g. asking stakeholders about their views on procurement duration), this study leverages a rich secondary data set comprising time stamp records from a major public procurement organisation in Germany. The organisation was selected not only for reasons of data accessibility but also due to its methodological relevance. As one of Germany's largest and most visible public buyers, both in terms of procurement volume and staff, it plays a central role in executing large-scale, often complex procurement procedures. In public and political discourse, the organisation has frequently been labelled as "too slow", "overly bureaucratic" and "ineffective" (Der Spiegel, 2023), making it a particularly salient case for examining the relationship between red tape and procurement performance.

From a theoretical standpoint, the case offers a meaningful opportunity to study procurement under conditions of high regulatory density and asset specificity. The organisation's portfolio spans from routine items such as office supplies to complex, defence-related procurement of ships, aircraft and other strategic assets. Many of these items are tailored to unique technical specifications, supplied by limited vendors, and subject to additional layers of security and compliance regulations. These characteristics are consistent with what transaction cost theory would define as high asset specificity. This is an important factor known to increase coordination complexity and, by extension, procurement duration. Thus, despite limitations inherent to single-case research, the case selection is justified not merely by data access but also by its analytical fit: the organisation operates in a highly

formalised environment with strong procedural recording practices, while simultaneously facing political pressure to improve performance. The case thus serves as a "critical case" for exploring the broader research question of how changes in red tape affect procurement efficiency.

Moreover, Germany presents a relevant national context for this study. As a mature, rules-based procurement system operating under EU directives and national regulations, Germany offers a setting where regulatory change is transparent and formally codified. The timing of the study coincides with two significant regulatory interventions: a new procurement acceleration law and a directive to reduce internal rules. This allows for an empirical comparison of procurement time and speed under varying levels of red tape.

3.2 Red tape operationalisation

Arguably, the higher the level of bureaucracy in a system, the greater the complexity of process execution within that system. Consequently, this should be accompanied by longer process durations. This is reflected by the extant literature's view on red tape, as earlier presented in the background section. For the purpose of the present study, it is necessary to additionally operationalise the intensity of red tape.

The quantity and quality as well as their usage and implementation are of relevance in this context. In the case organisation, a recent analysis counted the presence of over 7,900 different rules, instructions, laws and directives. However, most of these are technical (e.g. quality descriptions of production procedures or materials). Thus, merely counting the quantity of rules is not sufficient to operationalise red tape, as for example an additional rule might optimise usage and implementation of existing red tape and thus, potentially even help to reduce the red tape problem. Then again, measuring the qualitative intensity of red tape also bears risks, as the number of rules and their interdependencies exceeds the feasibility of a proper assessment. Hence, it is necessary to search for an alternative way to operationalise red tape.

In the present case, a proxy for the red tape intensity is provided by overarching changes in the regulatory framework. On 1 July 2022 a so-called "procurement acceleration law" (PAcL) was implemented that sets new and eased regulatory rules for the case organisation. On 25 April 2023, this was even intensified by a Secretary of State-Directive (SoS-D) in which the case organisation was provided with even more decision-making freedom by further reducing internal rules and regulation. Therefore, the proxy for red tape is marked by the dates of these strategic acceleration initiatives. This allows to differentiate levels of red tape intensities according to time phases in which the regulatory initiatives have been either enacted or not (see Table 1).

This study uses data already starting before the COVID-19 pandemic, since this phase is expected to have the highest level of red tape compared to recent phases with the use of PAcL and SoS-D. The most recent phase of SoS-D is reasoned as the one with the lowest level of red tape. Having this in mind, the analysis of procedural time stamps allows to calculate the overall (mean) duration of procurement procedures. Compared with the phases, this allows to evaluate and test the already existing proposition that red tape causes or relates to public procurement time.

3.3 Data pool, data quality and sample overview

The data set used in this study was directly exported from the internal IT system of the case organisation, a major German public procurement body. The system records every formal procurement procedure initiated within the organisation and automatically logs procedural metadata, including multiple time stamps (e.g. initiation date, tender opening, deadline,

Table 1. Operationalisation of different red tape intensities over time

Phases	Timeframe	Phase content	Operationalisation for red tape in the case
Pre-COVID19	Before 30 June 2020	Initial state of highly regulated public procurement; legal rules and internal directives dominate the execution of public procurement in the organisation	Highest level of red tape in the sample
COVID19	1 July 2020 to 30 June 2022	Extraordinary timeframe with loosening of public procurement regulations (in particular direct procurement of marginal value) but on the other hand major additional rules for executing work, shut-downs etc	Extraordinary phase of red tape, reduced on the one hand, increased on the other
PAcL	1 July 2022 to 24 April 2023	New law for acceleration of public procurement (for defence sector) with numerous and different approaches, e.g. loosened use of lots, freedom in the choice of procedure etc	Medium level of red tape
SoS-D	25 April 2023 to 31 December 2024	New directive of the state secretary to accelerate public procurement also by reducing internal rules and instructions that go beyond legal regulation	Lowest level of red tape

Source(s): Authors' own creation

contract award); procedural types (e.g. open, restricted, negotiated); estimated and actual procurement volumes; and the number of applicants and bids. The raw export covered a total of 42,070 procurement procedures conducted between January 2018 and December 2024. Data extraction was performed by in-house IT personnel via a secured export interface, ensuring data completeness and alignment with internal reporting structures.

Following extraction, the data set was screened for completeness, plausibility and consistency. In the first step, duplicate entries and procedures with missing key time stamps were removed. Next, implausible values (e.g. negative durations, durations exceeding three years or missing procurement types) were flagged and cross-validated against secondary internal reports. Extremely long procedures (i.e. above the 99.5^{th} percentile) were subjected to additional manual inspection and flagged as outliers where appropriate. After this initial cleaning process, all variables were reformatted to ensure comparability and usability in the analysis (e.g. standardising date formats, harmonising procurement procedure codes).

The data set is subject to right-censoring, as longer-running procedures, especially those initiated in later years like 2024, are underrepresented due to the cut-off date of 31 December 2024. To correct this, an adjustment factor was applied. This factor was derived from the annual change in mean total duration of procurement procedures, calculated by comparing cohorts with increasing time since initiation. All cohorts were then adjusted to a standardised observation window of six years using a proportional uplift approach.

The cleaned data set was then used to calculate key time-based metrics. Procurement duration was computed as the number of days between the initiation of the procurement process and the formal end of procedure (e.g. contract award). The measurement is similar to other duration measurement approaches in procurement using specific process steps as time stamps (e.g. Migliaccio *et al.*, 2010: duration between request for proposals and due date; e.g. Prier *et al.*, 2021: duration between receiving offers and award notice announcement). Procurement speed was operationalised in two ways, using two performance measures in relation to duration:

(1) bids received per duration; and

(2) net procurement volume per duration.

These metrics were subsequently aggregated across the four regulatory phases (Pre-COVID, COVID, PAcL, SoS-D) to allow comparative analysis under varying levels of red tape. Descriptive and inferential statistical analyses, including chi-square tests and Cramér's V, were conducted using SPSS to examine the relationship between red tape intensity and procurement performance outcomes.

Each year covered in the data has almost equal share with around 6,462–6,849. In 2018 and 2024, the number of retrieved data points are slightly lower but still big enough to be included in the analysis (4,776 / 4,423) (see Figure 1). Relating the data to the distinct phases, Pre-COVID-19 represents 14,749 data sets, COVID 13,251, post-COVID altogether 14,070 with PAcL including 5,423 and SoS-D 8,647 projects.

