The State of Municipal Procurement in the Netherlands: Insights into Maturity, Ambitions, and Influencing Factors

Including an improved and applied CEP maturity model

Faculty of Behavioural, Management and Social Sciences (BMS)
MSc Business Administration (BA) – Purchasing and Supply Management (PSM)

Author: Krysta Roza
S3337251

First Supervisor: Prof. Dr. Louise Knight
Second Supervisor: Dr. Klaas Stek
External Supervisor: Marlou Snijders

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University of Twente
P.O. Box 217, 7500AE Enschede (Placeholder)
The Netherlands

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Abstract

The procurement processes of Dutch municipalities play a crucial role in achieving social goals, ensuring transparency, and complying with laws and regulations. In particular, the contract management and purchase-to-pay (P2P) components determine the efficiency and effectiveness of municipal procurement. In 2020, Snijders developed the CEP maturity model to support municipalities in assessing and improving their procurement maturity. Since then, however, various trends, such as digitization, sustainability, and changing organizational dynamics, have not been adequately incorporated into the model, making it less applicable and up-to-date. Moreover, recent knowledge about the maturity level of municipalities in 2025 is lacking.

This study had a dual purpose. First, the existing CEP model was evaluated and improved based on feedback from ten domain experts collected through a survey and two focus group sessions. Among other things, the revision led to the addition of an initial level and more nuance between successive maturity levels. The revised model was then applied in a nationwide survey of 88 municipalities aimed at measuring current and desired maturity levels. The results show that the current average maturity level is low (M = 1.94 on a scale of 1 to 5), with many municipalities, especially in the operational area, being at the fundamental or organized level. At the same time, ambition is high. On average, municipalities aim to achieve a level of 3.63 within five years, particularly toward the standardized level. The second goal of the study was to identify internal factors that influence progress on the maturity scale. The availability of substantive knowledge proved to be the most important explanatory factor. Municipalities with sufficient knowledge scored significantly higher on procurement maturity. Notable was the opposite effect of the factor time, which showed a significant negative influence. Other factors examined, such as budget, organization size, and organizational culture, showed no significant correlation with maturity level.

The improved CEP model provides municipalities with a practical and accessible tool to determine their current maturity level, define their desired situation, and formulate targeted improvement steps. It supports self-assessment as well as strategic steering and benchmarking against other municipalities. Based on the results, realistic but ambitious growth targets can be set. By periodically using the model as a measurement tool, municipalities can monitor their progress and implement structural improvement measures. This approach contributes to a stronger positioning of procurement within the organization and further professionalization. Based on the findings, municipalities are advised to invest primarily in knowledge development, such as through training, knowledge sharing, and the recruitment of substantive expertise, to work towards a higher level of procurement maturity.

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1 Introduction

Municipal procurement processes play a critical role in supporting public sector goals, such as sustainability, transparency, and compliance with legal requirements (Grandia & Volker, 2023). These processes not only ensure the efficient allocation of public funds but also directly impact the quality of public services provided to citizens. Within the public sector, purchasing is essential due to its direct impact on taxpayer funds and public services (Grandia & Meehan, 2017). In the Netherlands, municipalities allocate substantial budgets to these processes, making it essential to continuously improve their efficiency and effectiveness (Grandia, 2023). According to van Weele (2018a), procurement, in its broadest sense, encompasses all strategic activities involved in acquiring works, supplies, or services that align with organisational objectives. Within this framework, purchasing refers specifically to the operational execution of procurement activities, including order processing and transactional management. Procurement and purchasing ensure compliance with legal frameworks such as the Public Procurement Act and European directives while supporting broader societal objectives (Monczka et al., 2021).

Two critical elements of the purchasing process are Purchase-to-Pay (P2P) and contract management. The P2P processes streamline the procurement lifecycle by integrating purchasing and accounts payable systems, such as e-invoicing, to improve compliance and administrative efficiency. P2P helps improve procurement efficiency by reducing repetitive steps, minimizing resource waste, and enhancing accuracy in purchasing and payment processes (Songchumsai et al., 2023). Similarly, contract management ensures that agreements are executed effectively, monitored for performance, and closed in a manner that minimizes risks and maximizes value (Garrett & Rendon, 2005).

While some municipalities have progressed in maturing their purchasing processes, significant inconsistencies remain. Schippersheijn et al. (2013) found that municipalities often operate at a basic maturity level, lacking robust contract management and operational procurement practices. For instance, a study of 15 Dutch municipalities revealed limited progress in adopting structured procurement frameworks. van Wijk (2014) highlighted that more than half of Dutch municipalities do not implement contract management or operational procurement management, exposing a gap in their ability to meet strategic and regulatory demands. The introduction of mandatory e-invoicing in April 2019 emphasized the need for more digital infrastructures. Snijders et al. (2022) report that the average procurement maturity level of Dutch municipalities is relatively low, approximately 1.5 on a 4-point scale. Snijders (2020) provides further explanation for this limited maturity, noting that many municipalities lack the necessary systems to fully implement Purchase-to-Pay (P2P), which restricts their ability to streamline procurement workflows and leverage strategic insights. In addition, contract management practices in Dutch municipalities were often underdeveloped, with limited monitoring of contract performance and little effort to actively extract value from agreements. These shortcomings hinder municipalities' ability to meet the growing demands for public procurement accountability, efficiency, and compliance (OECD, 2023; Oluwafemi, 2024).

In 2020, the COPPA Efficient Purchasing (CEP) Maturity Model was developed by Snijders (2020) to address these challenges. The model provides a structured framework to assess the maturity of municipal purchasing processes, focusing specifically on P2P and contract management. The model enables municipalities to benchmark their current maturity level against a desired standard, helping to identify gaps and prioritize areas for improvement. Benchmarking exercises play an important role in enhancing procurement processes. In the past, regular maturity assessments, such as the Contract Management Maturity Model (CMMM) by Garrett and Rendon (2005), have played a key role in helping organizations identify strengths, address weaknesses, and plan targeted improvements. Benchmarking against industry standards reveals gaps and encourages continuous improvement (Rendon, 2015), which is essential for adapting to regulatory pressures and managing budget constraints. Adopting similar approaches can be especially valuable for municipalities. Snijders (2020) emphasizes that systematic maturity assessments in purchase-to-pay and contract management processes enable better resource allocation, legal compliance, and strategic alignment. Snijders also recommended revisiting the findings of the maturity assessment in Dutch municipalities after three years to assess progress and uncover new

challenges and opportunities for improvement. Despite this recommendation, limited research has been conducted to provide updated insights into the maturity of the purchasing process within Dutch municipalities.

However, since the introduction of the CEP model to assess the maturity, several limitations have been identified in practice. According to Snijders (personal communication, 2024), who applied the model in multiple municipalities, feedback from both municipal users and colleagues suggests that the model no longer fully reflects recent technological advancements or adequately captures the evolving complexity of municipal procurement. Additionally, practitioners noted that an extra maturity level might be necessary to more clearly distinguish between the existing stages. Based on this feedback, the model was first evaluated and improved before reassessing the current maturity level of Dutch municipalities.

Therefore, this research builds upon the foundation of the CEP 2020 Maturity Model by critically evaluating its relevance and improving its structure to reflect Dutch municipalities' current and future needs. The study has two aims: first, to refine the model to incorporate new trends and developments identified in the public sector, such as automation and sustainability guidelines. The second aim is to assess the current and desired levels of purchasing maturity among Dutch municipalities. This includes measuring the current and desired maturity level and investigating the internal factors that influence maturity. To achieve these aims, the research follows a two-stage structure, each guided by two specific research questions.

Stage 1: Model Evaluation and Improvement
This stage focuses on critically evaluating the existing CEP 2020 Maturity Model and improving it where needed. The guiding questions are:

1. How can the current CEP maturity model be evaluated?
2. What adjustments can be made to improve the CEP 2020 maturity model for assessing the maturity levels of Dutch municipalities?

Stage 2: Assessment and Influencing Factors
This stage examines the actual maturity levels within municipalities and explores internal factors that influence progression. The guiding questions are:

3. What are the current and desired purchasing maturity, with a focus on P2P and contract management in Dutch municipalities?
4. Which factors influence an organization's progression of maturity?

This research is relevant for both academic and practical purposes by addressing critical gaps in understanding and application. From an academic perspective, this research contributes to the literature on maturity models and public procurement. Maturity models offer organizations a framework to evaluate strategic and operational processes, identify areas for improvement, and implement targeted adjustments. In this study, the CEP model is aligned with recent technological developments and societal trends. Furthermore, the research emphasizes the role of P2P and contract management as crucial pillars of efficiency and compliance within public organizations. The theoretical model is enriched by focusing on the influencing factors that shape progression towards maturity.

From a practical perspective, the findings offer actionable insights for municipalities. By evaluating and improving the CEP model, the research provides an adjusted tool for benchmarking maturity levels, identifying gaps, and developing strategies for improvement. Municipalities can use these insights to modernize their purchasing processes, align them with regulatory requirements, and achieve greater efficiency and accountability. Moreover, the study is also useful for policymakers, consultants, and procurement professionals looking to improve frameworks that support continuous improvement in the public sector. Through these insights, the research contributes to a deeper understanding of how maturity models can be improved to change organizational and technological environments while simultaneously offering practical recommendations to bridge the gap between theory and practice.

This study consists of two stages, as shown in Figure 1, and is structured as follows. Chapter 2 outlines the theoretical framework, which explains the key concepts surrounding procurement maturity, contract management, and the P2P process. It also discusses existing maturity models, their evaluation, and factors that may influence the development of procurement maturity within organizations. Chapter 3 describes the methodology of Stage 1 of the study, in which the existing CEP model was evaluated and improved based on input from experts through a survey and focus group sessions. The results of this evaluation phase are presented in Chapter 4. Stage 2, covered in Chapter 5, applied the improved model in a quantitative survey of Dutch municipalities. The purpose of this phase was to determine current and desired maturity levels, as well as to identify factors that influence the growth in maturity. The results of this measurement and related analyses are discussed in Chapter 6. The report concludes with Chapter 7, which discusses and explains the key findings. Also discussed in this chapter are the implications and recommendations for follow-up research.

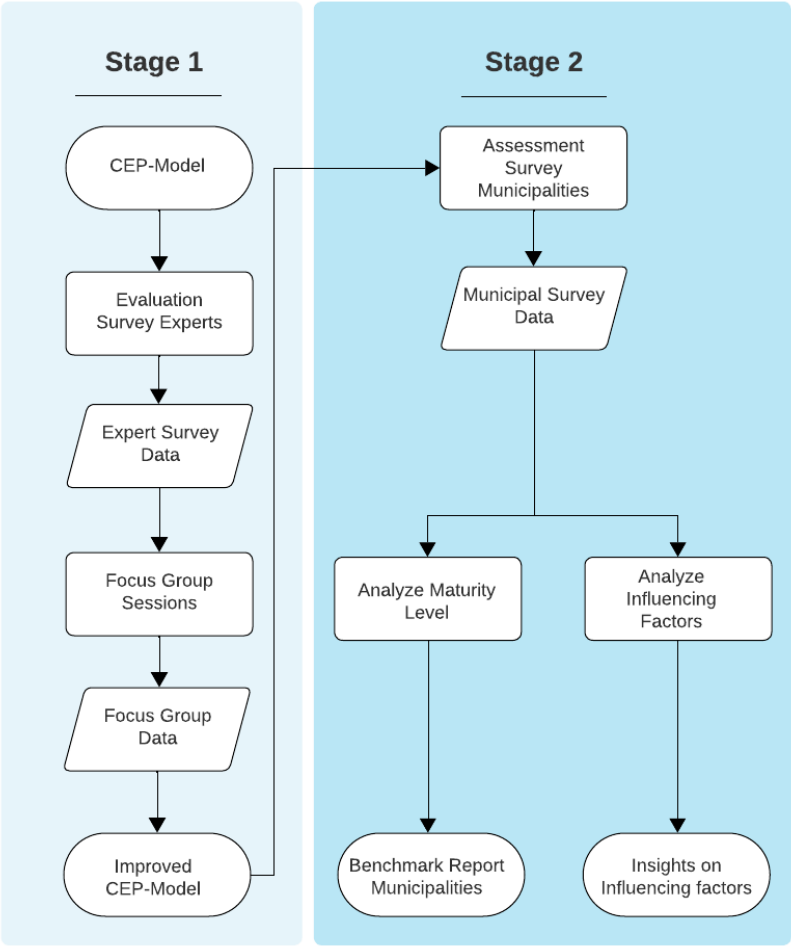

Figure 1 Research Design and Two-Stage Approach

2 Theoretical Framework

This chapter outlines the theoretical framework underlying this study. First, the context of public procurement processes within municipalities and trends in public procurement are described. Maturity models are then discussed, including their role and limitations. The CEP model is introduced, and the evaluation of maturity models is described. Finally, internal factors influencing an organization's progression along the maturity scale are examined. This theoretical framework provides a basis for further analysis and application within this study.

2.1 Public Procurement Municipalities

Public procurement can be defined as "The process by which central, regional, and local governments, governed by law and regulations, purchase goods and services" (Vluggen et al., 2019, p. 2). Public procurement by Dutch municipalities plays a crucial role in achieving social goals and managing public funds efficiently. Municipalities collectively spend more than 35 billion euros annually on various goods, services, and works, representing almost half of total public procurement in the Netherlands (VNG, n.d.). To effectively manage this considerable expenditure, municipalities apply procurement and tendering policies aligned with both national and European regulations. The 2012 Procurement Act forms the legal framework in this regard, in which transparency, non-discrimination, and proportionality are central. This legislation aims to ensure fair competition, promote integrity, and achieve optimal value for taxpayers' money (OECD, 2019; PIANOo, 2021). Transparency is seen to minimize corruption and inefficiency, with a well-structured procurement process with clear criteria and control mechanisms being crucial (OECD, 2015). According to Schiele (2019), "Most of the purchasing activities in the public and the private sector overlap. However, concerning the legal framework in particularly on contracting issues, substantial differences exist" (p. 53). Transparency, regulatory compliance, and the pursuit of social value are prominent requirements within the public sector (Caldwell & Bakker, 2017; Harland et al., 2019). Whereas industrial procurement often focuses on cost reduction and competitive advantage, public organizations must comply with strict laws and regulations. Moreover, they must account for public funds, resulting in a higher level of control and accountability. This difference in priorities makes the procurement process more complex and requires specific knowledge and skills from the professionals involved (van Weele, 2018b). In addition, municipalities aim to create social value through procurement, also known as Socially Responsible Public Procurement (SRPP). According to the European Commission (2020, p. 5), "SRPP aims to address the impact on society of the goods, services and works purchased by the public sector."

2.2 The Purchasing Process

To assess the maturity of the purchasing process in Dutch municipalities, it is essential first to provide a clear picture of the structure and functioning of this process. Purchasing is defined as "obtaining from external sources all goods and services which are necessary for running, maintaining and managing the company's primary and support activities at the most favorable conditions" van Weele (2018a, p. 9). Van Weele's (1988) purchasing model provides a solid foundation for understanding the procurement process. This linear model divides procurement activities into tactical and operational phases, consisting of six key steps: needs identification, supplier selection, contracting, ordering, monitoring, and evaluation (van Weele, 2018a). Procurement activities can be classified into different categories depending on their purpose and impact on the procurement process. Bäckstrand et al. (2019) state that procurement activities fall into two main categories: tactical and operational activities. Tactical activities focus on strategic decisions, such as selecting suppliers and concluding contracts. These activities lay the foundation for effective cooperation and long-term relationships within the procurement process. On the other hand, operational activities focus on the practical implementation of these agreements and include tasks such as placing orders, tracking deliveries, and monitoring progress (Bäckstrand et al., 2019; Schiele, 2019). Together, these categories form the basis of the procurement process, where tactical decisions and operational execution support each other to achieve the set goals. Figure 2 provides an overview of the procurement process (van Weele, 2018a). While the model is widely used in both public and private contexts, in the public sector, it needs to be complemented by insights specific to the challenges of municipalities, such as an emphasis on social value and transparency.