Annually, the case organisation spends a substantial volume on procuring goods and services. The overall analysed procurement volume for the given time-frame is over €41.4bn as depicted in Figure 2. The annually mean procurement volume is €5.6bn. Generally, the budget of the considered procurement organisation increased over time. The increase is in part steep, as the procurement organisation received extraordinary funding to address urgent

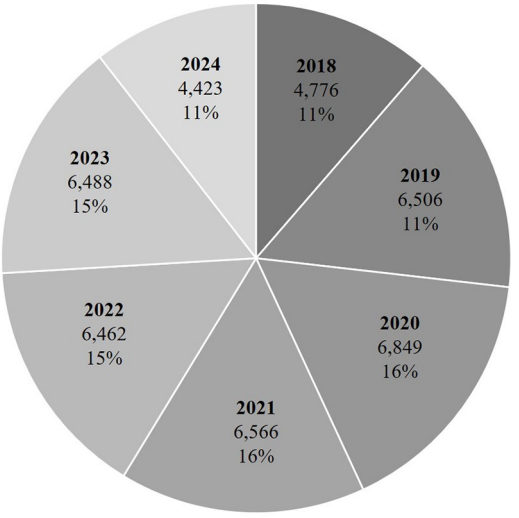

Figure 1. Sample overview
Source: Authors' own creation

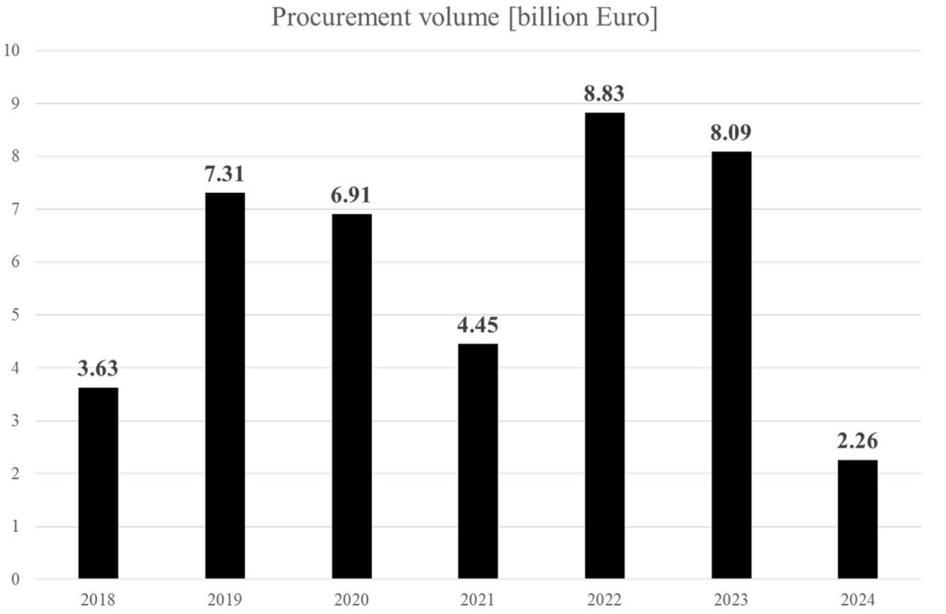

Figure 2. Procurement volume per year
Source: Authors' own creation

demand. The relatively small figure in 2024 is explained by the fact that this analysis took place at end of 2024, where high budget projects started in 2024 are not yet finished.

4. Findings

4.1 Duration time of public procurement

Across the sample, a reduction in the duration of public procurement procedures can be observed. In 2018, the mean duration time per procurement procedure was 197.0 days, while by 2023 it had decreased to 152.8 days. This is a reduction of over 22.4%. In 2024, the mean duration further decreases to 124.8 days, representing a 36.6% reduction compared to 2018. A relatively consistent downward trend in duration over the years is depicted in Figure 3.

Additionally, duration is analysed in relation to red tape phases. The descriptive findings indicate that duration decreased progressively from phase to phase. The mean time savings are substantial, declining from 180.9 days in the first phase (pre-COVID-19) to 136.1 days in the final phase (a reduction of over 24.8 percentage points). This finding is noteworthy in itself, given the immense reduction in duration. Furthermore, it suggests a clear trend: phases characterised by lower levels of red tape tend to have shorter public procurement durations (see Figure 4). This supports further investigations into potential causal relationships driving the observed decline in procurement duration.

To provide a more fine-grained perspective of the duration reduction in the examined case, different procurement procedures types are analysed (see Appendix 1). Figure 5 depicts changes in the mean duration of each procurement procedure type. The range of reduction spans from −10.4% to −59.6%. All procedures exhibit shorter duration durations, with the sole exception being "negotiated procedure with call for competition", which showed an

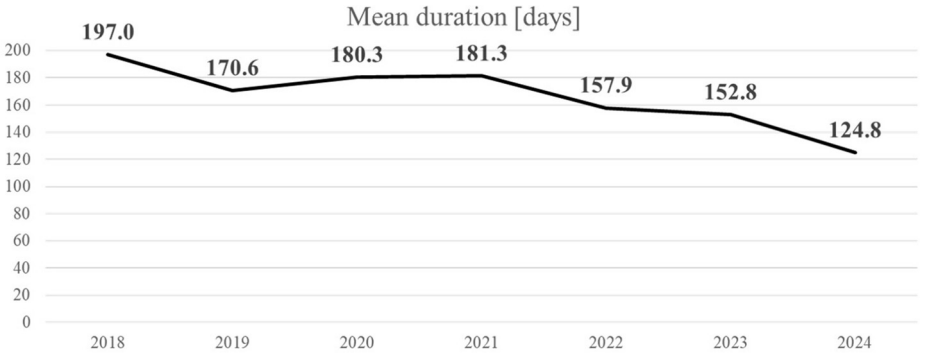

Figure 3. Average duration time per year
Source: Authors' own creation

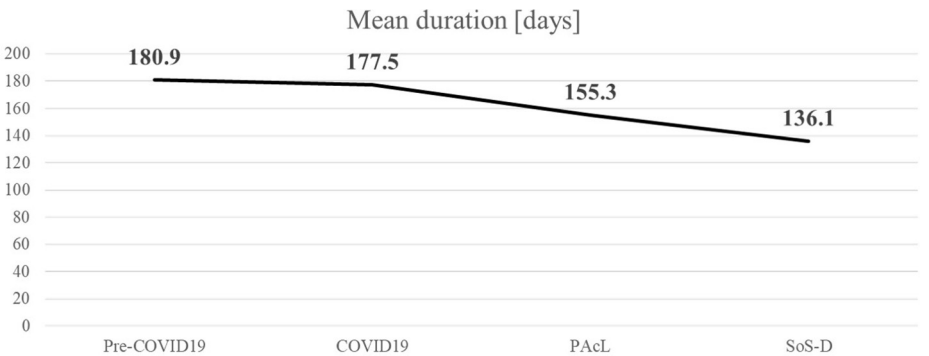

Figure 4. Average duration time per red tape phase
Source: Authors' own creation

increase of +18.25%. The greatest reductions were observed in the "public tender" (below EU threshold) and the negotiating procedures with or without tender publication.

4.2 Speed of public procurement

Next, this research investigates the speed of public procurement, defined as relationship between time and a performance metric. This helps to assess acceleration in procurement processes. Two different approaches are used to investigate public procurement speed:

(1) mean bids per mean duration; and
(2) mean procurement volume per mean duration time.

First, the mean number of bids, sorted by red tape phases, shows only slight variation. The overall mean is 2.17, ranging from a high of 2.29 in 2018 to a low of 2.11 in 2024. Figure 6 shows this relatively stable trend, with a slight decrease from 2.22 to 2.11 bids per procedure. This could suggest a marginal decline in competitive intensity.

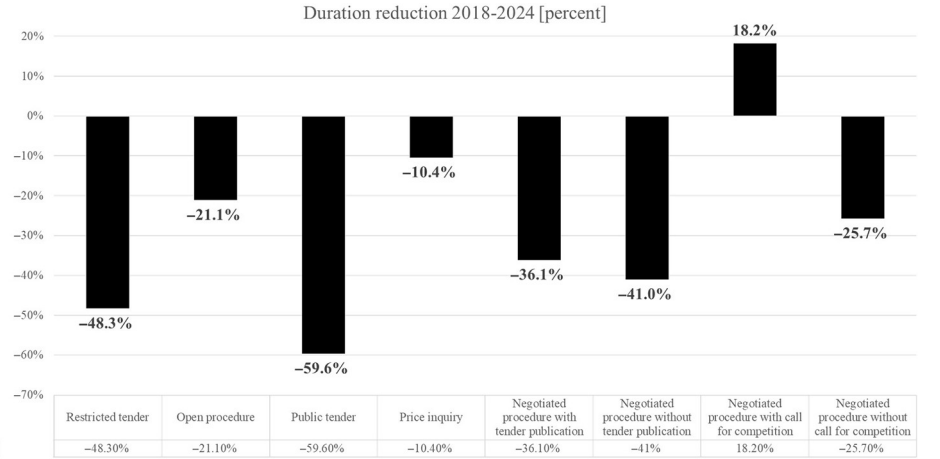

Figure 5. Duration reduction per public procurement procedure
Source: Authors' own creation

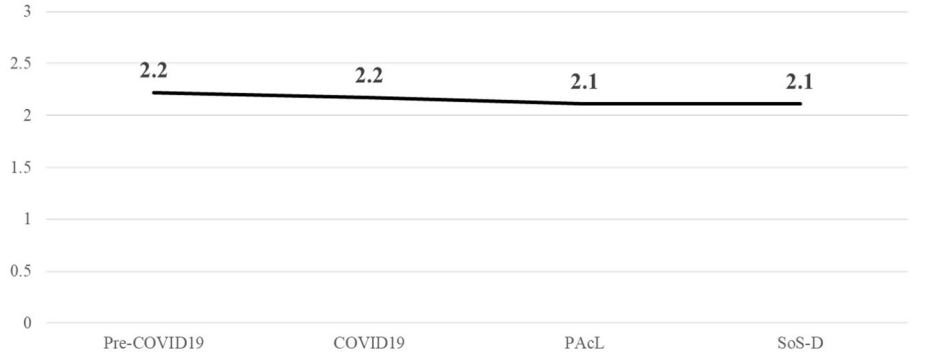

Figure 6. Mean bids per red tape phases
Source: Authors' own creation

Using this data for evaluation public procurement speed, the metric "bids per day" is used to assess acceleration. Results show that in the most recent phase (SoS-D), with the lowest level of red tape, the highest speed is achieved. Overall, speed increases steadily across the phases, from 0.0123 to 0.0155 (see Figure 7).

Second, speed is assessed using net procurement volume. Descriptive data indicate that the mean value ranges from 1.10 PAcL before the pandemic to 0.84 during the COVID19 phase. Although the volume declined during the pandemic, it rebounded afterward. This suggests that analyses of public procurement trends should treat the COVID-19 period as a potential outlier. Generally, the data indicate stable procurement volume when comparing the pre-COVID-19 with PAcL (post-COVID19) phases. The slight decline in the SoS-D phase is

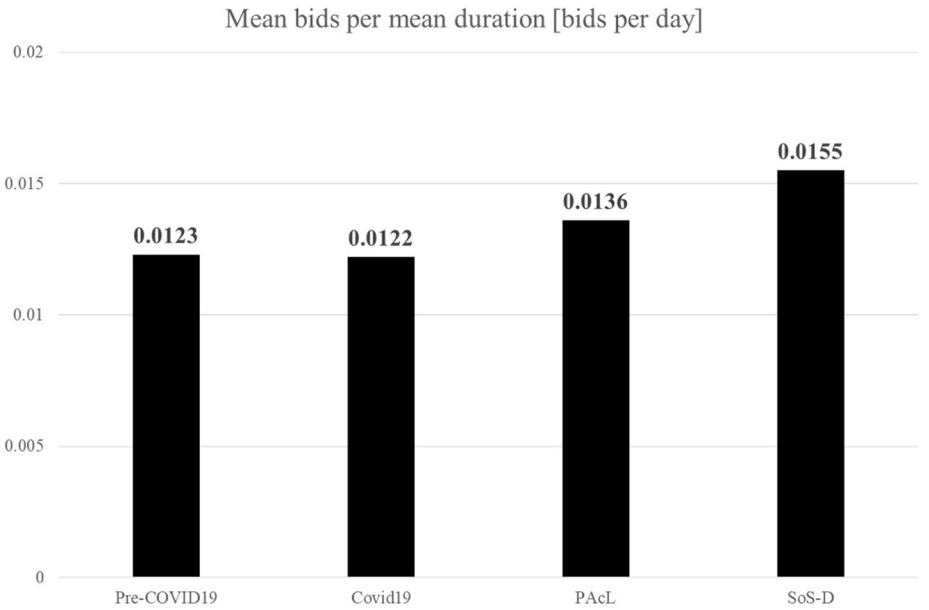

Figure 7. Speed assessment − bids per day
Source: Authors' own creation

likely due to incomplete project data for that period, especially for high-volume contracts (see Figure 8).

Using volume as a performance criterion, its ratio to time indicates an increase in procurement speed from pre-COVID19 to post-COVID19 phases. Only the COVID-19 phase shows a notably lower volume per day ratio. This would imply an acceleration of 24% acceleration in procurement volume processed per procedure day (see Figure 9).