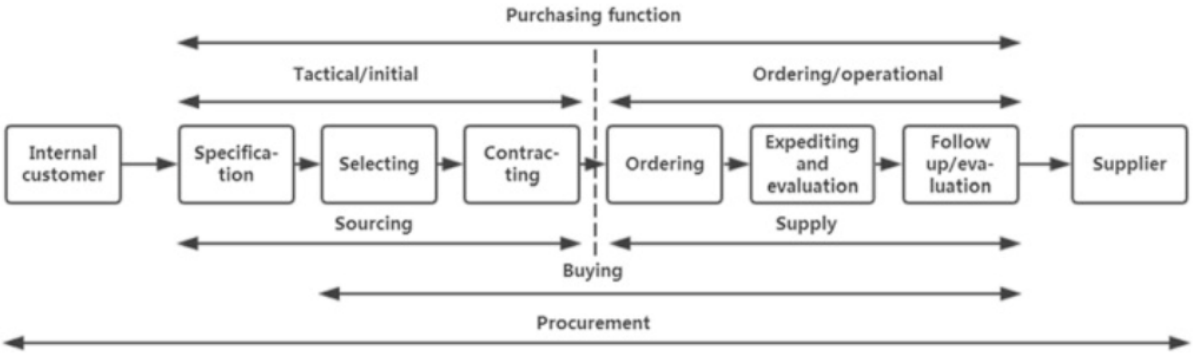

Figure 2 Van Weele's (1988) procurement process

The 'Handreiking Contractbeheer' by the Vereniging van Nederlandse gemeenten (VNG, 2014) emphasizes that contract administration and contract management are essential elements within the procurement process of municipalities. Contract administration focuses on monitoring agreements with suppliers and managing risks, while contract management includes broader processes. Tonkes and Vlasveld (2020) define contract management as "achieving the objectives intended by the contract by proactively monitoring compliance with all responsibilities, obligations, procedures, agreements, conditions, and rates stipulated in the contract during its execution phase; resolving all ambiguities, contradictions, and gaps; managing all risks associated with the contract; and implementing the desired changes to the contract" (p. 11). Contract management addresses five of the six steps of Van Weele's (1988) procurement process, as shown in Figure 3. Operational tasks, such as placing orders, monitoring deliveries, and evaluating performance, are closely intertwined with contract management (van der Valk & Rozemeijer, 2009).

According to Rendon (2015), contract management encompasses "how contracts are planned, structured, awarded, administered, and closed out" (p. 1484). Tonkes and Vlasveld (2020) define a contract as "a written agreement, the result of a multi-sided legal act by which one or more parties make a commitment to one or more other parties" (p. 9). A well-managed contract can serve as a protection mechanism against suppliers failing to meet agreed-upon requirements, which is of great importance because supplier performance contributes directly to end-user satisfaction (Valk & Iwaarden, 2011). Figure 3 shows the integration of procurement, contract administration, and contract management in the procurement process.

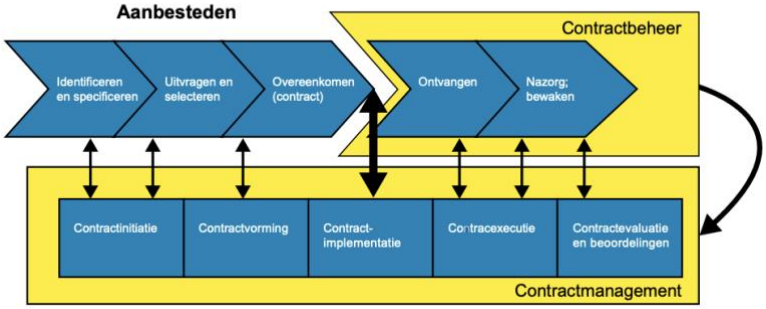

Figure 3 Integration of Tendering, Contract Management and Contract Management in the Procurement Process according to: Handreiking contract management and contract management (VNG, 2014).

A key executive component of the procurement process is the P2P process, which forms the operational core. The P2P process includes activities such as purchase order creation, order processing, invoice processing, and payment (Schiele, 2019; Van Raaij, 2016). According to Dachyar and Praharani (2016), the P2P process consists of a set of activities specifically designed to support an organization's operational procurement processes. A P2P process begins with creating a purchase order and ends with the completion of the payment process (Schulze et al., 2021). The P2P process thus support contract execution and is closely aligned with operational contract management. An effective P2P process

ensures that the right products of the right quality are ordered at the right cost. To paint a complete picture of the procurement process of Dutch municipalities, key elements from Van Weele's linear model and VNG's insights were combined. This combined model integrates the tactical and operational phases with contract management and P2P processes, providing a basis for assessing purchasing maturity at municipalities (Figure 4).

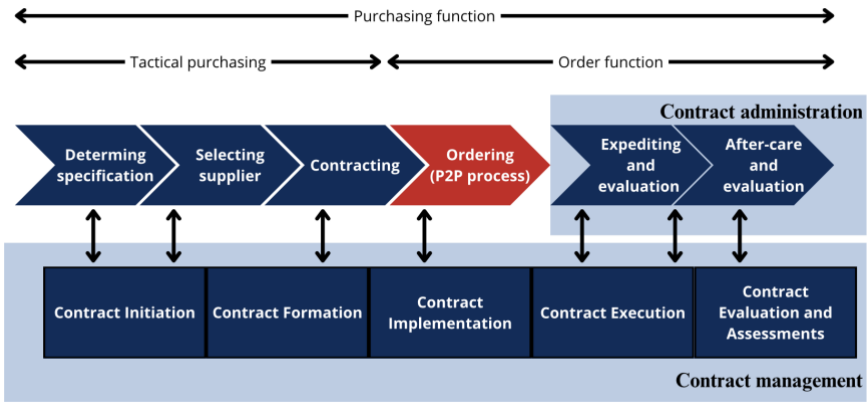

Figure 4 Combined model of van Weele and VNG

2.3 Trends in Public Procurement with a focus on P2P and Contract Management

The public procurement sector is evolving rapidly, driven by technological innovations, sustainability requirements, and the need for more efficient processes. Within this playing field, P2P and Contract Management are areas that deserve strategic attention. This section discusses trends and developments within the purchasing process. By identifying recent trends, it can be assessed whether these should be integrated into the maturity model.

The first trend is sustainable and socially responsible procurement. Sustainable and socially responsible procurement is high on the agenda of public organizations. As noted by Schotanus et al. (2024), sustainability is increasingly seen as a strategic priority within public procurement, especially for achieving environmental and social objectives. Yet circular and innovative procurement strategies remain underused, mainly due to a lack of expertise and the complexity of implementation. By explicitly including sustainability requirements in contracts, public organizations contribute to broader Environmental, Social and Governance (ESG) goals (Aavenir, 2024). Moreover, public procurement has a significant impact on the adoption of circular economy practices. Sun et al. (2024) highlight that through strategic procurement policies and circular criteria, public organizations can play a catalytic role in transitioning to a more sustainable economic model.

The second trend is digitization and automation of the P2P process. Digitization has fundamentally changed the P2P cycle. Innovations such as Robotic Process Automation (RPA) and process mining optimize procurement processes. RPA automates repetitive tasks, such as invoice processing, while process mining identifies bottlenecks and reveals areas for improvement. Emphasizing that these technologies not only increase efficiency but also improve compliance and flexibility (Flechsig et al., 2022). Technologies such as blockchain and artificial intelligence (AI) promise to further transform public procurement. Blockchain increases transparency and traceability in supply chains. AI and machine learning are increasingly being used to automate routine tasks in contract management and proactively manage contractual obligations. AI-driven systems enhance compliance by automatically identifying abnormalities and providing proactive insights into supplier performance (Aavenir, 2024). In addition, AI can provide predictive analytics and optimize procurement strategies (Bahaweres et al., 2022). This enables public organizations to proactively make improvements and better align strategic choices with their goals. While technologies hold great promise, internal barriers such as poor departmental integration and a lack of digital skills continue to pose challenges. Investment in training and technology is crucial to overcome these barriers. “Massive upskilling is needed,” experts argue, recommending training at all levels (Di Mauro et al., 2024, p. 3).

2.4 The Role and Limitations of Maturity Models

Maturity models have become important tools for organizations looking to evaluate, improve, and professionalize their processes. These models describe the stages of development that an organization or process goes through, from unstructured basic levels to high levels of optimization and maturity. Pöppelbuß and Röglinger (2011) describe that "Maturity models usually include a sequence of levels (or stages) that together form an anticipated, desired, or logical path from an initial state to maturity" (p. 3). The concept of maturity models originated in information systems, as seen in the Software Engineering Institute's Capability Maturity Model (CMM) (Paulk et al., 1993). Since then, it has been applied in many other domains, such as performance management, supply chain management, and procurement processes (Andreasen & Gammelgaard, 2018; Bititci et al., 2015; Schiele, 2007). The models are valuable for evaluating the current situation and providing a roadmap for future improvement (Bititci et al., 2015). According to Bititci et al. (2015), "maturity models promote organizational learning". Lasrado et al. (2015) hereby emphasize the promotion of a culture of continuous learning by evaluating processes. Another advantage is that these models allow organizations to benchmark (Jugdev et al., 2002). This ability to compare is crucial in competitive markets, where performance must be continuously monitored and improved (Khoshgoftar & Osman, 2009; Lasrado et al., 2015).

While maturity models can help guide improvement efforts, they also have limitations. Søgaard et al. (2019) argue that traditional maturity models may not be suitable for responding to disruptive technologies, as they often do not sufficiently consider contextual dependencies. Researchers suggest integrating maturity models with strategic alignment and contextual factors to address this issue (Potage, 2017; Søgaard et al., 2019). In addition, maturity models are often criticized for their rigidity. Andreasen and Gammelgaard (2018) argue that the linear approach of many models inadequately recognizes the complexity of organizational change: "PSM maturity models are too rigid for PSM managers to apply, and although maturity models are commonly accepted in PSM literature, in practice, they may produce the opposite effect of what is promised" (p. 1). Schiele (2007) also argues that some models take an overly simplistic, linear approach. In addition, Lasrado et al. (2015) and Lahrmann et al. (2011) point out that many models are developed without sufficient empirical validation, which limits their applicability.

2.5 Procurement Maturity as Governance Instrument and Policy Capacity

Maturity models are more than just technical tools for evaluating or improving processes. They can also be understood as instruments of governance that influence how organizations behave and how policies are implemented. As Triantafillou (2007) argues, instruments like benchmarking do not neutrally reflect performance. Rather, they construct what is seen as legitimate progress, thereby reinforcing norms and accountability structures in the public sector. Similarly, Andersen et al. (2020) state that maturity models are not merely descriptive. They carry embedded assumptions and values that steer organizations along a specific developmental path, often prioritizing control and standardization over flexibility and innovation.

This governance function becomes especially clear when examining how such models are used in public sector settings. Romolini et al. (2015), for instance, demonstrate that performance frameworks in local utilities can influence both internal processes and external relationships, depending on whether managers or politicians utilize them. In this way, maturity models do not just measure organizational development. They also define what counts as improvement, shape learning trajectories, and influence how public organizations, such as municipalities, perceive "good" procurement. By doing so, they act as tools of indirect governance, guiding behaviour, resource allocation, and even organizational identity.

This normative and steering function of maturity models also has direct implications for policy implementation itself. By shaping how organizations define problems, set priorities, and structure learning, they can enhance or constrain the underlying capacities needed for effective policy execution. In this sense, procurement maturity can also be interpreted as a form of policy capacity: the ability of an organization to design and implement policies effectively. This approach moves beyond procedures and routines to emphasize the capabilities needed to achieve strategic policy goals. In the public

administration literature, policy capacity is often described as a multidimensional concept, involving strategic, analytical, and operational components (Painter & Pierre, 2005; Wu et al., 2015). From this viewpoint, a mature procurement function is not only more efficient, but also more capable of managing complex policy objectives, such as sustainability, innovation, or social impact by embedding them into procurement procedures, supplier relationships, and performance metrics (Peters, 2015). This repositions procurement as a strategic policy instrument. Wu et al. (2015) identify three key types of policy capacity:

- Analytical capacity: the ability to assess policy problems and develop solutions.
- Operational capacity: the ability to implement policies through systems, coordination, and processes.
- Political capacity: the ability to build legitimacy and support among stakeholders.

Procurement maturity models, such as CEP, can strengthen especially the analytical and operational dimensions by promoting standardization, performance measurement, and cross-organizational learning. In this way, they not only map current practice, but also build institutional capacity for effective policy implementation at the local level (Howlett & Ramesh, 2016).

2.6 The Coppa efficient purchasing model (CEP)

Many different procurement maturity models (PMMs) can be found in the literature. However, traditional PMMs do not specifically focus on P2P and contract management. Therefore, the CEP maturity model was developed by Snijders (2020) to assess the purchasing maturity of municipalities (Figure 5). The model was based on existing PMMs, P2P maturity models, and contract management maturity models developed by various researchers and consultancies. This gives the CEP model a solid theoretical foundation. Compared to traditional PMMs, the CEP model focuses on P2P and contract management. At the same time, the model covers dimensions such as policy, organizational structure, etc. Elements such as HR and leadership are excluded to maintain the study's focus (Snijders, 2020).

The CEP model contains three main subjects, namely general, orders, and contracts, which are shown on the Y-axis. The four different stages, namely Ad hoc, Basic, Standard, and Integration, are shown on the X-axis. The CEP model enables the assessment of an organization’s maturity in specific areas (e.g., P2P processes or contract management) rather than the whole organization. This gives a more detailed and nuanced picture, recognizing that some parts of an organization may be more advanced than others. In contrast, a “composite measure” would only examine the average score for the procurement function, assuming the procurement function can only develop as a whole (Søgaard et al., 2019, p. 160).

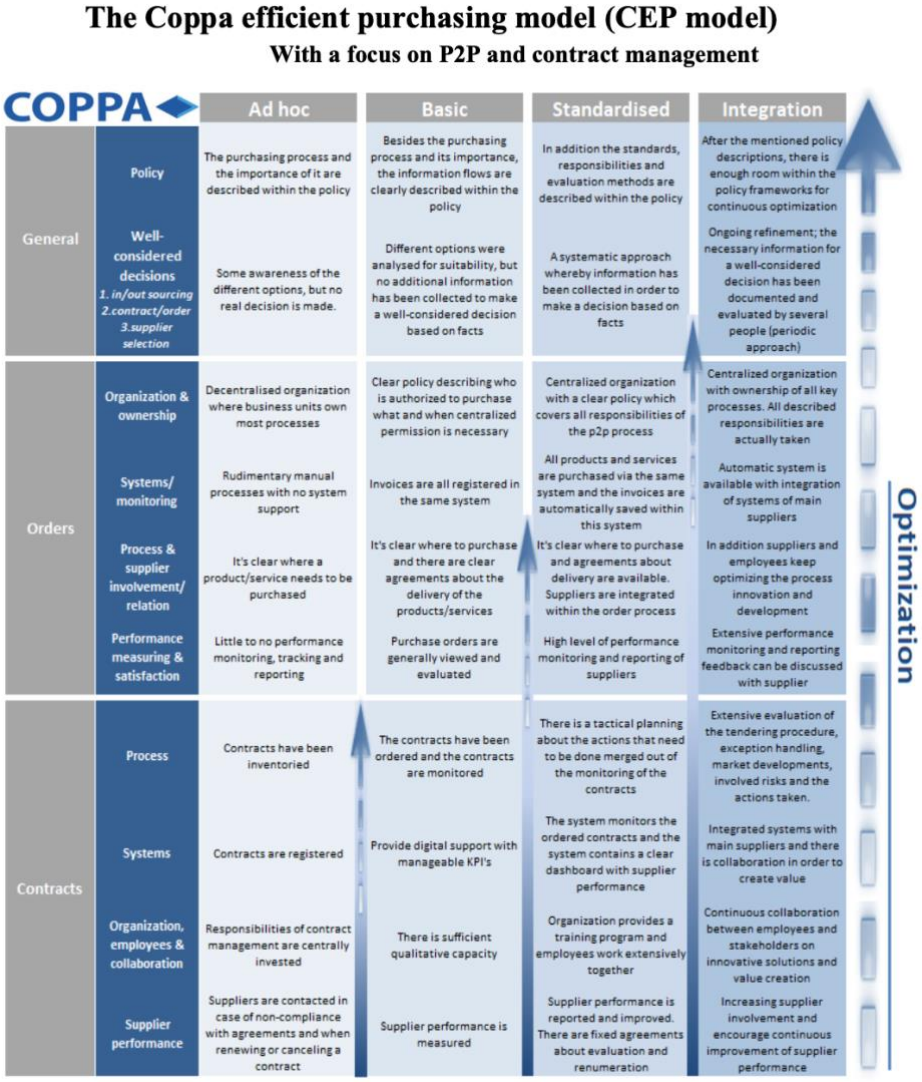

Figure 5 The Coppa efficient purchasing model

2.7 Evaluation of Maturity Models

To measure the current maturity level within Dutch municipalities, it is important to first evaluate the current CEP model. To answer question 1: How can the model be evaluated? relevant literature has been identified to evaluate the model. According to Patton (2008) "evaluation begins with the premise that evaluations should be judged by their utility and actual use; therefore, evaluators should facilitate the evaluation process and design any evaluation with careful consideration for how everything that is done, from beginning to end, will affect use" (p. 37). Assessment of a maturity model focuses on understanding and improving the process being evaluated, while evaluation focuses on analysing and improving the maturity model itself (Salah et al., 2022). In the literature, apart from the article by Salah et al. (2022), there is a lack of research providing concrete guidance on how expert evaluators should conduct evaluations of maturity models and what aspects of the constructs and tools should be examined during such evaluations. Salah et al. (2022) describe three types of maturity model evaluation. First, Author evaluation: This is carried out by the authors of the maturity model themselves, who evaluate the processes of the maturity model for their intended use or compare the model with other similar maturity models. Second, Domain expert evaluation: This evaluation is conducted by experts in the process that the maturity model aims to improve, but who were not involved in developing the model. Third, Evaluation in a practical setting involves using the maturity model in practical situations.