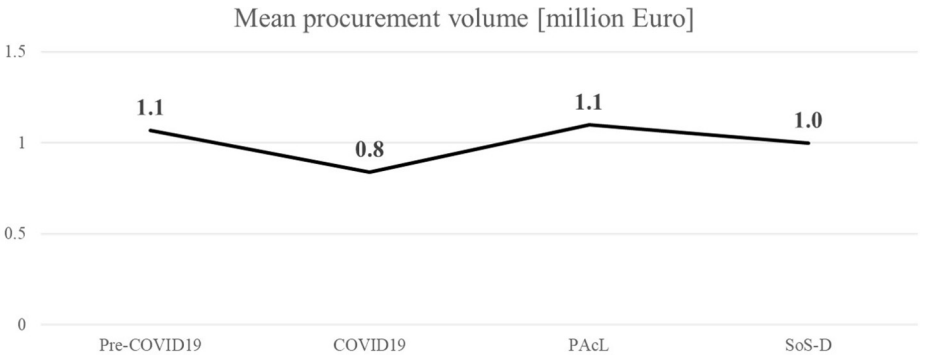

Figure 8. Mean procurement volume per tender
Source: Authors' own creation

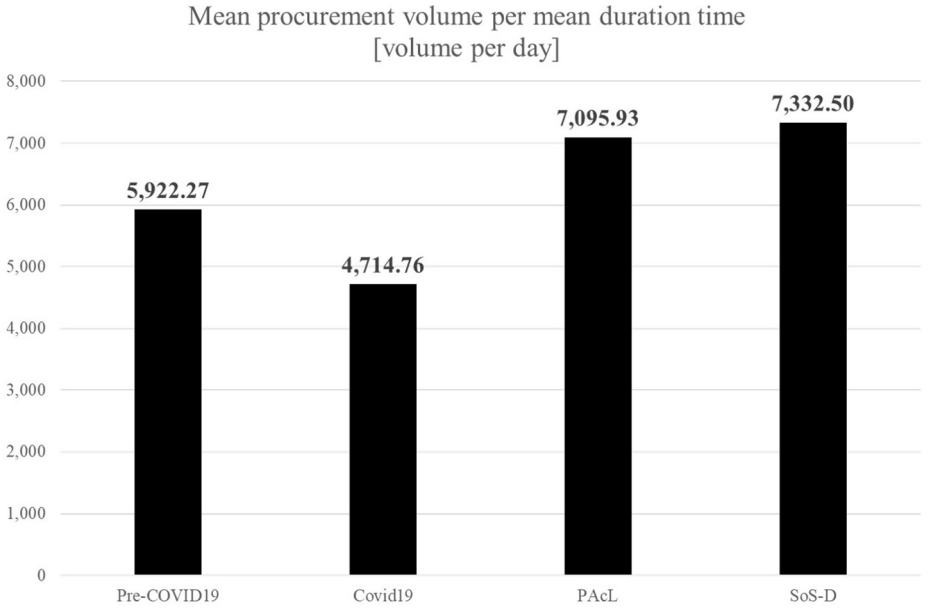

Figure 9. Speed assessment − volume per day
Source: Authors' own creation

4.3 Multivariate analysis of the relation between red tape and time

Finally, multivariate statistics is used to evaluate the relation between red tape and time. First, correlation analysis investigates how the variables relate to each other (see Appendix 2). Duration, tender volume (0.067**), number of bidders (−0.040**) and number of applicants (−0.038**) are significantly correlated, though the coefficients are small.

To analyse the relation between duration and red tape intensity levels, a chi-square test is used. The chi-square test determines whether there is a significant association between two variables. It compares observed and expected frequencies and thereby assesses if the differences between these frequencies are due to chance or statistically significant interdependencies. If the chi-square test is significant, the null-hypothesis of independency must be refused, what in turn indicates a dependency. Cramér´s V is then used to measure the strength of the association. The same procedure is used for speed by volume and speed by number of bids.

For the calculation SPSS software was used. To meet the prerequisite of the chi-square test, an expected cell count of at least five continuous variables were grouped into meaningful categories:

- Project duration in days was aggregated into monthly intervals, with all durations exceeding three years combined into one single category.
- Speed in volume per day was grouped into increments of €10,000 per day, with all values above €100,000 forming the top category.
- Speed in bids per day was divided into seven categories: ≤0.01; 0.01–0.02; 0.02–0.03; 0.03–0.04; 0.04–0.05; 0.05–0.1; and >0.1 bids per day.

Each of these categorical variables was then tested against the bureaucracy proxy using the chi-square test to assess potential associations. The analysis revealed a highly significant chi-square result for procedural duration (Table 2), with a Cramér's V of 0.200, indicating a weak association between duration and red tape (Table 3). In other words, there is a statistically weak dependency between red tape and the duration of public procurement procedures.

For procurement speed by volume, the chi-square test was significant, with a Cramér's V of 0.025 (Appendix 3), while speed by number of bids yielded a highly significant chi-square test with a Cramér's V of 0.070 (Appendix 4). These results suggest that the relationship between red tape and procurement speed, both in terms of procurement volume and number of bids, is statistically significant but weak.

5. Discussion

Red tape in public procurement refers to the excessive or rigid compliance requirements that public officials and suppliers must address to complete a procurement process. Often, red tape is only analysed for procurement procedures, but there are numerous additional rules before and after the pure tendering process. These rules are intended to ensure transparency, fairness and accountability, but their sheer complexity can lead to significant delays in decision-making (Coursey and Pandey, 2007; Jovanović *et al.*, 2022). As a result, projects that might have been completed faster in the private sector often face prolonged delays in the public sector due to the need to follow strict procedural guidelines. This is what also the case organisation faces, as the published reports with multi-year delays for some of their most prominent procurement objects (e.g. Bundesministerium der Verteidigung, 2023).

This study contributes to the literature by empirically capturing how changes in the regulatory environment translate into measurable shifts in procurement durations. This is based on red tape operationalised by multiple timeframes with different settings of rules and

Table 2. Chi-square test results

Statistical parameters	Value	Df	Approximate significance (two-sided)
Pearson chi square	1,677.774	37	< 0.001
Likelihood ratio	1,972.096	37	< 0.001
Linear by linear association	195.975	1	< 0.001
N of valid cases	42,070		

Note(s): 0 cells (0.0%) have expected count less than 5. The minimum expected count is 9.36
Source(s): Authors' own creation

Table 3. Symmetric measures and Cramér's V results

Statistical parameters	Value	Approximate significance
Nominal by nominal		
Phi	0.200	< 0.001
Cramér's V	0.200	< 0.001
N of valid cases	42,070	

Source(s): Authors' own creation

regulations. Unlike prior studies that often rely on subjective perceptions to assess red tape (Coursey and Pandey, 2007; Scott and Pandey, 2005), our approach offers an objective measurement based on process data from the case organisation.

This approach offers the opportunity to analyse longitudinal changes due to the addressed red tape mitigation actions. Due to recent crises and risks in supply security for public organisations, new rules were issued in a top-down approach that aimed to combat the red tape problem. These approaches, including a new law (PAcL) or secretary of state directive (SoS-D) did not only change the regulatory frame, but they also addressed risk aversion and use of exemption rules in public procurement. Nevertheless, red tape is, in part, a safeguard against accusations of corruption, nepotism or mismanagement. The more rules and procedures in place, the safer procurement officials may feel from these accusations. However, this emphasis on safeguarding can create delays. The top-down approach was a major signal to the organisation to become less risk averse and backed the use of exemption rules. The analysis provides empirical evidence that policy interventions, such as the SoS-D directive, can lead to a measurable reduction in procedural risk aversion within public procurement. This highlights that red tape is not merely a function of regulation quantity, but also of organisational interpretation and leadership framing, adding a behavioural dimension to the debate.

In light of previous reports and research in the field, this study underpins the reasoning that red tape is causing delays with empirical evidence. This is in contrast to prevalent practices. For instance, The World Bank Benchmarking Report measures time in public procurement, but, instead of referring to procedural time, it examines the waiting time of suppliers to receive payment (World Bank, 2017). Similar to Hoekman and Taş (2022), who use regulation quality as a proxy for procurement system effectiveness, this study also applies a regulatory phase-based proxy to assess time-related performance outcomes. Moreover, the European Union examined the administrative capacity in the EU with regard to public procurement and also analysed time or time-consumptive issues like training of personnel (European Union, 2022, 2023). As such, this research generally adds a new empirically substantiated perspective to existing approaches.

Moreover, analysing procurement time is not new to academic research, as a number of studies contemplated transition factors of more efficient procurement systems (e.g. Anjali Kumar *et al.*, 2015). Time is, by and large, a variable that is interpreted as inefficiency. Vice versa, the reduction of procurement time in the public sector is an indirect goal of almost every reform (Thai, 2017). Empirical studies show duration times of 286 days in the mean (Anjali Kumar *et al.*, 2015). Anjali Kumar *et al.*'s (2015) research indicated that different procedures and procurement methods lead to far reaching different times (434 days to 209 days, Anjali Kumar *et al.*, 2015). The presented duration time of the case sample is below that duration time. But the mean duration time lies with 197 days in 2018 still in the lower range of Anjali Kumar *et al.* (2015). It seems as if there is even a longer global trend of management efforts that resulted in time reduction of public procurement procedures. Effectively, duration time is decreasing, while procurement speed is increasing. It is of interest if this is only a limited or a lasting trend and if the findings can be reproduced in other (country) settings.

This research contributes to the public procurement literature by proposing a more standardised way to evaluate duration or speed times, as most studies and research works measure time differently. Wang *et al.* (2020) measure the time between publication of a tender to the award of contract. Flynn (2018) measures the time between deadline of receipt of offers and award of contract. In contrast, Hult *et al.* (2002) investigate in a survey the total time between initialising and ending of a procurement procedure. This research investigates

a data set that in its findings of this article follows the total time approach, similar to Hult *et al.* (2002), but data would also allow to measure partial times. If research on the topic would follow a more standardised way referring to time stamps, duration and speed, then overarching, even meta-analysis studies would be possible.

This could enhance existing benchmarks about the time consumption in public procurement. For example, Flynn (2018) mentions that 120 days is a satisfactory timespan for the duration time of public procurement (receipt of offers to award of contracts). Comparing our results with this benchmark, the mean total duration time in our case is in the last phase (SoS-D) with 136.1 days is close to that threshold. Findings indicate that the case organisation is on a good path towards increased efficiency, but findings also highlight the need for a more differentiated view on best practices, taking the diversity of project types and public procurement procedure types into account. It would also help to have appropriate measurement indicators and instruments for duration or speed in public procurement. As of now, research is quite heterogeneous. For example, Arun Kumar *et al.* (2005) investigate and measure the difference between real and goal/estimated duration time. This research contributes to the instruments for evaluating public procurement time by proposing speed metrics. Processed bids per day or processed procurement volume per day are metrics that can be used for cross-organisational or cross-country assessment of public procurement time.

Referring the research back to red tape, it is plausible, within the limitations of the operationalisation and measurement of red tape in this study, that procurement red tape reduces time performance. However, there are numerous other effects discussed in the red tape research streams, that are also worth investigating. First of all, budgeting red tape, i.e. hindering rules in the public budgeting process, can also cause inefficiencies (Coursey and Pandey, 2007). This would call for a more fine-grained analysis and even a better merger of red tape theory with performance measurement and management in public procurement.

In addition, Haase describes a central dilemma in public procurement: the urgent need for speed and responsiveness during crises often clashes with the regulatory safeguards designed to ensure accountability, transparency and fairness (Haase, 2019). While the potentially unintended effects of reducing regulatory controls lie beyond the scope of this paper, they raise an important question: should public organisations aim for the right timing in procurement, rather than simply the shortest or fastest procedures?

Despite these additional considerations, the present research supports the observation that red tape contributes to procurement delays. The data set, spanning the period from 2018 to 2024, provides a robust empirical foundation, enabling a rigorous examination of the dependency hypothesis. As such, this study offers a meaningful contribution by empirically testing the assumed relationship between bureaucratic intensity and procurement duration using a large and representative sample. Moreover, it introduces novel benchmarking tools for assessing time efficiency in public procurement processes.

6. Conclusions

6.1 Methodological implications

The methodology of this paper contains two original aspects. First, the relation between red tape and time in public procurement is not evaluated by perceptions of involved people but by means of an empirical secondary analysis based on actual procurement durations. This was grounded on a public procurement software systems' data output on 42,070 procurement procedures including the respective time stamps. This is a promising avenue for future research. Furthermore, time is a variable that allows comparison, benchmarking and meta-analysis not only between different public procurement organisations but also between different regulatory contexts. Second, this research distinguishes between the simple

duration of a public procurement procedure and the speed of it. Hence, this work introduces speed metrics (bids per duration time; volume per duration time) and proposes an approach to evaluate public procurement procedures in relation to its main drivers. The findings showed an increase in speed and interdependency between red tape and public procurement duration. Beyond that, this work can be seen as a methodological proposition that speed metrics must be developed to really assess and evaluate how fast public procurement actually is.

6.2 Managerial implications

Overall, the perception and gut feeling that red tape is causing delays in public procurement procedures is supported by empirical evidence based on a substantial secondary data set. In general, public procurement managers shall work on reducing redundant or superfluous rules and regulations or internal instructions. Additionally, public procurement managers are tasked to monitor and evaluate time and speed of their procedures.

Then again, managerial effort shall be taken in a differentiated way. Extraordinary demand in a new-buy-situation will typically cause longer procedures than standardised, market-common demand in a re-buy situation. Different measures must be taken. The data set revealed that in the last phase, internal instructions had also a major impact and loosening documentation requirements was one of the key drivers to increase speed and reduce time duration. The case organisation simply allowed to use the documentation form with the lowest administrative duration for a higher number of procurement procedures. This decreased times tremendously. Consequently, the transfer of time-efficient work flows to public procurement procedures is recommended.

6.3 Content-related implications and limitations

The findings indicate that red tape and public procurement duration are interrelated phenomena: lower levels of red tape correspond to faster procurement procedures. That dependency is also backed by the highly significant chi-square-test. This complements findings by Hoekman and Taş (2024), who demonstrate a trade-off between procedural discretion and outcomes such as contract prices and small and medium-sized enterprise contract awards, reinforcing the importance of regulatory design in shaping performance. The finding also corresponds to the perception of involved people, media and society at large. Nevertheless, this is one of the few studies that had access to an actual large-scale data set of procedures including their respective time stamps. Thus, this study is able to provide empirical evidence on the relationship between red tape and public procurement time. This finding not only calls for but also justifies further studies to get more fine-grained insights.

While this study offers empirical insights into the relationship between red tape and procurement efficiency, its conclusions are shaped by several contextual and methodological constraints that merit reflection. The study is based on secondary data from a single, albeit major, German public procurement organisation. While this provides in-depth insight into a highly formalised procurement system, the findings may not be directly transferable to other national or institutional contexts with different regulatory cultures, administrative capacities or procurement volumes. The single-case design limits the ability to make cross-organisational comparisons or to draw conclusions about broader systemic patterns across the EU or globally. Moreover, the operationalisation of red tape is based on four discrete regulatory phases. This presents both a strength and a limitation. On the one hand, it allows for a structured comparison of procurement performance over time. On the other, it simplifies a complex phenomenon. Regulatory change rarely translates instantly into procedural practice, and procurement processes that span multiple phases may blur the

intended contrast between high- and low-red-tape periods. Although care was taken to detect and control for such outliers, some level of misclassification remains possible and may have attenuated observed effects. Methodologically, the study relies on descriptive and bivariate statistical approaches, which are effective for detecting patterns but limited in isolating causal mechanisms. Key influences such as project complexity, market competition or organisational risk aversion were not systematically modelled. This limits the explanatory power of the findings and highlights the need for future research to incorporate multivariate methods and richer sets of explanatory variables.

Taken together, these limitations suggest several opportunities for future research. Expanding the empirical scope to include multiple procurement organisations across different countries or administrative levels would allow for cross-case comparison and strengthen the robustness of findings. Furthermore, a more nuanced operationalisation of red tape, perhaps through hybrid indicators combining document analysis, survey input and regulatory burden metrics, could improve construct validity. Finally, incorporating multivariate statistical techniques and interaction terms would help uncover the contingent conditions under which red tape most strongly affects procurement performance.