The second evaluation method, domain expert evaluation, is often the most feasible and effective approach in situations where cost and practicality play an important role. This method uses the expertise of professionals who are well acquainted with the process that the maturity model seeks to improve without being involved in its development. This allows for an objective evaluation, free from possible developer bias (Søgaard et al., 2019). In addition, this method offers flexibility as evaluations can be conducted through surveys, interviews, or simulated assignments. This enables the evaluation to adapt to the specific needs of the organization or research project while still yielding valuable insights (De Bruin et al., 2005; Lasrado et al., 2015). The second method thus strikes a balance between cost, feasibility, and obtaining relevant, objective feedback for improving the maturity model. The study created a Maturity Model Domain Expert Evaluation Tool to evaluate maturity models. The criteria selected for the evaluation reflect essential characteristics of a well-designed maturity model, such as clarity, relevance, comprehensiveness, and usability. These criteria were derived from both the Maturity Model Domain Expert Evaluation Form and established academic literature on maturity model design and assessment. **Error! Reference source not found. Error! Reference source not found.**presents the key evaluation criteria, their definitions, and supporting sources:

Table 1 Evaluation Criteria for Maturity Models based on Salah et al. (2022)

Evaluation Criteria	Explanation	Sources
	Maturity Levels	
Sufficient representation (Sufficiency)	The maturity levels must adequately represent all stages of maturity within the domain.	Søgaard et al. (2019); Schiele (2007)
No overlap (Accuracy)	There should be no overlap between the descriptions of the different maturity levels.	Søgaard et al. (2019); Pöppelbuß (2011)
	Processes and Practices	
Relevance	The processes and practices must be relevant to the domain.	Schiele (2007); Koivisto (2013)
Comprehensiveness	The processes and practices must cover all key aspects within the domain.	Koivisto (2013); Lahrmann et al. (2011)
Distinctiveness (Mutual Exclusion)	Processes and practices must be clearly distinguishable.	Bititci et al. (2015); Pöppelbuß (2011)
Accuracy	The processes and practices must be correctly assigned to their respective maturity levels.	Søgaard et al. (2019); Lahrmann et al. (2011)
	Maturity Model	
Understandability	The maturity levels, guidelines, and documentation must be understandable for the target audience.	Koivisto (2013); Bititci et al. (2015)
Ease of Use	The model must be easy to use, including the scoring scheme and guidelines.	Schiele (2007); Bititci et al. (2015)
Usefulness and Practicality	The model must be practically applicable and useful for conducting assessments.	Andreasen & Gammelgaard (2018) Koivisto (2013)

To effectively guide organizations, maturity levels must sufficiently represent all stages of development within the domain. This ensures that each step in the maturity pathway is clear, actionable, and relevant to the organization (Schiele, 2007). Moreover, descriptions of maturity levels must avoid overlap to maintain clarity and prevent confusion during assessments (Søgaard et al., 2019). A strong theoretical foundation is also important, as models without a scientific basis often fail to align well with the complex realities of organizations (Pöppelbuß & Röglinger, 2011; Søgaard et al., 2019). Some models base their structure on previous models, such as the Capability Maturity Model (CMM), without providing a theoretical underpinning, which undermines their credibility (Lattfaut et al., 2011).

Processes and practices form the foundation of any maturity model and must accurately reflect the domain's relevance and comprehensiveness to ensure meaningful assessments. A maturity model must encompass all key dimensions, including technology, human capital, strategy, and operations, to provide a holistic view of organizational maturity (Koivisto, 2013; Schiele, 2007). In addition to covering all critical aspects within the domain, processes and practices must be distinct and clearly defined (mutual exclusivity) to prevent redundancy and ambiguity in evaluation (Bititci et al., 2015; Pöppelbuß & Röglinger, 2011). Furthermore, their accuracy is essential, meaning they should be correctly assigned

to their respective maturity levels to maintain the integrity of the model's assessment framework (Lahrmann et al., 2011; Søgaard et al., 2019).

A critical feature of an effective maturity model is the understandability for its target audience. The maturity levels, assessment guidelines, and documentation must be presented in a clear and accessible manner (Koivisto, 2013). Detailed level descriptions and predefined scenarios provide valuable guidance, allowing organizations to identify areas for improvement, prioritize them, and understand what is needed for progress (Bititci et al., 2015; Schiele, 2007). The usability of a maturity model is vital for its acceptance and application. Models must include intuitive scoring schemes and straightforward assessment guidelines to ensure that users can easily evaluate and benchmark their progress (Potage, 2017; Søgaard et al., 2019). An easy-to-use model minimizes resistance to adoption and promotes consistent use in organizational contexts. Furthermore, a maturity model must demonstrate its practical value by being useful in conducting assessments and applicable to real-world scenarios. Clear improvement measures aligned with maturity levels are essential for guiding organizations in achieving specific goals (Koivisto, 2013).

In addition to the evaluation framework that serves as the foundation for assessing maturity models, the literature identifies other key aspects that contribute to a model's effectiveness. A maturity model must not only support operational improvements but also align with the broader strategic objectives of an organization, ensuring its relevance at both operational and leadership levels (Koivisto, 2013; Schiele, 2007). Without this alignment, the model risks being viewed as a purely administrative tool rather than an asset for organizational decision-making and long-term planning. Flexibility is another critical component, as models should be adaptable to various organizational contexts, including differences in size, sector, and strategic priorities (Andreasen & Gammelgaard, 2018; Potage, 2017). This adaptability ensures that the model remains applicable across different industries and evolving business environments. Beyond flexibility, maturity models should integrate seamlessly with existing organizational structures and processes. Søgaard et al. (2019) highlight that a model is more effective when it builds on previous implementations and best practices, rather than forcing organizations to completely change their existing workflows. Another key factor is the model's ability to scale with an organization's growth and evolve over time. Potage (2017) highlights the importance of designing maturity models that can incorporate new technological advancements and regulatory requirements, ensuring their long-term sustainability.

2.8 Internal factors influencing progression along the maturity scale

To answer the question, "Which factors influence an organization's progression along the maturity scale?" it is important to identify relevant variables that can influence this progression. Hayes (2022) argues that factors such as budget, time, knowledge (under the heading of "available resources"), and organizational culture play a significant role in process optimization and innovation. Snijders (2020) confirms these insights and additionally highlights the influence of organization size. These factors can be summarized as organizational characteristics, including organizational size (Borgman et al., 2013), available resources (Baker, 2012), and culture (Awa et al., 2016).

2.8.1 Influence of Organization Size

The size of an organization can influence progression along the maturity scale. Akingbola et al. (2019) indicate that the size of a non-profit organization impacts its ability to achieve change. According to Amah et al. (2013), there is a division among researchers on the influence of organizational size on effectiveness and efficiency. As they write, "Some researchers claim size influences organisational effectiveness and efficiency, and some claim it does not" (p. 116). Despite this division, they acknowledge that size does play a role. Smaller organizations, such as smaller municipalities, tend to be more flexible, have shorter lines of communication, and make decisions faster. Large organizations, such as large municipalities, typically have access to more resources, including financial reserves and knowledge (Cavusgil et al., 2003). At the same time, smaller organizations often struggle with limited resources (Lin et al., 2019) while larger organizations experience internal inertia, which slows down the implementation of change (Livermore, 2008). For municipalities, this poses unique challenges. Large municipalities must combine their resources with the agility of smaller municipalities, while smaller

municipalities “offset some of their scale disadvantages through R&D cooperation and the development of network” (Laforet, 2013, p. 491). However, medium-sized municipalities seem to be in an intermediate position: they lack both the agility of small municipalities and the resources of large municipalities. Therefore, the following hypothesis is expected: *Hypothesis 1: There is a U-shaped relationship between organization size and maturity level: both small and large municipalities have a higher maturity level than medium-sized municipalities.*
Hypothesis 1a: A small organization’s size has a positive influence on *the progression along the maturity scale.*
Hypothesis 1b: A medium organization size has a negative influence on *the progression along the maturity scale.*
Hypothesis 1c: A large organization size has a positive influence on *the progression along the maturity scale.*

2.8.2 Available resources

Resource availability is an important factor for progression along the maturity scale within municipalities. Resources such as time, budget, and knowledge are essential to effectively improve processes and contribute to a higher maturity level. Implementing processes related to higher maturity levels can be an expensive process, which may not be financially feasible for smaller companies (Tontini et al., 2016). Financial resources are necessary to pay for technology, training, and other necessary tools that contribute to process maturity. Davenport (1993) argues that innovation depends on an organization's capacity and resources. Organizations that do not have sufficient staff, time, or budget may face difficulties in improving processes. Knowledge is often seen as “a resource that is valuable to an organisation's ability to innovate and compete” (Bollinger & Smith, 2001, p. 8). Without sufficient knowledge, employees cannot implement change effectively. According to Hayes (2022), process optimization is likely to fail if an organization lacks the necessary knowledge. Expanding knowledge within an organization, for instance, through training, is therefore essential to make changes successful. Lack of time, budget, and knowledge are major obstacles to process optimization. This leads to the following hypothesis: *Hypothesis 2: The availability of sufficient resources (time, budget, and knowledge) increases the progression along the maturity scale.*

2.8.3 Influence of Organizational Culture

Finally, organizational culture plays a crucial role in progression along the maturity scale. Yazici (2009) defines organizational culture as “the set of values, beliefs and behavioural norms that determine how members of the organisation perform their work” (p. 16). As Naranjo-Valencia et al. (2016) state, “Organisational culture is a key determinant for firm innovation and that it can actually foster it but that it can also act as a barrier against innovation” (p. 38). Cameron and Quinn's Organizational Culture Assessment Instrument (OCAI) is a widely used method to measure dominant organizational cultures (Cameron et al., 1999). Figure 6 shows the four dominant organizational cultures distinguished by the OCAI.

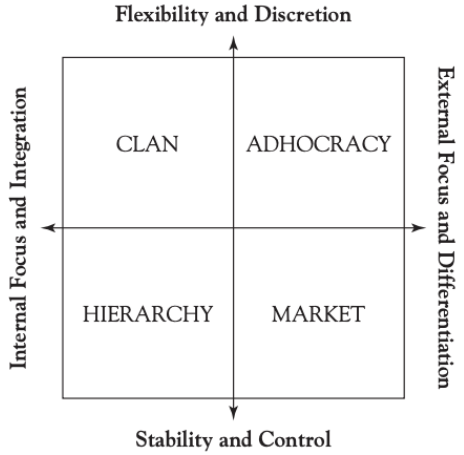

Figure 6 Organizational Culture Types (Cameron et al., 1999)

The four types can have different influences on progression along the maturity scale:

1. Hierarchical culture: A hierarchical culture, based on Max Weber's (1947) classic bureaucratic principles, is characterized by formality, structure, rules, and procedures that ensure stability, efficiency, and predictability. Organizations with a hierarchical culture emphasize clear decision lines, specialized tasks, and strict adherence to standards and rules.
2. Clan culture: A clan culture is characterized by a family-like atmosphere focusing on loyalty, shared values, and teamwork. Leaders act as mentors, while the organization focuses on creating a humane working environment with participation, commitment, and personal development as core values. Cameron et al. (1999) emphasize that clan cultures offer flexibility and a strong internal focus.
3. Adhocracy culture: An adhocracy culture is characterized by dynamism, creativity, and flexibility, focusing on innovation and adaptation to rapidly changing circumstances. Power and responsibilities constantly shift between individuals and teams, depending on specific challenges, and the organization often operates on a temporary, project-based basis. O'Reilly et al. (1991) argue that adhocracy cultures strongly drive technological and process innovations.
4. Market culture: A market culture focuses on the external environment and operates through economic mechanisms such as transactions, profitability, and competitive advantage. This culture values results, productivity, and market leadership. Process optimizations are often driven by cost reduction and performance improvement. Kotter and Heskett (1992) link market cultures to strategic focus and measurable results.

According to Naranjo-Valencia et al. (2016) cultures focused on external goals and differentiation tend to be effective in promoting efficiency and achieving results. This implies that both adhocracy and market cultures can be beneficial for the progression of maturity. These cultures are oriented toward innovation, competitiveness, and adaptability elements that can be beneficial for progressing along the maturity scale. In contrast, hierarchy and clan cultures are characterized by an internal focus, prioritizing stability, control, and internal cohesion. Hierarchical cultures often struggle to respond flexibly to environmental change. The influence of a clan culture is more ambiguous: while collaboration and motivation may support development, a lack of external orientation may limit its effectiveness. Rather than evaluating each cultural type separately, this study combines them based on their underlying focus orientation. This dichotomy between internal and external orientation is supported by Hartnell et al. (2011), who found that Clan and Hierarchy cultures tend to emphasize internal integration and coordination, while Adhocracy and Market cultures are more externally oriented, emphasizing innovation, competition, and differentiation. This classification strengthens the theoretical foundation for grouping these culture types in the present study. Based on this distinction, the following hypothesis

is proposed: *Hypothesis 3: Organizations with an external culture orientation demonstrate a higher progression along the maturity scale than organizations with an internal orientation.*

A conceptual model was developed to visualize potential internal factors and their associated hypotheses. Figure 7 illustrates how these factors influence progression along the maturity scale.

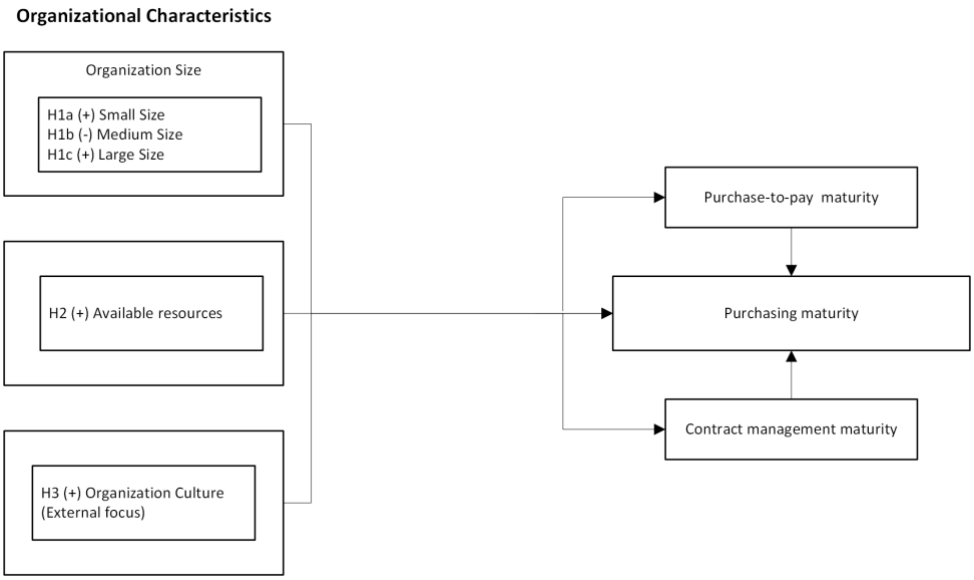

Figure 7 Conceptual model influencing factors purchasing maturity

3 Methodology Stage 1: Evaluation and Improvement of the Model

This chapter outlines the methodology used in Stage 1, which focused on improving the CEP maturity model. A two-step mixed-methods approach was applied, consisting of a structured expert survey followed by in-depth focus group sessions. The subsequent sections describe the design, implementation, and analysis of both research phases.