References

Bagnasco, A.M. (2022), "Public procurement between emergency and transparency: where We are", *Eurasia Business and Economics Society Conference*, Springer Nature, Switzerland.

Bozeman, B. (1993), "A theory of government "red tape", *Journal of Public Administration Research and Theory: J-PART*, Vol. 3 No. 3, pp. 273-303, available at: www. jstor.org/stable/1181785

Bozeman, B. (2012), "Multidimensional red tape: a theory coda", *International Public Management Journal*, Vol. 15 No. 3, pp. 245-265, doi: 10.1080/10967494.2012.725283.

Bretschneider, S. (1990), "Management information systems in public and private organizations: an empirical test", *Public Administration Review*, Vol. 50 No. 5, p. 536, doi: 10.2307/976784.

Bundesministerium der Verteidigung (2023), *17. Bericht des Bundesministeriums der Verteidigung zu Rüstungsangelegenheiten: Teil 1*.

Bundesrechnungshof (2024), "Bericht nach § 88 Absatz 2 BHO an den Haushaltsausschuss des deutschen bundestages über die Prüfung der beschaffung und verteilung von schutzmasken durch das bundesministerium für Gesundheit".

Busse, C. (2010), "A procedure for secondary data analysis: innovation by logistics service providers", *Journal of Supply Chain Management*, Vol. 46 No. 4, pp. 44-58.

Calantone, R.J. and Vickery, S.K. (2010), "Introduction to the special topic forum: using archival and secondary data sources in supply chain management research", *Journal of Supply Chain Management*, Vol. 46 No. 4, pp. 3-11, doi: 10.1111/j.1745-493X.2010.03202.x.

Cooke, D.K., Brant, K.K. and Woods, J.M. (2019), "The role of public service motivation in employee work engagement: a test of the job demands-resources model", *International Journal of Public Administration*, Vol. 42 No. 9, pp. 765-775, doi: 10.1080/01900692.2018.1517265.

Coursey, D.H. and Pandey, S.K. (2007), "Content domain, measurement, and validity of the red tape concept", *The American Review of Public Administration*, Vol. 37 No. 3, pp. 342-361, doi: 10.1177/1049731506290269.

Čudanov, M., Jovanović, P. and Jaško, O. (2018), "Influence of the public procurement procedure type on the duration of public procurement", *Lex localis - Journal of Local Self-Government*, Vol. 16 No. 2, pp. 361-378, doi: 10.4335/16.2.361-378(2018).

Davis, R.S. and Stazyk, E.C. (2014), "Making ends meet: how reinvention reforms complement public service motivation", *Public Administration*, Vol. 92 No. 4, pp. 919-936, doi: 10.1111/j.1467-9299.2012.02112.x.

Der Spiegel (2023), "Mammutbehörde in Koblenz: pistorius tauscht Spitze des Bundeswehr-Beschaffungsamtes aus", DER SPIEGEL, available at: www.spiegel.de/politik/deutschland/bundeswehr-boris-pistorius-tauscht-spitze-des-bundeswehr-beschaffungsamtes-aus-a-2a0ef53b-33a9-4881-87a9-238d9a4edbe6

Dickson, D. (2014), *The People's Government: An Introduction to Democracy*, Cambridge University Press, Cambridge, doi: 10.1017/CBO9781107358218.

El Benni, N., Ritzel, C., Heitkämper, K., Umstätter, C., Zorn, A. and Mack, G. (2022), "The cost of farmers' administrative burdens due to cross-compliance obligations", *Journal of Environmental Planning and Management*, Vol. 65 No. 5, pp. 930-952, doi: 10.1080/09640568.2021.1920376.

European Union (2022), (Ed.). "Annual burden survey 2021: the European Union's efforts to simplify legislation", available at: https://commission.europa.eu/system/files/2022-07/annual-burden-survey_2021_en.pdf

European Union (2023), (Ed.). "The European Union's action to simplify legislation: annual burden survey 2022", available at: https://commission.europa.eu/system/files/2023-09/ABS_20230912_0.pdf

Flynn, A. (2018), "Measuring procurement performance in Europe", *Journal of Public Procurement*, Vol. 18 No. 1, pp. 2-13, doi: 10.1108/JOPP-03-2018-001.

Flynn, A. and Davis, P. (2017), "Explaining sme participation and success in public procurement using a capability-based model of tendering", *Journal of Public Procurement*, Vol. 17 No. 3, pp. 337-372, doi: 10.1108/JOPP-17-03-2017-B003.

George, B., Pandey, S.K., Steijn, B., Decramer, A. and Audenaert, M. (2021), "Red tape, organizational performance, and employee outcomes: meta-analysis, meta-regression, and research agenda", *Public Administration Review*, Vol. 81 No. 4, pp. 638-651, doi: 10.1111/puar.13327.

Grochla, E. (1973), *Grundlagen Der Materialwirtschaft: Das Materialwirtschaftliche Optimum Im Betrieb*, (2nd ed.), Springer Gabler, Wiesbaden, available at: https://ebookcentral.proquest.com/lib/kxp/detail.action?docID=6711262

Grochla, E. (1992), *Grundlagen Der Materialwirtschaft: Das Materialwirtschaftliche Optimum im Betrieb*, (3., gründlich durchges. Aufl., unveränd. Nachdr). Gabler-Lehrbuch.Gabler.

Guriev, S. (2004), "Red tape and corruption", *Journal of Development Economics*, Vol. 73 No. 2, pp. 489-504, doi: 10.1016/j.jdeveco.2003.06.001.

Haase, T.W. (2019), "Uncertainty in crisis management", In A. Farazmand (Ed.), *Springer eBook Collection. Global Encyclopedia of Public Administration, Public Policy, and Governance*, Springer, pp. 1-5, doi: 10.1007/978-3-319-31816-5_2922-1.

Harland, C.M., Knight, L., Patrucco, A.S., Lynch, J., Telgen, J., Peters, E., Tátrai, T. and Ferk, P. (2021), "Practitioners' learning about healthcare supply chain management in the COVID-19 pandemic: a public procurement perspective", *International Journal of Operations and Production Management*, Vol. 41 No. 13, pp. 178-189, doi: 10.1108/IJOPM-05-2021-0348.

He, C., Milne, A. and Ataullah, A. (2023), "What explains delays in public procurement decisions? ", *Economic Modelling*, Vol. 121, p. 106201, doi: 10.1016/j.econmod.2023.106201.

Hoekman, B. and Taş, B.K.O. (2022), "Procurement policy and SME participation in public purchasing", *Small Business Economics*, Vol. 58 No. 1, pp. 383-402, doi: 10.1007/s11187-020-00414-z.

Hoekman, B. and Taş, B.K.O. (2024), "Discretion and public procurement outcomes in Europe ", *European Journal of Political Economy*, Vol. 82, p. 102525, doi: 10.1016/j.ejpoleco.2024.102525.

Holoubek, M. (2009), "Vergaberecht 2009", SpringerLink Bücher. Springer, doi: 10.1007/978-3-211-36816-9.

Hult, G.M., Ferrell, O. and Hurley, R.F. (2002), "Global organizational learning effects on cycle time performance", *Journal of Business Research*, Vol. 55 No. 5, pp. 377-387, doi: 10.1016/S0148-2963(00)00161-2.

Jovanović, P., Ivanović, T., Maričić, M. and Ivančević, S. (2022), "Public procurement employees' perception on legal changes, perceived red tape and job stress: evidence from Serbia", *Engineering Economics*, Vol. 33 No. 5, pp. 507-520, doi: 10.5755/j01.ee.33.5.29934.

Kersting, S. and Neuerer, D. (2020), "BER: Warum der Pannen-Flughafen erst jetzt eröffnet wird", Handelsblatt, available at: www.handelsblatt.com/politik/deutschland/hauptstadtflughafen-14-jahre-bauzeit-warum-der-ber-erst-jetzt-eroeffnet-wird/26289214.html

Kortendieck, G., and Stepanek, P. (2019), "Controlling in der deutschsprachigen Sozialwirtschaft: Eine Einführung", *Springer eBooks Education and Social Work*, Springer VS, Wiesbaden, doi: 10.1007/978-3-658-24600-6.

Kortukova, T., Kolosovskyi, Y., Korolchuk, O.L., Shchokin, R. and Volkov, A.S. (2023), "Peculiarities of the legal regulation of temporary protection in the European Union in the context of the aggressive war of the Russian Federation against Ukraine", *International Journal for the Semiotics of Law - Revue Internationale de Sémiotique Juridique*, Vol. 36 No. 2, pp. 667-678, doi: 10.1007/s11196-022-09945-y.

Kroeber-Riel, W. (1966), "Beschaffung und Lagerung: Betriebswirtschaftliche Grundfragen der Materialwirtschaft", Springer Gabler. in Springer Fachmedien Wiesbaden GmbH, available at: https://ebookcentral.proquest.com/lib/kxp/detail.action?docID=6601661

Kumar, A., Nair, A. and Piecha, J. (2015), "Measuring efficiency in international public procurement", *Journal of Public Procurement*, Vol. 15 No. 3, pp. 365-389, doi: 10.1108/JOPP-15-03-2015-B005.

Kumar, A., Ozdamar, L. and Ng, C.P. (2005), "Procurement performance measurement system in the health care industry", *International Journal of Health Care Quality Assurance*, Vol. 18 No. 2, pp. 152-166, doi: 10.1108/09526860510588179.

Loader, K. (2007), "The challenge of competitive procurement: value for money versus small business support", *Public Money and Management*, Vol. 27 No. 5, pp. 307-314, doi: 10.1111/j.1467-9302.2007.00601.x.

Loader, K. (2010), "Is local authority procurement 'lean'? An exploration to determine if 'lean' can provide a useful explanation of practice", *Journal of Purchasing and Supply Management*, Vol. 16 No. 1, pp. 41-50, doi: 10.1016/j.pursup.2009.10.001.

Loader, K. (2015), "SME suppliers and the challenge of public procurement: evidence revealed by a UK government online feedback facility", *Journal of Purchasing and Supply Management*, Vol. 21 No. 2, pp. 103-112, doi: 10.1016/j.pursup.2014.12.003.

Lödding, H. (2016), *Verfahren Der Fertigungssteuerung: Grundlagen, Beschreibung, Konfiguration*, (3. Aufl. 2016). Springer Vieweg, Heidelberg, available at: http://nbn-resolving.org/urn:nbn:de:bsz:31-epflicht-1607838

McCue, C. and Prier, E. (2008), "Using agency theory to model cooperative public purchasing", *Journal of Public Procurement*, Vol. 8 No. 1, pp. 1-35, doi: 10.1108/JOPP-08-01-2008-B001.

Menzel, B. (2023), "Stuttgart 21 verzögert sich weiter – und wird noch teurer", Merkur, available at: www.merkur.de/wirtschaft/stuttgart-21-verzoegerung-kosten-inbetriebnahme-planungen-deutsche-bahn-gerichtsverfahren-zr-92576695.html

Migliaccio, G.C., Bogus, S.M. and Chen, A. (2010), "Effect of duration of design–build procurement on performance of transportation projects", *Transportation Research Record: Journal of the Transportation Research Board*, Vol. 2151 No. 1, pp. 67-73, doi: 10.3141/2151-09.

Ministerium für Verkehr Baden-Württemberg (2023), "Stuttgart 21", available at: https://vm.baden-wuerttemberg.de/de/mobilitaet-verkehr/schiene/ausbau-der-schiene-in-baden-wuerttemberg/ausbauprojekte/stuttgart-21#:~:text=as%20Bahnprojekt%20Stuttgart%2021%20besteht,Bahn%20offiziell%20f%C3%BCr%202025%20vorgesehen

OECD (2020), "Public procurement and infrastructure governance: initial policy responses to the coronavirus (COVID-19) crisis. (OECD policy responses to coronavirus (COVID-19))", OECD, available at: www.oecd.org/coronavirus/policy-responses/public-procurement-and-infrastructure-governance-initial-policy-responses-to-the-coronavirus-covid-19-crisis-c0ab0a96/

Olupot, P.S. (2023), "Institutional pressures and procurement cycle time in Uganda's Central government procuring and disposing entities: the mediating role of opportunistic behavior", *Journal of Public Procurement*, Vol. 23 Nos 3-4, pp. 344-364, doi: 10.1108/JOPP-04-2023-0024.

Paul, S. (2018), "Crisis in Boeing 787 Dreamliner: an investigation from project management control perspective", *International Journal of Human Resource Studies*, Vol. 8 No. 4, p. 242, doi: 10.5296/ijhrs.v8i4.13805.

Prier, E. and McCue, C.P. (2009), "The implications of a muddled definition of public procurement", *Journal of Public Procurement*, Vol. 9 Nos 3-4, pp. 326-370, doi: 10.1108/JOPP-09-03-04-2009-B002.

Prier, E., McCue, C.P. and Csáki, C. (2021), "Evaluating decision speed as a measure of public procurement performance in the European single market", *International Journal of Public Administration*, Vol. 44 No. 13, pp. 1065-1075, available at: https://ideas. repec.org/a/taf/lpadxx/v44y2021i13p1065-1075.html

Rutkowski, C.J., Eboch, K., Carr, A. and Greer, B.M. (2022), "Strategic procurement collaboration for the common good: private and public procurement relationship duringa pandemic", *Journal of Public Procurement*, Vol. 22 No. 1, pp. 43-63, doi: 10.1108/JOPP-10-2020-0076.

Schapper, P.R., Veiga Malta, J.N. and Gilbert, D.L. (2006), "An analytical framework for the management and reform of public procurement", *Journal of Public Procurement*, Vol. 6 Nos 1-2, pp. 1-26, doi: 10.1108/JOPP-06-01-02-2006-B001.

Schoeni, D., Butler, L. and Trybus, M. (2023), "A special issue on the emerging impact of the Russian invasion of Ukraine on defence procurement in Europe", doi: 10.2139/ssrn.4636560.

Scott, P.G. and Pandey, S.K. (2005), "Red tape and public service motivation", *Review of Public Personnel Administration*, Vol. 25 No. 2, pp. 155-180, doi: 10.1177/0734371X04271526.

Tátrai, T., and Nyikos, G. (2013), "The uses and abuses of public procurement in Hungary", *Charting a Course in Public Procurement Innovation and Knowledge Sharing/*, edited by Gian Luigi Albano, Keith F. Snider *and* Khi V. Thai. PrAcademics Press, Boca Raton, pp. 29-54, available at: https://ippa.org/images/books/ippc5/chapter_2_tatrai.pdf

Tempelmeier, H. (1983), "Lieferzeit-Orientierte Lagerungs- und Auslieferungsplanung", *Physica-Schriften Zur Betriebswirtschaft Ser: v, 6*. Physica-Verlag, Heidelberg, available at: https://ebookcentral.proquest.com/lib/kxp/detail.action?docID=6599215

Thai, K.V. (2017), "International handbook of public procurement/Khi V. Thai ", (1st). *Public Administration and Public Policy*, Routledge, London.