3.1 Research Design

To evaluate and improve the CEP maturity model prior to conducting the maturity assessment among Dutch municipalities in Stage 2 of the study, a mixed-methods research design was applied. This design consisted of two sequential phases: an expert survey and follow-up focus group sessions. Both phases served to assess and refine the model's clarity, applicability, and structure.

The research approach followed the principles of Domain Expert Evaluation (Salah et al., 2022), which involves gathering feedback from experts with direct experience in applying the model to assess municipal purchasing maturity. However, they were not involved in its initial development. This ensured an independent and practice-based evaluation. While the survey allowed for individual evaluation and identification of key improvement areas, it also revealed differences in interpretation and opinion, particularly regarding terminology, logical progression, and practical implementation. Therefore, follow-up focus group sessions were organised to collectively discuss the diverging perspectives, verify proposed adjustments, and work towards a shared understanding of the model structure and definitions. This two-step design ensured both individual critical assessment and group validation, strengthening the reliability of the revised model.

3.2 Domain Expert Survey

The survey was completed by ten domain experts, affiliated with Coppa, a Dutch consultancy firm supporting organizations in optimizing their procurement and contract management processes. Participants were selected based on their experience with the model as an assessment tool and their specializations in contract management, P2P, or both. Data from the expert survey was collected through an online survey distributed via Qualtrics. The questionnaire was structured in three main parts. First, participants answered two general questions about their name and function within the organization. Second, they were asked to evaluate the overall structure and clarity of the maturity model using Likert-scale items and to reflect whether four levels were sufficient. These Likert-scale items assessed key characteristics of the model and its maturity levels, such as completeness, logical progression, and accuracy (Salah et al., 2022). Finally, the third and most extensive part consisted of open-ended questions aimed at gathering qualitative feedback per model dimension. Experts reflected on whether maturity levels were missing, where an additional level might be appropriate, and what processes or practices should be added. They were also asked to consider current trends and technologies that are important to integrate into the model.

The survey method was preferred over individual interviews for two reasons. First, it allowed experts to reflect on specific improvements at their own pace, which often leads to more thoughtful and comprehensive responses. Second, because the answers were directly recorded in the system, the data were immediately available for analysis, eliminating the need for transcription and saving time (Healey et al., 2002). The Likert-scale responses were analysed descriptively, providing insight into the experts' perception of the model's structure and characteristics. In parallel, the open-ended questions were analysed through thematic analysis, following the six stages of (Verhoeven, 2020): exploring, coding, thematizing, revising and refining, identifying and structuring, and presenting. An inductive approach was employed to identify recurring themes across the model, utilizing a flexible method for recognizing and analyzing patterns within qualitative data (Saunders et al., 2016). These findings formed the basis for the first revised version of the CEP model. The full questionnaire is provided in Appendix A.

3.3 Focus Group Sessions

The same ten experts who had participated in the survey were also involved in two follow-up focus group sessions, ensuring continuity in feedback and enabling in-depth discussions that built upon their earlier reflections. Their dual participation allowed for critical discussion on proposed model revisions. Two focus group sessions were conducted on 26 March and 18 April 2025. Each session focused on the evaluation of individual dimensions of the revised model. The sessions were moderated, audio-recorded, and transcribed. For each dimension, a set of three slides was presented using PowerPoint:

1. A slide with a summary of expert suggestions from the survey for adding a new maturity level within that dimension, including proposed processes and practices.
2. A second with other relevant comments or concerns raised by experts during the survey, such as clarity issues or critique of existing levels.
3. A third slide with the revised version of the dimension, incorporating the feedback received.

For the analysis, an inductive thematic analysis was employed. This method is particularly suitable for exploring qualitative data without imposing predefined categories, allowing themes to emerge directly from the data (Braun & Clarke, 2006; Castleberry & Nolen, 2018). This aligns well with the purpose of the focus groups: to identify and validate improvements to the CEP model based on the practical experiences of domain experts. Thematic analysis contributed to content validity, as emerging themes from practitioner input ensured that the model revisions were grounded in real-world practice. This enhanced the model's relevance and applicability. At the same time, the inductive approach enabled the identification of recurring issues, such as "unclear terminology" or "illogical progression between levels", which provided insight into whether the model's constructs were perceived as coherent and meaningful by its intended users (Braun & Clarke, 2006). This approach is consistent with the principles of utilization-focused evaluation, which emphasizes the practical use of evaluation findings to improve the object being evaluated (Patton, 2008). By combining individual survey feedback with group-based thematic validation, the study strengthened the reliability and practical relevance of the revised maturity model. Each model dimension was then refined individually based on the identified themes and dialogue.

4 Findings Stage 1: Evaluation and Improvement of the Model

This chapter presents the results of the domain expert survey and the follow-up focus group sessions aimed at evaluating and improving the CEP maturity model. Based on the methods described in Chapter 3, the findings are presented in two parts.

4.1 Domain Expert Survey Findings

The expert survey was designed to evaluate the CEP maturity model based on the practical experience of ten domain experts. The survey consisted of two main components: a general assessment of the model and a detailed reflection of its dimensions.

4.1.1 General Assessment of the Model

The first part of the survey asked experts to rate the model on several evaluation characteristics, such as clarity, logical progression, and completeness, which were derived from the evaluation framework introduced in section 2.7. The results, displayed in Figure 8 and Figure 9, were based on Likert-scale items ranging from 1 ("Strongly Disagree") to 5 ("Strongly Agree"), indicating potential areas for improvement.

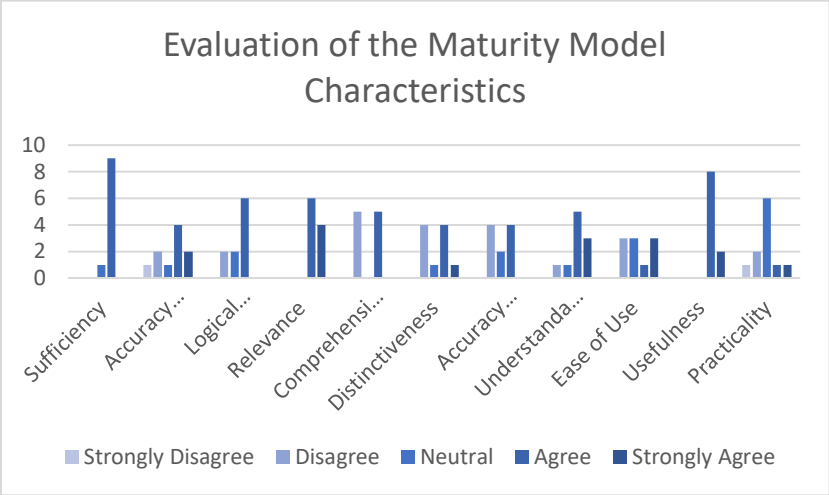

Figure 8 Expert Ratings on the Maturity Model Characteristics (n = 10) Distribution of responses across evaluation criteria

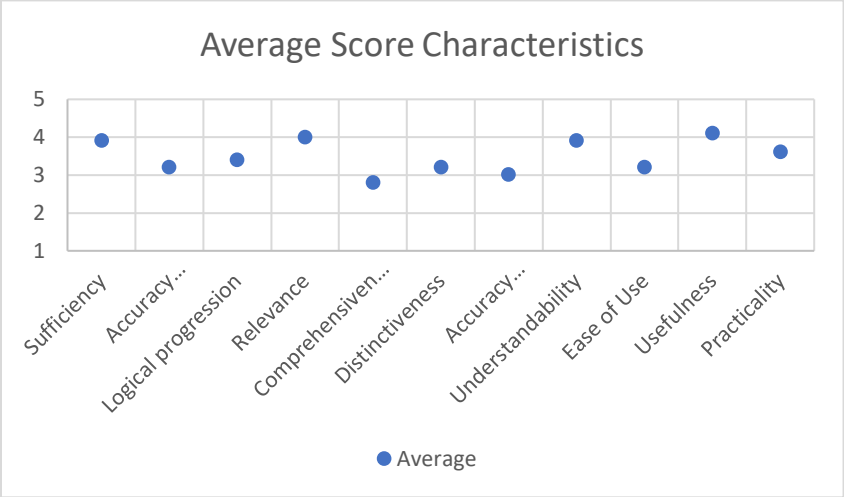

Figure 9 Average Scores on Maturity Model Evaluation Characteristics. Each dot represents the average score per characteristic.

The model scored well on sufficiency, relevance, understandability, and usefulness. Practicality received a moderate score (M = 3.6), indicating that the model is applicable but could benefit from further refinement. One respondent noted: “Yes, the model is applicable, but it is not very practical. We often lose clients when we present this.” The lowest scoring characteristic was comprehensiveness (M = 2.8), suggesting that several elements may still be missing across certain dimensions. These results suggest that, although the model is well-structured and generally usable, further enhancements in areas such as comprehensiveness, practicality, and accuracy could improve its clarity and applicability.

Additionally, when asked whether the model’s four maturity levels were sufficient, 70% of experts indicated a preference for adding a fifth level. A follow-up question invited respondents to explain this preference for five levels. Based on their answers, two key reasons were identified: (1) providing more nuance in early stages and (2) reducing large gaps between maturity levels.

4.1.2 Evaluation of Individual Dimensions

In the second part of the survey, respondents provided open-ended feedback on each model dimension, including suggestions where an additional level might be appropriate and what improvements were preferred. These responses were thematically analysed using the software, Atlas.ti, and grouped into six themes that recurred across multiple dimensions. The full codebook containing all codes, themes, and example fragments is provided in Appendix B.

Theme 1. Need for an Entry-level stage
Experts frequently noted that the existing level (‘Ad Hoc’) assumes a minimum degree of structure or awareness, which does not reflect the reality in many municipalities. Respondents advocated for the addition of a level even before Ad hoc to capture situations where no policies, systems, or responsibilities are in place. Quotes included “There is no awareness of available options” and “Contracts are not registered. That comes before Ad Hoc”.

Theme 2. Illogical Progression Between Levels
Several respondents observed that the transitions between levels were unclear or inconsistent. For example, the difference between ‘Standardized’ and ‘Basic’ was not always clear, and some practices were placed in higher levels despite being relevant for earlier stages. This signals a need for restructuring the descriptions and logic of the maturity levels.

Theme 3. Overemphasis on Structure over Implementation
A recurring theme was that the model focuses too heavily on the presence of policies or systems, and not enough on how these are used in practice. As one respondent explained, “The existence of a system does not mean it is used correctly or optimally.” This theme highlights the need to incorporate not only the presence of structures but also their practical application, monitoring, and evaluation, particularly at higher maturity levels.

Theme 4. Problems with Language and Formulation
Respondents criticized the use of subjective or vague terms such as “intuitive” or “intensive collaboration”. One expert stated, “I find the term ‘sufficient qualitative capacity’ rather vague.’ These expressions were seen as ambiguous and prone to misinterpretation. Experts recommended clearer and more neutral formulations to prevent such misinterpretations.

Theme 5. Lack of Functional Differentiation or Scale Sensitivity
Respondents pointed out that the model assumes uniform application of practices to all contracts or suppliers, while in practice, differentiation is essential. One noted, “You don’t need a dashboard for every contract. It depends on classification.” This highlights the need to incorporate functional differentiation and scalability into the model to better reflect real-world variation in contract types and supplier relationships.

Theme 6. Missing Content Elements
In various dimensions, essential elements such as strategic objectives, policy content, evaluation mechanisms, or links to broader goals were absent. One respondent noted, “I miss elements like objectives and vision.” Another added: “Evaluation of decisions is missing entirely.

These themes provided a coherent overview of recurring concerns across multiple dimensions and formed the foundation for the first revision of the CEP maturity model, see Appendix C. Based on Theme 1 (the need for an entry-level stage) and in line with earlier reasoning about improving nuance in the early stages, a new maturity level called ‘Fundamental’ was introduced. This newly added level roughly corresponds to what was previously covered by ‘Ad Hoc’, describing situations where basic functionalities are present, but not yet organised or embedded in a structured way. As a result, the ‘Ad Hoc’ level was redefined and now reflects a complete lack of structure, policy, or awareness. In addition to this structural addition, each model dimension was revised individually in response to expert feedback. This first revised version of the model served as the foundation for the subsequent focus group sessions, where proposed adjustments were further discussed and validated.

4.2 Focus Group Validation and Refinement
To validate and further improve the revised model, two focus group sessions were held with the same ten experts who completed the survey. The discussions were transcribed and analysed thematically. The full codebook containing all codes, themes, and example fragments is provided in Appendix D. The resulting codes were grouped into four overarching themes.

Theme A. Problems with Language and Formulation
Some terms had already changed or been removed based on the survey feedback. However, during the focus group sessions, several terms were still experienced as subjective or vague. Respondents agreed on eliminating unclear and redundant terms. For example, one participant noted, “You can remove ‘structured’ in ‘structured categorisation’.” This indicated the continued need for linguistic clarity and neutral phrasing to avoid misinterpretation.

Theme B. Illogical Progression Between Levels
A second key theme was the observation that the transition between maturity levels was too abrupt in some dimensions. This hinders the ability of organisations to accurately position themselves. In particular, the lack of a logical intermediate phase was repeatedly mentioned. For example: “For ‘Fundamental’, you really need to come up with something. There should be an intermediate step.” Or: “There’s clearly something missing between registration and management. You may have registered something, but that doesn’t mean it’s being managed.” Respondents emphasised the importance of a gradual scale in which intermediate steps are also clearly described.

Theme C. Shift from Structure to Application
A third central point concerned the finding that the model often focuses on the existence of policies, systems, or agreements, but makes insufficient distinction between their presence and actual use. Although the first revised version already attempted to address this, certain issues remained. As one expert stated: “It’s really about whether it’s being applied.” Or: “How do you actually use your system? That’s what it’s really about.” Respondents indicated that the model should more strongly differentiate between ‘having something’ and ‘applying it’ in practice.

Theme D. Need for Clear Conceptual Definitions
Lastly, the terminology used in the model, such as P2P, contract management, or purchasing orders, was not always applied consistently and caused confusion. Participants indicated that it is essential to maintain consistency in the use of key concepts so that users can interpret the model in a uniform way. This increases the reliability of maturity assessments.

At the end of the session, participants concluded that the addition of ‘Fundamental’ as a level was appropriate. They further suggested that the level previously called ‘Basic’ could more accurately be

renamed as ‘Organised’, as it reflects a state in which purchasing processes are formally structured and assigned, but not yet consistently applied, as is expected in the next level.

While the thematic analysis again led to overarching themes, these did not always provide direct input for revisions to individual dimensions. Nevertheless, the themes offered valuable direction for interpreting the underlying assumptions in the model, such as the emphasis on structure over application, and helped sharpen recurring points of friction in the formulation and positioning of maturity level descriptions. Based on these sessions, the final improved version of the CEP maturity model was developed (**Error! Reference source not found.**). The practical implications of these changes are further discussed in Section 4.3, supported by examples from specific dimensions.

4.3 Resulting Model Improvements

The integration of insights from the survey and focus group resulted in an improved version of the CEP maturity model. Key improvements include:

1. The addition of a new level at the early stages of the model, ‘Fundamental’. This allowed ‘Ad Hoc’ to serve as a true starting point, representing a situation in which no structure is in place.
2. Refinement of maturity level descriptions to ensure logical progression
3. Revision of vague or subjective wording
4. Greater emphasis on actual implementation and monitoring
5. Clarified definitions of core concepts
6. Integration of new trends such as CSR guidelines and automation

These six improvements are grounded in the recurring themes identified in both the survey (Section 4.1) and the focus group (Section 4.2). For example, the addition of the new ‘Foundational’ level (improvement 1) directly addresses the observed need for a true starting point in the model, as highlighted by participants who noted that many municipalities still operate without any structured approach. The emphasis on application and monitoring (improvement 4) reflects the recurring tension between formal structure and real-world implementation, a theme that emerged in both data sources. This is illustrated by the revised descriptions under “Well-considered decisions” and “Process”, which now place greater focus on actual application. Similarly, the focus on clarifying definitions of core concepts (improvement 5) became a central theme during the refinement process. A clear example of this can be found in the updated “Systems & Monitoring” dimension. In the earlier version of the model, the terminology used shifted inconsistently between “orders”, “invoices”, and “payments”, leading to ambiguity about which parts of the purchase-to-pay (P2P) process were being addressed. The revised model resolves this by explicitly referring to system support for the entire P2P process, thereby avoiding fragmented references to individual transactions. This change promotes a more coherent and conceptually sound understanding of the system's role across all maturity levels. Finally, “Policy” and “Systems & Monitoring” now incorporate more forward-looking elements such as CSR guidelines and automation (improvement 6), reflecting emerging trends identified in both data sources.

These adjustments are illustrated per dimension in Appendix E, which visualizes where specific changes have occurred. These revisions resulted in an improved CEP model that incorporates recent developments in procurement practices and effectively addresses the complexity of municipal purchasing processes. This model formed the foundation for the maturity assessment survey conducted in Stage 2 of the study

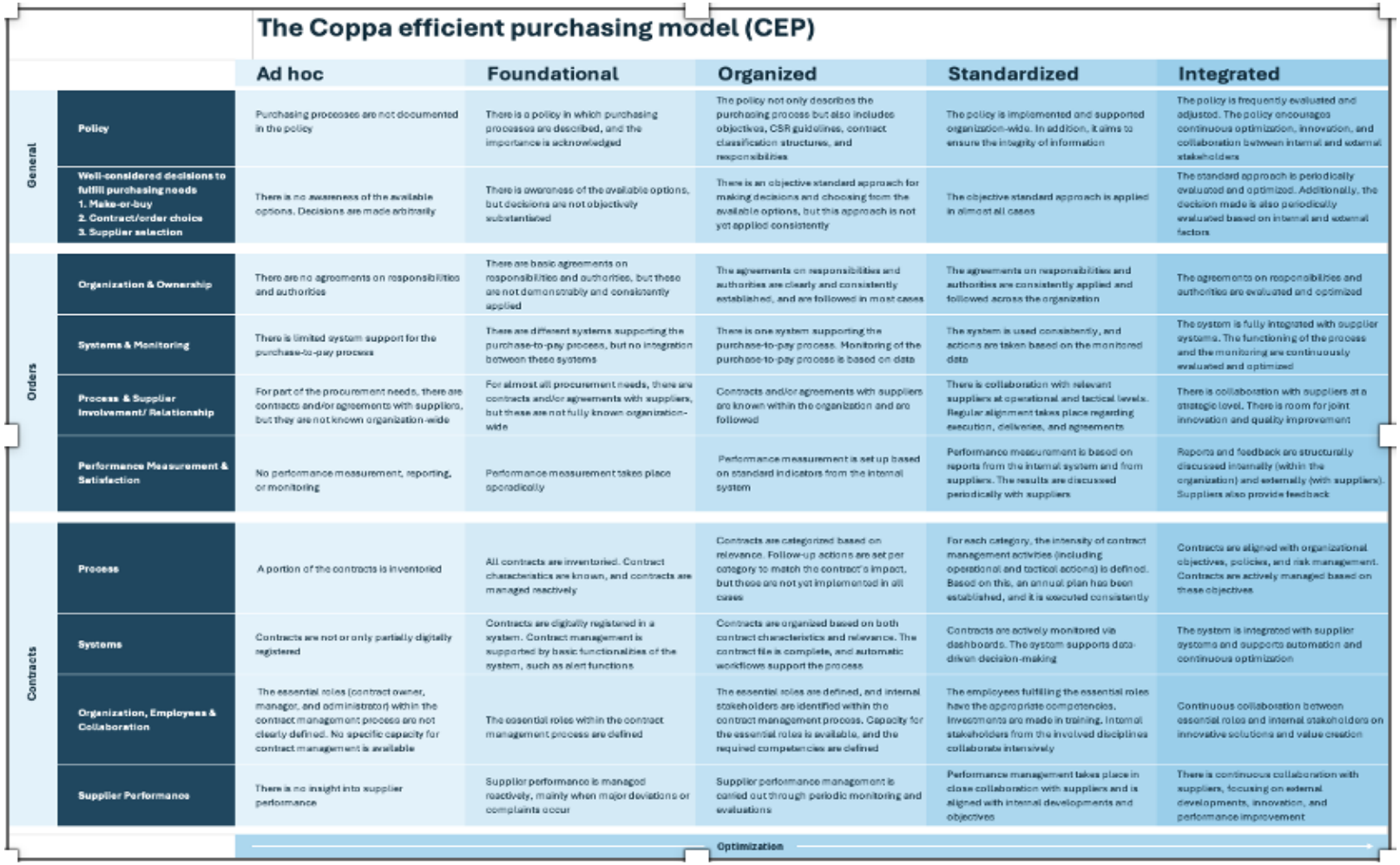

Figure 10 Improved CEP Maturity Model

5 Methodology Stage 2: Maturity Assessment Municipalities

This chapter outlines the methodology used in Stage 2 of the study, which focused on assessing the current and desired maturity levels of procurement processes in Dutch municipalities. Additionally, the survey examined internal factors that may influence an organization's ability to progress. The following sections describe the research design, sample, and data collection methods, survey structure, scoring approach, and statistical analyses used.

5.1 Research Design

The study applies a quantitative research method to gain insight into the current and desired maturity levels of Dutch municipalities' procurement processes. In Stage 1, an improved version of the CEP model was developed for assessing Stage 2. Additional insights are also gathered on the factors that influence an organization's progression along the maturity scale, specifically focusing on the size of the municipalities, the availability of resources, and the organizational culture within these municipalities. Quantitative research is effective for answering research questions starting with "what" or "how", as the results are quantifiable (Goertzen, 2017) and focus on objectivity and measuring variables (Goertzen, 2017; Queirós et al., 2017).

5.2 Sample and Data Collection Method

Data is collected via an online survey. Surveys have the advantage of being efficient, easy to replicate, and suitable for identifying patterns and correlations in data (Fowler Jr, 2013). At the same time, there are also limitations. For example, surveys can lead to a limited depth of responses and are prone to social desirability or non-response bias (Bell et al., 2022). These limitations are minimized in this study by a clear survey design and by anonymizing responses. The survey used in this study is an existing questionnaire developed by Snijders (2020) (see Appendix F) and has been adapted to align with the improved CEP model from Stage 1.

The study population consisted of all 342 Dutch municipalities. To obtain a representative picture, the aim was to achieve proportional representation of municipalities by size and geographical distribution. With a 90% confidence level and a 10% margin of error, a minimum sample size of 78 municipalities was targeted (Raosoft, 2025). The relatively wide margin of error was chosen due to practical considerations, including the survey's length (approximately 30 minutes) and the limited availability of respondents. To maximize the number of responses, the survey was drafted in Dutch and primarily sent to dedicated procurement e-mail addresses (e.g., inkoop@[name municipality) where available. If no such e-mail address was found, the survey was sent to the municipality's general e-mail address. The e-mail explicitly requested that the survey be forwarded to the procurement officer or the person responsible for purchasing within the municipality. To further improve the response rate, efforts were made to identify and directly contact relevant individuals through the professional network of Coppa and LinkedIn. Furthermore, the e-mail stated that if desired, the results and key findings could be shared, including a benchmarking report comparing the respondent's municipality to the national average. It was also emphasized that results would not be traceable to individual municipalities but only reported on a general or provincial level.

In total, 91 survey responses were received. Three responses were excluded from the analysis: one respondent indicated insufficient knowledge of the subject, one respondent held a function unrelated to procurement, and one showed an implausible answer pattern (identical answers across all items), which raised concerns about data reliability. The final dataset, therefore included 88 valid responses. Among these, eight responses were submitted by intermunicipal partnerships, each representing multiple municipalities. Because the target population of this study was individual municipalities, each of these partnership responses was duplicated to reflect the number of participating municipalities they represented. This resulted in 20 included observations (8 original + 12 copies) derived from

intermunicipal partnerships. This approach ensured that shared procurement arrangements were properly reflected in the analysis, while maintaining municipalities as the primary unit of analysis. Ultimately, the 88 responses represented municipalities from across all provinces and a distribution of small (≤25,000 residents; n = 57), medium (25,001–75,000; n = 21), and large (>75,000; n = 10) municipalities. This distribution broadly corresponds to the national segmentation of municipalities by population size. Respondents were predominantly procurement advisors, contract managers, and department heads. To mitigate the risk of non-response bias, early responses (first 25%) were compared with late responses (last 25%) in terms of municipality size and maturity level. No substantial differences were found, suggesting limited bias (Appendix G). While perfect proportionality cannot be guaranteed, the sample is considered sufficiently diverse and representative.

5.3 Survey Design

The survey consisted of six parts, which were structured as follows:

1. General Data about the municipality and the respondent
    - This section gathered demographic and organizational information
2. General procurement questions (Dimensions: Policy and Well-considered decisions)
3. Questions regarding the purchasing of individual orders (Dimensions: Organization & Leadership, Systems/monitoring, Process & Supplier involvement/relation and Performance measurement & satisfaction)
4. Questions about contracts (Dimensions: Process, Systems, Organization & collaboration, and Supplier performance)
5. To verify their previous answers, each model dimension was presented to respondents, who were then asked to indicate the maturity level that best reflected their organization.
6. Questions about Organizational Size, Culture, and Available resources (knowledge, time and budget)
    - The organizational size of a municipality was categorized as (small, medium, or large) based on the number of inhabitants.
    - Questions about resource availability were designed to capture different resources separately (Time, Budget and Knowledge). Respondents were asked to evaluate resource availability with statements like: *"There is sufficient budget available within our municipality to support procurement processes",* rated on a scale from "totally disagree" to "totally agree."
    - Questions about organizational culture within the municipality, using a brief description of the four organizational cultures described (Cameron et al., 1999). For the analysis, Clan and Hierarchical cultures were grouped under the category internal focus, while Adhocracy and Market cultures were combined under external focus. This classification distinguishes between cultures that emphasize internal integration versus those oriented toward external positioning and innovation (Hartnell et al., 2011).
    - Finally, an open question invited respondents to name factors that either enable or hinder effective purchasing processes.

Beyond the structure of the six parts, the survey incorporated additional design features to enhance its effectiveness and validity. Skip logic was applied to streamline the response process. If a municipality indicated it had reached a certain maturity level, only the follow-up questions relevant to that level were displayed; questions for higher levels were skipped if the required level was not attained. To improve validity, each dimension was assessed in two ways within the survey: first, through structured agreement with maturity-level statements (scored calculation), and second, through a direct self-assessment of the perceived maturity level. This dual approach enabled cross-checking between structured and subjective responses to improve consistency.

5.4 Measurement procedure

To determine the current maturity level for each dimension, a step-by-step scoring method was employed, as outlined in Appendix H. Respondents were asked to what extent they agreed with statements corresponding to maturity levels 2 to 5. Because level 1 (Ad hoc) reflects a complete absence of policy, systems, or structure, it was not explicitly included in the survey. Instead, the scoring procedure for level 2 (Foundational) was deliberately designed to distinguish between organizations that are still at level 1 and those that have reached level 2. To this end, stronger weighting was applied: respondents who selected "Agree" or "Strongly agree" received +2.0 points, while "Agree to a certain extent" yielded +1.5 points. Responses of "Disagree" or "Strongly disagree" received only +0.5 points, suggesting that the foundational criteria were not met. In such cases, the organization was classified as being at level 1.

Scoring procedure per level

- Level 2 (Foundational): Respondents could choose from five answer options. "Strongly agree" or "Agree" resulted in +2.0 points, "Agree to a certain extent" in +1.5 points, and "Disagree" or "Strongly disagree" in +0.5 points.
- Levels 3 to 5 (Organized, Standardized, Integrated): Agreement scores ranged from 0 to +1.0 point. "Strongly agree" or "Agree" each resulted in +1.0 point, "Agree to a certain extent" in +0.5 point, and disagreement in 0 points.

Example of how the score is calculated. Suppose a respondent provides the following answers for one dimension:

Table 2 Example of Scoring for One Dimension

Level (statement)	Response	Points
Level 2 - Foundational	Agree	+ 2.0
Level 3 - Organized	To certain extent	+ 0.5
Level 4 - Standardized	Disagree	+ 0.0
Level 5 - Integrated	-	-

Total score: 2.0 + 0.5 + 0.0 = 2.5 points
This corresponds to an estimated maturity level of 2.5

Comparison with self-assessed maturity level

- If the respondent's self-assessed maturity level was level 3, this closely aligns with the estimated calculated score, and no adjustment was made.
- If the self-estimate is one level lower than the calculated score, 0.25 points were subtracted.
- If it is one level higher, 0.25 points were added.
- If the self-estimated level differs by more than one level, the respondent's estimate was taken as the final score, under the assumption of potential misinterpretation of the statements.

Calculating overall maturity scores
For each dimension, the score was calculated. To determine the overall maturity level per municipality, the maturity scores of all ten individual dimensions were added together and divided by ten. This produced an average score representing the overall maturity level of the procurement. However, for the topics General, Orders, and Contracts, the median was used instead of the mean, due to the non-normal distribution of responses. As Streiner (2000) notes, the median is preferred in such cases because it is less sensitive to outliers and provides a more reliable central tendency.

5.5 Statistical analysis

The data analysis of the survey data was structured around two primary goals:

1. Determine municipality maturity scores
2. Identify the internal factors that influence the progression along the maturity scale.

Each goal required specific analytical steps, which are outlined in **Error! Reference source not found.**.

Table 3 Overview of Data Analysis Goals, Steps, and Statistical Methods

Goal	Steps	Statistical analysis
Determining maturity scores	Step 1 → Analyzed Survey Data Step 2 → Assigned scores Step 3 → Determine current scores for 2025 Step 4 → Determine desired score Step 5 → Analyze the gap between current and desired	Descriptive statistics (normality, mean, median standard deviations frequencies)
Identifying Internal Factors	Step 1 → Descriptive statistics per factor (including averages, median, standard deviations, and frequencies) Step 2 → Linear regression exploring the relationship between these factors and the maturity score Step 3 → Necessary Condition Analysis (NCA)	Descriptive statistics, linear regression, NCA

In addition to regression analysis, (NCA) was used to examine whether certain conditions are necessary, but not sufficient on their own, for achieving higher levels of procurement maturity. Whereas regression analysis assumes symmetric relationships and mean group differences, with a predictor contributing to the outcome, NCA instead focuses on asymmetric relationships. NCA examines whether a particular condition is necessary. Without this condition, the desired outcome cannot occur, however, its presence does not guarantee that outcome (Dul, 2016). In other words, without the necessary condition, achieving the outcome is impossible, but its presence by itself is not sufficient to achieve the outcome.

The analysis utilized the NCA package in R following the guidelines from the manual, Necessary Condition Analysis (NCA) with R (Version 4.0.0): A Quick Start Guide (Dul, 2024). A separate analysis was performed for each potential condition, using the CE-FDH and CR-FDH ceiling techniques. The effect size indicated which part of the area below the ceiling line is considered “empty”: the larger this area, the stronger the necessary relationship. The interpretation and assessment of effect sizes and fit indicators were interpreted according to the guidelines of Dul (2016).

6 Findings Stage 2: Maturity Assessment Municipalities

This chapter presents the results of Stage 2. First, the current maturity level of Dutch municipalities is discussed. Then, the findings regarding the desired maturity level are discussed. Finally, the extent to which five organizational factors are related to the average maturity level is examined.

6.1 Current Maturity Level

The average maturity score per municipality was calculated as the average across the ten dimensions of the model, resulting in a numerical score ranging from 0.5 to 5. The average maturity score of Dutch municipalities was M = 1.94. The normality check for the maturity score and the descriptive statistics for the current and ambition levels are shown in Appendices I and J. To clearly show the distribution of participating municipalities, the municipalities in Figure 11 are clustered on rounded half levels (steps of 0.5). This classification was chosen visually to better illustrate trends and concentrations in maturity. The average maturity score per municipality shows a concentrated distribution around the lower levels. Most municipalities are at level 1.5 (Fundamental) (25%) and 2.0 (Fundamental) (36%), followed by level 2.5 (Organized) with 24%. Only a small proportion of municipalities are at level 3.0 or higher (a total of 7%). No municipalities have optimized the procurement process to the fourth or fifth level. This distribution indicates an apparent clustering in the lower middle range of the maturity model, with a relatively high number of municipalities in transition from fundamental to organized practices. The almost complete absence of higher levels suggests that standardization and integration within municipal procurement organizations are currently still exceptional.