The New York Times (2013), "A rocky path for the 787 Dreamliner", The New York Times, available at: https://archive.nytimes.com/www.nytimes.com/interactive/business/boeing-787-dreamliner-timeline.html#/#time237_7031

Thommen, J., P., Achleitner, A., K., Gilbert, D.U., Hachmeister, D., Jarchow, S. and Kaiser, G. (2020), "Lehrbuch. Springer gabler", *Allgemeine Betriebswirtschaftslehre (9., Vollständig Überarbeitete Auflage)*, doi: 10.1007/978-3-658-27246-3.

Vecchi, V., Cusumano, N. and Boyer, E.J. (2020), "Medical supply acquisition in Italy and the United States in the era of COVID-19: the case for strategic procurement and public–private partnerships", *The American Review of Public Administration*, Vol. 50 Nos 6-7, pp. 642-649, doi: 10.1177/0275074020942061.

Vinton, D.E. (1992), "A new look at time, speed, and the manager", *Academy of Management Perspectives*, Vol. 6 No. 4, pp. 7-16, doi: 10.5465/ame.1992.4274427.

Wang, Q., Zhang, R. and Liu, J. (2020), "Price/time/intellectual efficiency of procurement: uncovering the related factors in Chinese public authorities", *Journal of Purchasing and Supply Management*, Vol. 26 No. 3, p. 100622, doi: 10.1016/j.pursup.2020.100622.

Welch, E.W. and Pandey, S.K. (2006), "E-Government and bureaucracy: toward a better understanding of intranet implementation and its effect on red tape", *Journal of Public Administration Research and Theory*, Vol. 17 No. 3, pp. 379-404, doi: 10.1093/jopart/mul013.

World Bank (2017), *Benchmarking Public Procurement: Assessing Public Procurement Regulatory Systems in 180 Economies*, International Bank for Reconstruction and Development, Washington DC.

Yeo, K.T. and Ning, J.H. (2006), "Managing uncertainty in major equipment procurement in engineering projects", *European Journal of Operational Research*, Vol. 171 No. 1, pp. 123-134, doi: 10.1016/j.ejor.2004.06.036.

Appendix 1

Table A1. Procurement procedures

Procurement procedure	German term	Definition	Legal basis and context
Restricted tender	Beschränkte Ausschreibung	A national procedure where a limited number of suppliers are directly invited to submit bids without a prior public notice	Below EU thresholds, under VOB/A (construction) and UVgO (supplies/services)
Restricted tender with a call for competition	Beschränkte Ausschreibung mit Teilnahmewettbewerb	A two-step national procedure where a public call precedes supplier selection; selected suppliers are then invited to bid	Below EU thresholds, UVgO/VOB/A
Restricted procedure	Nichtoffenes Verfahren	A formal EU-regulated two-stage procedure. Any supplier may apply, but only qualified candidates are invited to submit full tenders	Above EU thresholds, under GWB and VgV, per Directive 2014 / 24/EU, Art. 28
Open procedure	Offenes Verfahren	A fully public procedure where all interested suppliers may submit a tender	Above EU thresholds, under GWB/VgV, Directive 2014 / 24/EU, Art. 27
Public tender	Öffentliche Ausschreibung	A national equivalent of the open procedure; open to all suppliers via public notice	Below EU thresholds, under VOB/A or UVgO
Price inquiry	Preisanfrage	An informal, simplified procurement method for very low-value contracts where pricing is requested from a few suppliers	Below EU thresholds, allowed under UVgO §14 and VOB/A §3a
Negotiated procedure with tender publication	Verhandlungsverfahren mit Vergabebekanntmachung	A procedure where a public notice is published and selected participants negotiate the terms after initial offers	Above EU thresholds, under GWB/VgV, Directive 2014 / 24/EU, Art. 29
Negotiated procedure without tender publication	Verhandlungsverfahren ohne Vergabebekanntmachung	A direct negotiated process without a prior call, used only in exceptional cases (e.g. extreme urgency)	Above EU thresholds, only under strict exceptions, Directive 2014 / 24/EU, Art. 32
Negotiated procedure with a call for competition	Verhandlungsvergabe mit Teilnahmewettbewerb	A simplified negotiated process initiated with a public call, followed by negotiation with selected bidders	Below EU thresholds, under UVgO §12 (1) Nr. 2
Negotiated procedure without a call for competition	Verhandlungsvergabe ohne Teilnahmewettbewerb	A simplified, direct award process without prior publication, typically for low-value or urgent needs	Below EU thresholds, under UVgO §8 (4) and VOB/A §3a (3)

Source(s): Authors' own creation

Appendix 2

Table A2. Correlation matrix

Pearson correlations (n = 39,702)	Total duration	Volume	No. of bidders	No. of applicants
Total duration	1	0.067**	−0.40**	−0.38**
Volume		1	−0.013**	−0.009
Number of bidders			1	0.68**
Number of applicants				1

Note(s): **Correlation is significant at the 0.01 level (two-tailed) *correlation is significant at the 0.05 level (two-tailed)
Source(s): Authors' own creation

Appendix 3

Table A3. Chi square for speed by volume

Statistical parameters	Value	Df	Approximate significance (two-sided)
Pearson chi square	26.341	10	0.003
Likelihood ratio	28.315	10	0.002
Linear by linear association	1.324	1	0.250
No of valid cases	42.070		

Note(s): 0 cells (0.0%) have expected count less than 5. The minimum expected count is 10.03
Source(s): Authors' own creation

Appendix 4

Table A4. Symmetric measures and Cramér's V results for speed by volume

Statistical parameters	Value	Approximate significance
Nominal by nominal		
Phi	0.025	0.003
Cramér's V	0.025	0.003
No of valid cases	42.070	

Source(s): Authors' own creation

Table A5. Chi square for speed by tenders

Statistical parameters	Value	Df	Approximate significance (two-sided)
Pearson chi square	206.730	6	< 0.001
Likelihood ratio	255.925	6	< 0.001
Linear by linear association	147.427	1	< 0.001
No of valid cases	42.070		

Note(s): 0 cells (0.0%) have expected count less than 5. The minimum expected count is 6.02
Source(s): Authors' own creation

Table A6. Symmetric measures and Cramér's V results for speed by tenders

Statistical parameters	Value	Approximate significance
Nominal by nominal		
Phi	0.070	< 0.001
Cramér's V	0.070	< 0.001
N of valid cases	42.070	

Source(s): Authors' own creation

About the authors

Andreas H. Glas, is Assistant Professor and director of the Research Centre for Defence Acquisition and Supply Management at Bundeswehr University Munich. His research investigates the buyer-supplier interface and in particular performance-based contracts. Andreas H. Glas is the corresponding author and can be contacted at: andreas.glas@unibw.de

Michael Eßig, Prof., is Full Professor and head of the Procurement Research Group at Bundeswehr University Munich. This includes the Research Centre for Law and Management of Public Procurement and the Research Centre for Defence Acquisition and Supply Management.

Maximilian Holzner, MA, is a research scientist and doctoral candidate at Bundeswehr University Munich. His research focuses on the incorporation of software goods and components into supply chain management.

Dominik Oehlschläger, MSc, is research scientist and doctoral candidate at Bundeswehr University Munich. His research interests include digital twins and ultimate customer integration in supply chain management.