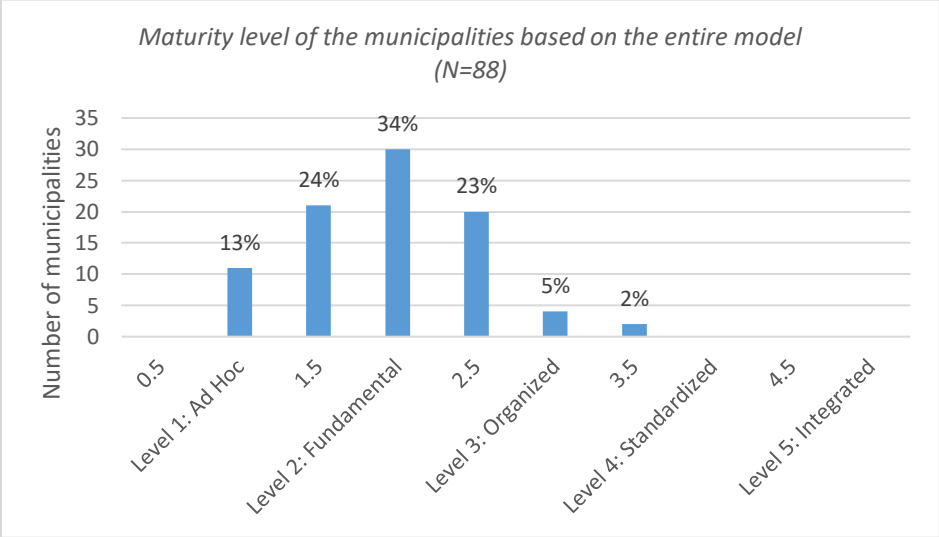

Figure 11 Distribution of Current Maturity Levels Among Municipalities (N=88)

Figure 12 shows the current maturity levels for each subject of the maturity model: General, Orders, and Contracts. These three components represent thematic clusters within the model: General refers to overarching policy and decision making, Orders relates to operational purchase-to-pay (P2P) processes, and Contracts covers contract execution and monitoring. The underlying model structure and the dimensions included in each subject are shown in Figure 10. Municipalities score highest on the General subject (mdn = 2.5). A large proportion is at the "Organized" level, indicating that the strategic and policy aspects of procurement are more developed than the operational processes. The maturity of the orders subject is lower. Here, municipalities are mainly at fundamental levels, indicating basic order processes that are still little standardized (mdn = 1.94). A similar picture applies to the contract's component. The median is even slightly lower with mdn = 1.59. The number of municipalities reaching advanced maturity levels in these two components is limited.

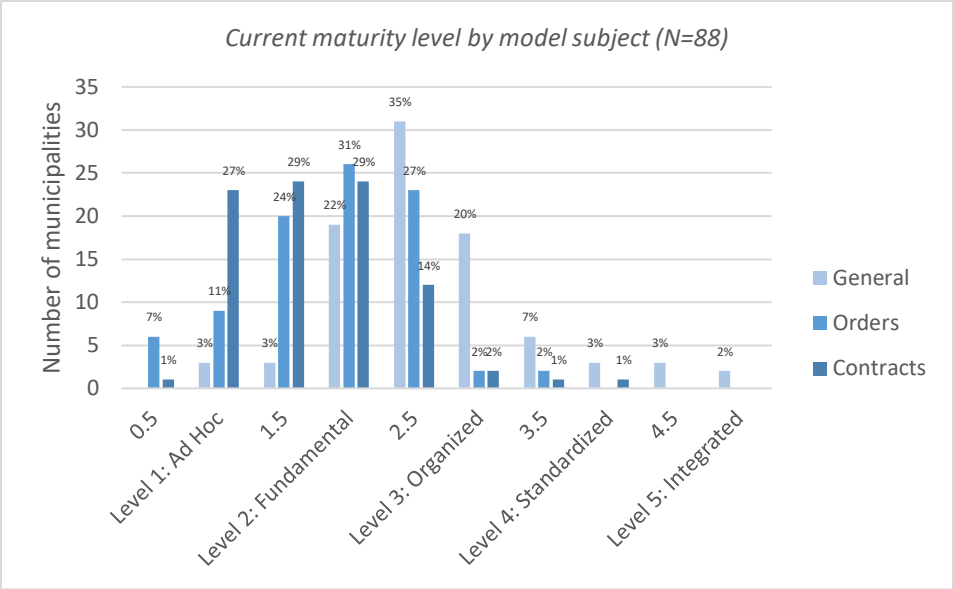

Figure 12 Current Maturity Levels per Subject of the Model (N=88). The model distinguishes three thematic clusters, referred to as model subjects: General, Orders, and Contracts. Each subject groups a set of related dimensions, as shown in Figure 10.

Figure 13 shows the maturity scores for each dimension, grouped by subject level: General, Orders, and Contracts. Each boxplot displays the distribution of scores, enabling comparison across different dimensions. The results show that the highest maturity scores are found within the general dimensions, such as Policy and Decision-making. These dimensions exhibit relatively high medians, accompanied by a wide spread. This suggests that some municipalities are already well-developed in this area, while others are still lagging. On average, the dimensions within the Orders and Contracts groups show lower maturity scores than the overall dimensions. The scores within Orders appear slightly higher than those of Contracts, but the difference is limited and inconclusive. In both groups, the median and spread remain relatively low, suggesting that municipalities are less developed in these domains. These results indicate that municipalities have primarily invested in the policy and organizational base so far. At the same time, there is still considerable room for growth in operational and contractual dimensions, such as performance and satisfaction, as well as process. Appendix K presents the descriptive statistics.

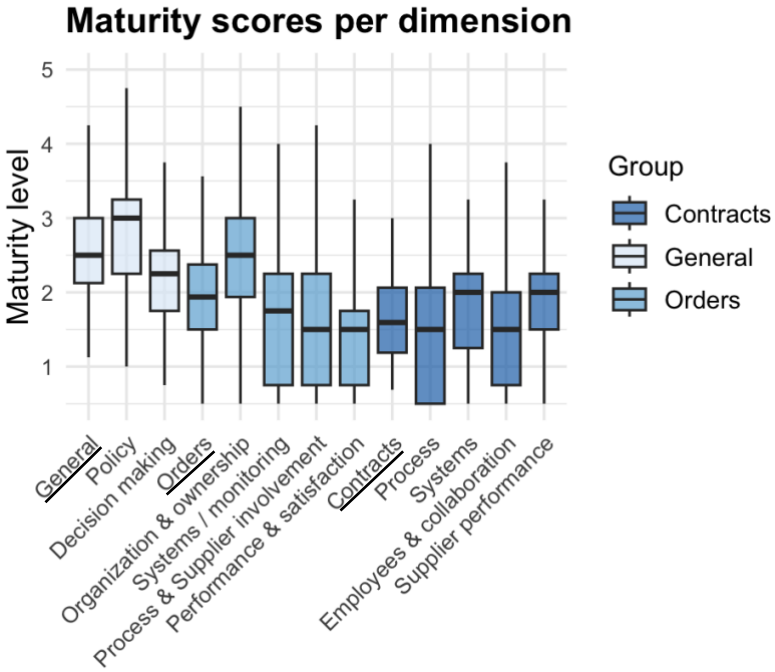

Figure 13 Distribution of Maturity Scores per Dimension by Subject Group

6.2 *Desired Maturity Level*

As many as 81% of municipalities are currently at levels 1.5 to 2.5 in terms of procurement maturity. However, ambition is considerably higher, with a clear peak at level 4 (Standardized) (see Figure 14). This indicates a desire for further professionalization of the procurement process. Municipalities are seeking a shift from a fundamentally working approach to a more organized and standardized way of working. The average maturity level is 1.94, while the average ambition level is 3.63. This means that, on average, municipalities want to achieve growth of more than 1.5 levels within five years.

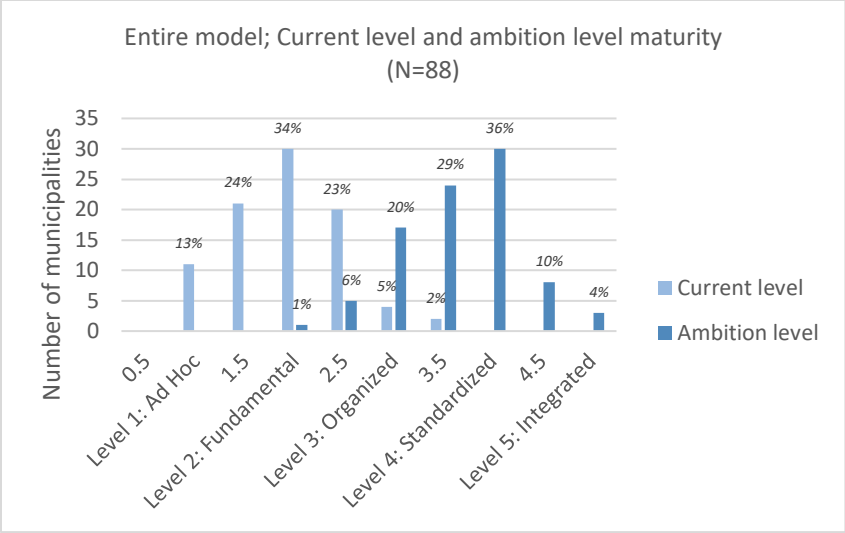

Figure 14 Current and Ambition Levels of Maturity (N=88)

This ambition is statistically supported by a paired samples t-test, which shows that the difference between current maturity level (M = 1.94, SD = 0.55) and ambition level (M = 3.63, SD = 0.58) is significant: $t(87) = 25.160$, $p < .001$. The effect size is large (Cohen's $d = 2.68$), indicating a substantial difference. The assumption of normality was not violated (Shapiro-Wilk: $p = 0.546$), indicating that the t-test was reliably applied, see Appendix L. In addition to this mean difference, a Pearson correlation was conducted to examine whether there is a relationship between current maturity level and ambition level across municipalities, see Appendix M. The analysis shows a statistically significant, moderate positive correlation between current maturity and ambition level, $r(88) = 0.38$, $p < .001$. This suggests that municipalities with more mature procurement processes tend to express higher ambitions for improvement.

Figure 15 illustrates the average number of steps municipalities aim to progress in maturity. Most municipalities (n = 27) aspire to a 1.5-level increase, followed by a 2-level increase (n = 21) and a 1-level increase (n = 19). Only a small number of municipalities aspire to a very limited (<1) or just huge (>3) optimization target. This distribution shows that many municipalities set realistic, yet ambitious, growth targets.

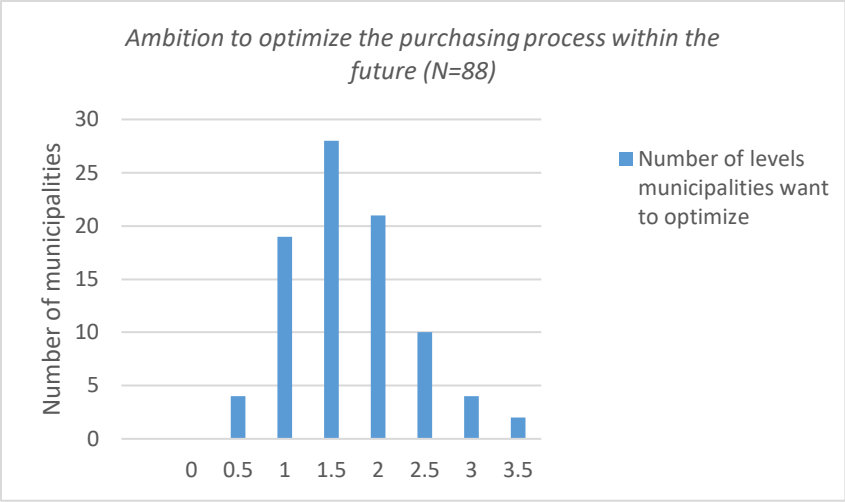

Figure 15 Ambition to Improve: Number of Maturity Levels Municipalities Aim to Advance (N=88) Ambition to Improve: Number of Maturity Levels Municipalities Aim to Progress (N=88)

Figures 16 to 18 show that municipalities have clear ambitions in all three subjects to grow to higher maturity levels. For the general subject, the ambition is mainly at level 4 ("Standardized"), indicating a desire for further implementation and assurance of procurement policies and considered decisions. For orders and contracts, many municipalities want to move up several levels, with a clear focus on level 3.5 to 4. Notably, the difference between ambition and current score is highest for contracts, where municipalities currently score lowest. This could indicate that contract management is presently perceived as an important area for improvement. The ambition for the orders component is relatively more limited, although no firm conclusions can be drawn about prioritization based on these figures.

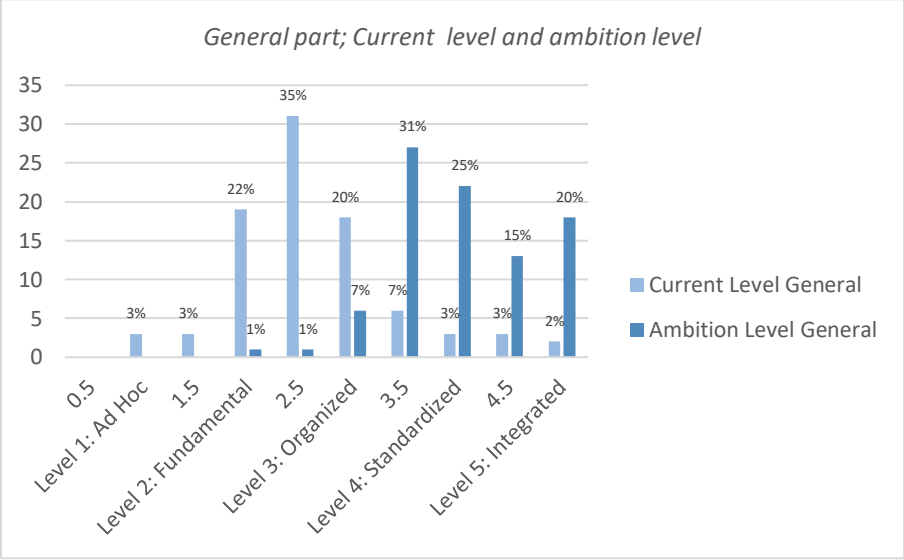

Figure 16 Current and Ambition Maturity Levels by Subject General (N=88)

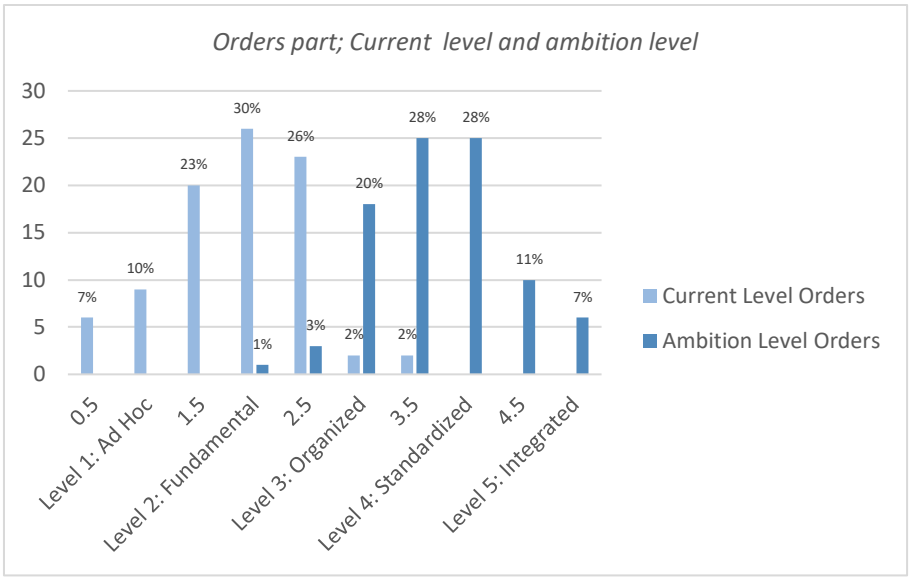

Figure 17 Current and Ambition Maturity Levels by Subject Orders (N=88)

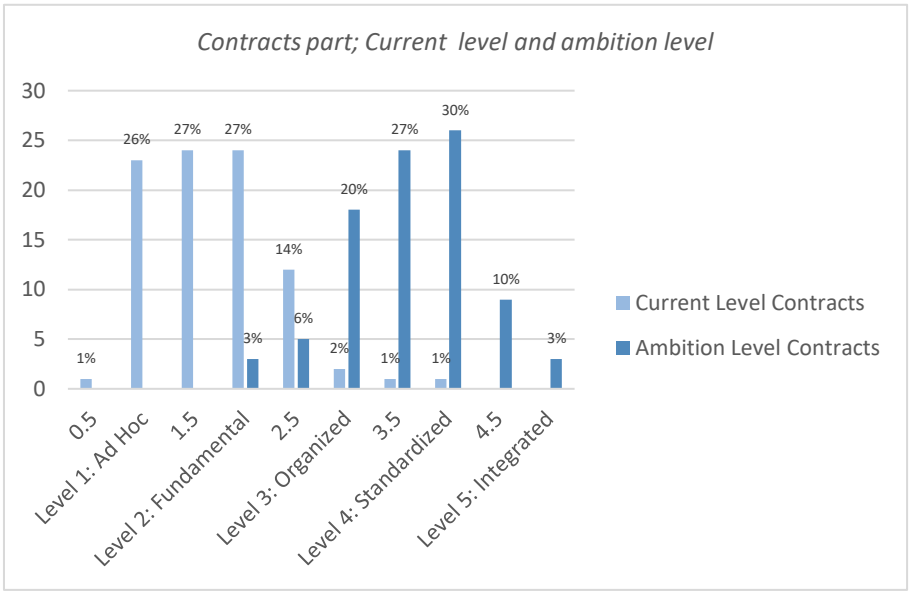

Figure 18 Current and Ambition Maturity Levels by Subject Contracts (N=88)

6.3 Influencing Factors on Maturity Level

To examine the relationship between influencing factors and the maturity level of municipalities, a multiple linear regression analysis was conducted. Here, the average maturity level (dependent variable) was explained in terms of five independent variables: organizational size, organizational culture, availability of knowledge, time, and budget. The dependent variable in this study is Maturity_Current. In Appendix N, a correlation matrix was constructed to illustrate the relationships between the key variables. The explanatory variables, Knowledge, Time, and Budget, correlate to varying degrees with the maturity score. The strongest correlation is visible between knowledge and maturity score (r = .365), followed by budget (r = .153). The variable time showed a slight negative correlation with (r = -.107), which is unexpected and was investigated further. The intercorrelations between knowledge, time, and budget are low to moderate (maximum r = .414), indicating that these variables are unlikely to cause severe multicollinearity in multiple regression analysis. Based on the theoretical framework, three hypotheses were formulated to guide this analysis. Hypothesis 1 proposed a U-shaped relationship between organizational size and maturity level. Hypothesis 2 posits that the availability of sufficient resources has a positive influence on progression along the maturity scale. Hypothesis 3 posits that

municipalities with an externally oriented organizational culture exhibit higher maturity levels than those with an internally oriented culture. These hypotheses were tested in the following sections using multiple regression analysis and Necessary Condition Analysis (NCA).

6.3.1 Multiple Regression Analysis

A linear regression analysis was conducted to examine the extent to which six variables: Knowledge, Time, Budget, Culture, Size_small, and Size_large collectively predict the current level of maturity. The model was found to be significant, $F(6, 81) = 3.267$, $p = .006$, and explained approximately 19.5% of the variance in maturity ($R^2 = .195$, adj. $R^2 = .135$). Of the individual predictors, Knowledge ($\beta = 0.356$, $p = .001$) showed a positive and significant effect on maturity. Time ($\beta = -0.258$, $p = .028$) had a significant negative effect. In contrast, Budget, Culture, and both Size_small and Size_Large were not statistically significant predictors. These findings are summarized in Table 4 and visually represented in the marginal effects plots in Figure 19, which also display the 95% confidence intervals for each variable. Additional diagnostic tests indicated no concerns regarding multicollinearity (maximum condition index = 16.242), and the assumptions of normally distributed residuals and homoscedasticity were met (see Appendix O). Based on these results: Hypothesis 1 is not supported, as organization size (small or large) shows no significant difference in maturity level compared to medium-sized municipalities. Hypothesis 2 is partially supported: only knowledge has the expected positive effect, while time has an unexpected negative effect, and budget is not significant. Hypothesis 3 is not supported, since organizational culture does not have a statistically significant impact on maturity.

Table 4 Regression Results for Factors Influencing Current Maturity Level

Coefficients

Model		Unstandardized	Standard Error	Standardized[a]	t	p
M_0	(Intercept)	1.941	0.059		32.849	< .001
M_1	(Intercept)	1.258	0.337		3.728	< .001
	Culture (1)	−0.010	0.120		−0.087	0.931
	Size_small (1)	−0.027	0.138		−0.194	0.847
	Size_large (1)	−0.108	0.207		−0.520	0.605
	Knowledge	0.249	0.074	0.356	3.340	0.001
	Time	−0.185	0.083	−0.258	−2.237	0.028
	Budget	0.137	0.084	0.200	1.618	0.110

[a] Standardized coefficients can only be computed for continuous predictors.

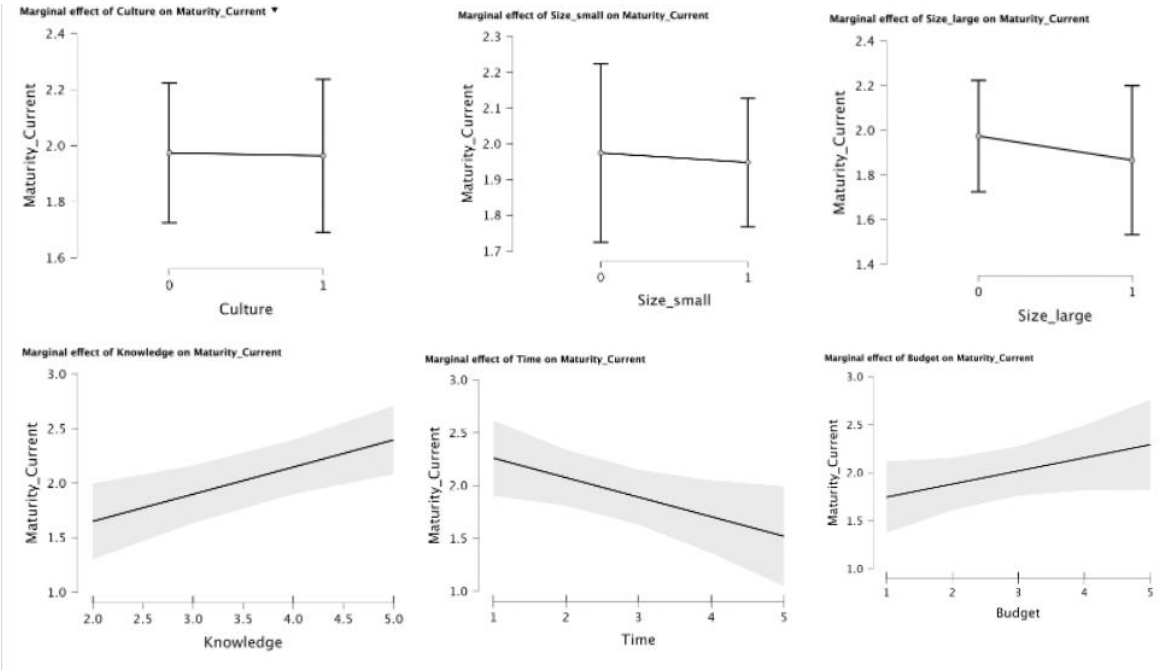

Figure 19 Marginal Effects of Independent Variables on Current Maturity Level (Subfigures showing effects of Culture, Size (small/large), Knowledge, Time, and Budget with 95% CI)

6.3.2 NCA-analysis

In addition to regression analysis, NCA was used to examine whether certain conditions are necessary conditions for higher levels of procurement maturity. Although the regression results indicate a positive effect of Knowledge and an adverse effect of Time on procurement maturity, the NCA plots provide additional insights into which conditions are necessary for achieving higher levels of maturity. Table 5 shows that the effect sizes (d = 0.170, d = 0.168 and d = 0.166, respectively) are just above the cutoff of 0.1, indicating medium necessary effects according to Dul (2016). For Knowledge, the NCA plot reveals a clear empty zone below the ceiling line, suggesting without a minimum level of knowledge, higher maturity levels are not observed. This supports the interpretation of Knowledge as a statistically significant necessary condition. For Time and Budget, effect sizes were also above the threshold, but the visual patterns were less conclusive, and the p-values are not below the conventional 0.05 threshold. These findings imply that Time and Budget may serve as weak or partial boundary conditions, rather than strong necessary conditions based on this data.

Table 5 NCA Results: Necessary Conditions for Achieving Higher Maturity Levels

Predictor	Effect size	p-value	Interpretation
Knowledge	0.170	0.037	Medium, statistically significant
Time	0.168	0.165	Medium, not significant
Budget	0.166	0.066	Medium, marginally significant
Size_small	0.029	0.648	Small, not significant
Size_large	0.000	1.000	None
Culture	0.000	1.000	None

Effect sizes (d) are classified according to Dul (2016) as follows: small effect if $d < 0.1$; medium effect if $0.1 \leq d < 0.3$; large effect if $0.3 \leq d < 0.5$

The NCA plots of Figure 20 support the interpretation of knowledge as a necessary condition. The scatterplot for knowledge shows a relatively straightforward ceiling zone, indicating that higher levels of procurement maturity do not occur without a minimum level of knowledge. For Time and Budget, however, the ceiling zone is less clearly visible in the scatterplots. Although the NCA analysis indicates small but meaningful effect sizes just above the 0.1 threshold, the visual evidence is limited. In these cases, higher levels of maturity can still occur at low values of time or budget, suggesting that their role as necessary conditions is not strongly supported visually. No ceiling zones or significant effect sizes were found for Culture, Size_Small, or Size_Large, indicating that these are not necessary conditions. This means higher levels of procurement maturity can be achieved regardless of these factors.

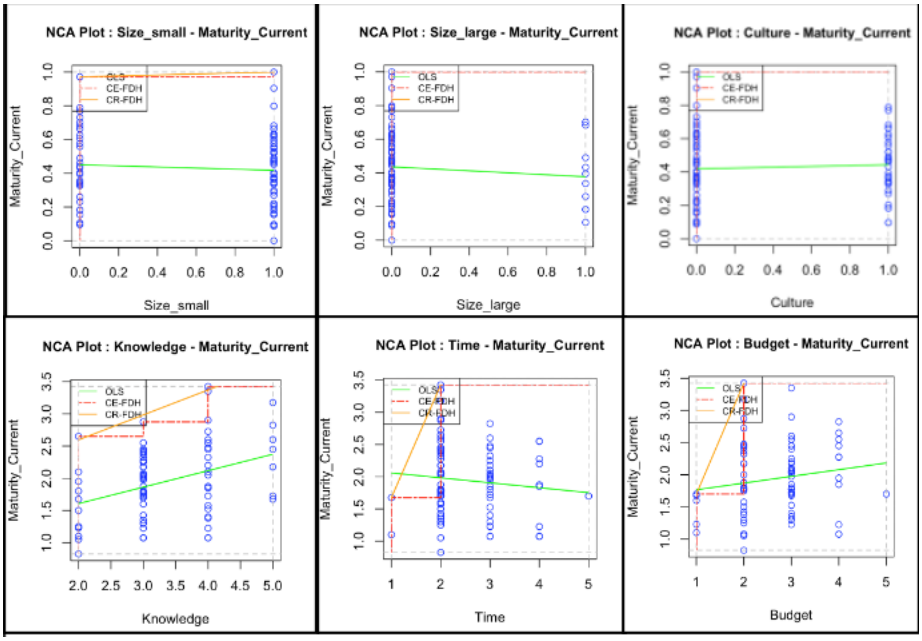

Figure 20 NCA Plots: Necessary Condition Analysis for Predictors of Maturity Level

6.3.3 Explorative Analysis

Although not part of the initial theoretical framework, an exploratory Partial Least Squares Structural Equation Modeling (PLS-SEM) analysis was conducted to test a potential mediation effect, based on indications from the regression results. Specifically, the analysis examined whether the effect of available budget on procurement maturity is mediated by knowledge. The findings suggest that the budget has no direct significant effect on procurement maturity but does have an indirect effect through Knowledge. This indicates that a higher available budget may not automatically lead to a higher maturity level, but should first promote knowledge development within the organization, which in turn contributes to mature procurement processes (see Figure 21).

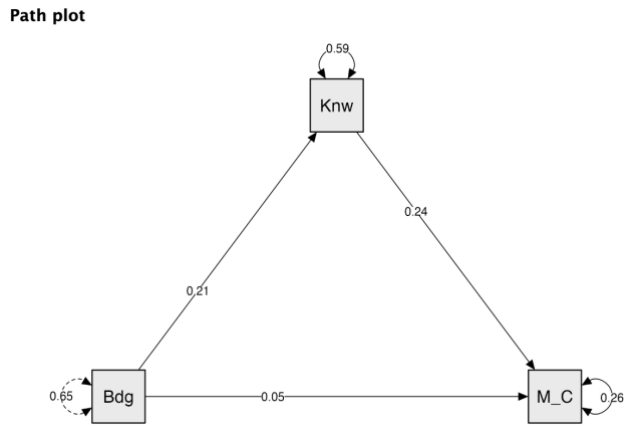

Figure 21 PLS-SEM Path Model: Relationship Between Budget, Knowledge, and Maturity Level

The full results, shown in Appendix P, display that the direct effect of the Budget on procurement maturity is not significant ($\beta = 0.054$, $p = 0.435$). However, they do show a significant positive effect of Budget on Knowledge ($\beta = 0.207$, $p = 0.042$), and a strong significant effect of Knowledge on procurement maturity ($\beta = 0.244$, $p < 0.001$). The estimated indirect effect of budget through knowledge is .050 and is statistically significant at the 10% level ($p = .079$). The overall effect of Budget on procurement maturity is thus not significant ($\beta = 0.104$, $p = .147$) but does show an indication of an indirect mechanism. This finding suggests that a higher budget does not automatically lead to higher procurement maturity, but instead that this effect may be mediated through knowledge development. This result highlights the importance of knowledge building as an intermediate factor and provides a starting point for follow-up research on steering mechanisms in procurement process maturity.

6.3.4 Additional Barriers Identified in Open-Ended Responses

In addition to the quantitative analyses, the survey included an open-ended question to identify any further factors that may hinder the development of procurement maturity. These responses can be found in Appendix Q. Analysis of these responses reveals several recurring challenges that impact progression along the maturity scale. Capacity and resources are the most frequently cited barriers to success. Many municipalities report structural staff shortages and time constraints. These capacity issues are associated with staff turnover and working with temporary or inexperienced staff, making professionalization difficult. Additionally, decentralization and a lack of oversight play crucial roles in this context. In many municipalities, the procurement function is spread across departments and domains, with only minor central direction. This leads to fragmentation, limited visibility of ongoing processes, and a lack of uniform practices. Regarding the P2P process, support within municipalities often appears to be limited. Respondents indicate that the added value of a structured P2P process is still insufficiently recognized, especially by departments such as Finance or in smaller municipalities where flexibility is preferred over standardization. This attitude hinders the implementation of systems and practices designed for process control and data-driven decision-making. Finally, cultural and behavioural barriers are frequently mentioned. Municipalities often identify a conservative attitude among employees, characterized by an internal orientation and silo thinking. These factors limit collaboration across departments and inhibit change readiness. Such aspects form a barrier to maturity. These findings suggest that achieving higher levels of maturity requires more than optimizing measurable organizational factors, and broader conditions must also be addressed.

7 Discussion and Conclusion

This chapter discusses the main findings of both stages of the research and answers the four guiding research questions. The first part of the study focused on evaluating and improving the CEP 2020 Maturity Model. The second part of the study assessed the current and desired maturity levels of municipalities and explored which internal factors influence progression. This chapter integrates the insights from both stages to draw overall conclusions. In addition, it outlines the study's limitations, recommendations for future research, and discusses implications for both practice and theory.

7.1 Discussion and Conclusion

The evaluation characteristics proposed by Salah et al. (2022) were used as a guiding framework, enabling a systematic assessment of the old model, such as logical structure, relevance, comprehensiveness, clarity, and usability. The evaluation identified several shortcomings in the original model. For example, respondents noted missing elements and overlapping descriptions across maturity levels. Based on these findings, as well as expert feedback and thematic analysis, the model was improved. Five distinct maturity levels were formulated for each dimension. Greater nuance was added to the early stages, and the large conceptual jumps between levels were reduced. As a result, the revised model offers a clearer, more practical, and more distinctive structure than the previous four-level version. The revised model was then applied to measure the current and desired maturity levels of Dutch municipalities. The results show that most municipalities are currently at levels 1.5 to 2.5, with an average of 1.94. This indicates a basic to beginning level of maturity. Ambition is considerably higher, with an average of 3.63 and a clear peak at the standardized level. Municipalities are thus striving to further professionalize their procurement process, in which, among other things, more strategic elements and data-driven decision-making play a more significant role.

The observed gap between current and desired levels raises the question of what organizational factors enable or hinder this progression of maturity. To this end, three hypotheses were developed and tested in the theoretical framework. Hypothesis 1: There is a U-shaped relationship between organization size and maturity level: both small and large municipalities have a higher maturity level than medium-sized municipalities. This hypothesis was not confirmed. Neither the regression analysis nor the NCA revealed a significant relationship or necessary condition for organization size. One methodological explanation is that the number of large municipalities in the sample was relatively low, which may have limited the ability to detect a U-shaped pattern. Although literature suggests that small municipalities may benefit from agility, and large municipalities typically have more resources (Cavusgil et al., 2003), the results of this study did not conform this relationship One possible explanation is that both small and large municipalities struggle with similar structural barriers, such as staffing shortages or fragmented responsibilities, which is evident in the open-ended responses. Another possible explanation is that smaller municipalities may compensate for limited internal capacity by engaging in intermunicipal cooperation or outsourcing procurement functions. These arrangements allow access to shared expertise and systems, effectively raising maturity levels without requiring internal scale. As a result, a direct relationship between size and maturity may be obscured. Intermunicipal cooperation is a common strategy in the Dutch public sector (Boogers et al., 2016).

Hypothesis 2: The availability of sufficient resources (time, budget, and knowledge) increases the progression along the maturity scale. This hypothesis was partially confirmed: of the three variables, only knowledge showed a significant positive relationship with maturity, both in the regression and NCA analysis. The NCA plot further suggests that higher maturity levels are achieved only from a knowledge score of at least 3 (neutral), indicating that knowledge may be a necessary (but not sufficient) condition. These findings align with broader theoretical perspectives. Wu et al. (2015) describe analytical policy capacity as the ability to assess policy problems and develop solutions, which requires internal expertise and learning mechanisms. Similarly, the concept of absorptive capacity emphasizes that organizations need a sufficient knowledge base to recognize, assimilate, and apply new information or innovations (Levinthal & Cohen, 1990). Moreover, knowledge-rich environments may experience cumulative advantages over time. Aljanabi & Kumar (2013) argue that organizations with high internal expertise tend to attract further talent, creating a reinforcing dynamic in which knowledge concentration

enhances organizational learning capacity. Bollinger & Smith (2001) and Hayes (2022) similarly stress the importance of knowledge for innovation and development. The role of time and budget proved more complex. Regression analysis showed a negative relationship between time and maturity. One explanation is that only 11 of the 88 municipalities agreed that sufficient time was available, leading to a skewed distribution. In the NCA, time and budget had medium effect sizes ($d > 0.1$), but this was not supported visually: even with low scores on these variables, relatively high maturity still occurred. Therefore, they cannot be considered strictly necessary conditions. Notably, 57% of respondents reported insufficient time, and 42% reported a lack of budget (Appendix Q). These patterns may reflect measurement limitations (e.g., single-item indicators), skewed data, or unmodeled interaction effects. An exploratory analysis did reveal a potential interaction between budget and knowledge: budget alone was not significant, but respondents with both sufficient knowledge and sufficient budget had higher maturity levels than those lacking either. This suggests that budget supports maturity only when accompanied by knowledge development. These findings align with policy implementation research, which emphasizes that organizational capacity depends on interdependent, conditional, and context-specific factors (Fernández-i-Marín et al., 2024; Hill & Hupe, 2002).

Hypothesis 3: Organizations with an external culture orientation demonstrate a higher progression along the maturity scale than organizations with an internal orientation. This hypothesis was not confirmed. Neither regression analysis nor NCA shows that organizational culture is significantly related to maturity level. A lack of a direct relationship does not necessarily rule out the possibility that culture is still relevant. Culture may be significant in combination with other factors that were not considered in this study, such as leadership, learning culture, or strategic change capability.

In addition to the quantitative analyses, the open-ended responses highlight structural bottlenecks that hinder further growth in procurement maturity. Many municipalities experience a lack of capacity (in terms of staff and time), limited central control, and insufficient support for P2P processes. Cultural and behavioural barriers, such as silo thinking and resistance to change, are also frequently mentioned. These findings emphasize that increasing maturity requires more than just optimizing measurable factors.

These findings imply that national or regional strategies to support procurement maturity should prioritize knowledge development over structural resource allocation. Rather than focusing solely on budget redistribution or organizational restructuring, central government and procurement networks might achieve more impact by facilitating access to expertise, shared learning platforms, and intermunicipal knowledge alliances. Intermunicipal collaboration can play a crucial role in pooling knowledge resources and developing collective professional capacity. This reflects a necessary shift in focus from institutional input (e.g., budget) to organizational capabilities, as suggested in policy capacity frameworks (Wu et al., 2015).

7.2 Limitations and Future Research

This study has several limitations that affect the interpretation of the results. First, the data is based on self-reported perceptions. Although respondents were instructed to submit one response per municipality, full control over duplicate entries could not be enforced. However, no duplicate municipalities were found among the email addresses provided for receiving the benchmark report, suggesting a limited risk of multiple entries. The use of self-reported data also introduces potential bias due to subjective interpretation, social desirability, or estimation errors. Objective data sources, such as actual budgets or policy documents, were not used to validate responses, which limits the reliability and generalizability of the findings. To safeguard data quality, one response was excluded due to the respondent explicitly reporting insufficient knowledge. However, ten responses with only partial familiarity (“to some extent”) were included under the assumption that this level of knowledge was sufficient for a reasonably informed assessment. Still, variations in interpretation and accuracy remain possible.

This study received 91 responses out of a total of 342 Dutch municipalities. After excluding three invalid entries, one due to insufficient knowledge, one submitted by a facility employee, and one with an implausible answer pattern, the final dataset comprised 88 valid municipal observations. Among these,

eight responses were submitted by intermunicipal purchasing cooperatives, representing a total of 20 municipalities. These were duplicated accordingly to ensure that each municipality was treated as a distinct unit of analysis. While this approach reflects shared procurement arrangements, it may also have introduced clustering effects. The final sample includes municipalities from all provinces and reflects the national distribution of small (n = 57), medium (n = 21), and large (n = 10) municipalities. While no structured sampling strategy was applied, participation was voluntary, the sample is considered sufficiently diverse for analysis. A non-response check comparing early and late respondents showed no substantial differences, suggesting limited bias. Furthermore, for some factors, the distribution of responses across Likert scales was skewed, with few responses in extreme categories. This limited dispersion may have reduced statistical sensitivity, particularly for theoretically relevant variables such as time and budget. As such, the findings should be interpreted with appropriate caution and seen as a foundation for further research rather than definitive conclusions. Finally, the maturity model was applied to the municipal procurement function as a whole, without distinguishing between domains such as the social or physical domain. In practice, these areas often involve different processes and institutional logics, which may influence how procurement maturity is experienced. Future applications of the model may therefore benefit from domain-specific tailoring.

Although this study focuses specifically on Dutch municipalities, its findings may hold broader relevance beyond the national context. Across Europe and other parts of the world, public organizations face comparable challenges in modernizing procurement processes, particularly regarding the integration of digital technologies and sustainability objectives (ESG) (Stoffel et al., 2019). By situating the Dutch municipal case within broader developments in public administration, this study contributes to the international debate on strengthening procurement maturity across different governance settings. The improved maturity model offers a practical framework that can help similarly structured public sectors better understand and address these issues in a structured way. Future comparative studies could further explore the adaptability and validity of the model across different institutional and cultural settings.

Future research can help deepen and broaden the insights from this study in several ways. First, it is recommended that the revised maturity model be retested against characteristics on which experts assessed the earlier CEP model in Stage 1 of this research. A repeat expert measurement, conducted several years after the previous one, could reveal the extent to which the model still aligns with the practice and complexity of municipal procurement processes. In addition, qualitative interviews could provide more in-depth insights into the operation and coherence of influencing factors. Longitudinal research, which tracks the development of municipalities over time, can provide valuable insights into growth paths and success factors. Also, case studies of municipalities performing above average on procurement maturity can help identify “good practices”, not only in terms of achieved maturity levels, but also in understanding the pathways and organizational strategies that enabled this development. Such insights can offer valuable lessons for other municipalities aiming to progress. In addition, follow-up research with multiple respondents per municipality would contribute to a more reliable and complete picture of procurement practices and maturity within municipalities, as individual interpretations can then be better contrasted. Finally, for follow-up research, it is recommended that the application of the model be analysed domain-specifically. Such an approach can provide more focused insights into how maturity develops within different contexts and contribute to more domain-specific development strategies. Future comparative studies may further validate the transferability of the model in different governance contexts.

7.3 Practical and Theoretical Implications

The improved maturity model presented in this study provides municipalities with a practical framework to systematically evaluate and improve their procurement processes. By using five distinct levels for each dimension, the model more closely aligns with the practice and complexity of municipal procurement. Municipalities can use the model to determine their current and desired maturity level and identify the necessary steps to bridge this gap. The fact that participating municipalities receive a benchmark report, comparing their scores with those of other municipalities, contributes to awareness, motivation, and mutual learning. One of the main findings of this study is that knowledge is essential

for growth on the maturity scale. Municipalities would therefore do well to make targeted investments in knowledge building, for example, through training, knowledge sharing, and collaboration in procurement partnerships. At the same time, it is crucial to free up time and resources to enable this professionalization drive. Without sufficient capacity, further development will remain limited. The maturity model thus functions not only as a measuring instrument but also as a steering tool for contract management and P2P processes. Based on the findings, national policy aimed at improving procurement maturity should emphasize the establishment of shared knowledge infrastructures, such as public procurement academies, centralized advisory services, or regional learning communities. These initiatives can address knowledge gaps without requiring each municipality to invest independently. Moreover, embedding maturity models in intermunicipal cooperation agreements may stimulate collective learning and benchmarking. The model therefore offers municipalities tools to measure their procurement maturity and make targeted improvements periodically.

This study makes several theoretical contributions to the existing literature on procurement maturity and maturity models in the public sector. First, the findings confirm the importance of knowledge as a key variable for organizational development, in line with previous theories, such as those of Bollinger and Smith (2001). Whereas previous studies focused mainly on private organizations, this study shows that knowledge also functions as a strategic success factor in the context of municipal procurement processes. Second, the study contributes to the operationalization and empirical testing of the otherwise abstract concept of procurement maturity. The results challenge common assumptions about internal factors, such as organizational size, time, and culture, whose direct effects on maturity appear limited. This opens space for theorizing about alternative or moderating influences, including leadership, change competence, or organizational learning culture. Third, this study makes an additional theoretical contribution by applying the evaluation framework proposed by Salah et al. (2022) to the existing CEP maturity model. Previous literature lacked empirical reflection on the quality of maturity models in the public sector. Rather than relying on anecdotal feedback, this structured approach enabled a systematic review of the CEP model. The evaluation revealed specific limitations, such as overlapping level descriptions, insufficient distinctiveness, and lack of comprehensiveness, which directly informed the development of the revised five-level model presented in this study. Compared to its predecessor, the revised model offers clearer distinctions, stronger alignment with procurement practice, and improved usability for benchmarking. As such, this study reinforces the importance of embedding maturity models in reflective evaluation cycles and contributes to the broader discussion on how such models function not only as diagnostic tools. Lastly, this study contributes to a broader understanding of maturity models as governance instruments. Rather than being neutral measurement tools, such models also shape how organizations think and act. They influence what is seen as “good” procurement and help steer learning, behaviour, and resource use in a specific direction (Andersen et al., 2020; Triantafillou, 2007). From this perspective, procurement maturity can also be seen as a form of policy capacity. The ability to develop and implement policies effectively (Wu et al., 2015). Maturity models support especially the analytical and operational sides of this capacity, by promoting structured processes and learning (Howlett & Ramesh, 2016). This highlights their potential value not only for measurement, but also for building stronger public organizations.

8 References

In this report, Grammarly and ChatGPT were used for grammar and spelling checks

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9 Appendices

Appendix A: Model Based on Feedback Domain Expert Survey

Het Coppa efficient purchasing model (CEP)

		Ad hoc	Foundational	Basic	Standardized	Integrated
General	Policy	No policy describing purcashing processes.	Policy includes a description of the purchasing process and acknowledges its importance	Policy includes descriptions of purchasing processes, objectives, contract classification structures, sustainability criteria, CSR guidelines, and responsibilities. Simple reporting on information flows is present	Policy is implemented organization-wide and focuses on ensuring information integrity. It is frequently evaluated and adjusted	Policy is an integral part of the organization, promoting continuous optimization, innovation, and collaboration between internal and external stakeholders
	Well-considered decisions to fulfill purchasing needs 1. Make-or-buy 2. Contract/order choice 3. Supplier selection	No awareness of existing options; decisions are made arbitrarily or intuitively without underlying analysis	Awareness of available options exists, but they are not yet applied objectively. Decisions remain largely intuitive	An objective standard approach has been developed to assess options, but it is not yet consistently applied	The objective standard approach is always applied. Decisions are consistently made based on established facts and criteria	The standard approach is periodically evaluated and optimized. Decisions are assessed internally and externally and adjusted as necessary
Orders	Organization & Ownership	No established agreements on purchasing responsibilities. Decisions are made arbitrarily without clear mandates or control.	Decisions are made arbitrarily without clear mandates or control.Some basic rules are agreed upon regarding mandates and approvals, but this is not fully structured	A clear mandate arrangement describes who is authorized to make purchases and under what conditions approval is needed. The arrangement is shared and followed within the organization	The mandate arrangement and responsibilities within the P2P process are fully developed. There is centralized insight into purchases and expenditures at all times, and compliance with the mandate arrangement is structurally monitored	purchasing decisions and mandates are not only documented and followed but also periodically evaluated and optimized
	Systems & Monitoring	Manual purchasing processes without system support	purchasing processes occur via digital systems, but orders and contracts are still managed in different systems without integration	A central system registers all purchasing-related processes. Orders and invoices are centrally visible. Approvals and commitments are still processed manually, without standardized workflows	purchasing processes occur via a standardized system with automated approval workflows. Commitments and performance declarations are directly linked to contracts, and processes are consistently applied	All orders are processed through the purchasing system. The system is fully integrated with accounting and supplier systems
	Process & Supplier Involvement/ Relationship	No contracts with price agreements or known fixed suppliers	It is clear where purchases should be made, and there are clear agreements on the delivery of products/services	It is clear where purchases should be made, and this is actually adhered to organization-wide for all purchases	Suppliers are integrated into the ordering process. Contracts, agreements, and reports (such as order status and delivery) are centrally visible	Collaboration with suppliers occurs at strategic, tactical, and operational levels, including process innovation and quality improvement of the product or service
	Performance Measurement & Satisfaction	Little to no performance measurement, reporting, and monitoring	purchasing orders are generally reviewed and assessedordeeld	Performance measurement based on reports from suppliers	Performance monitoring (such as order status and delivery) is visible and is monitored and reported in real-time from the internal system	Extensive performance measurement. Documented reports/feedback are discussed with suppliers. Suppliers also provide feedback
Contracts	Process	Contracts are partially or not inventoried. There is no central overview, and contracts are stored scattered without structure	Contracts are collected and stored, but without a fixed process or ownership. No categorization or control over contract compliance	Contracts are centralized, and basic actions (such as renewal) are performed. Ownership is assigned, but monitoring occurs reactively	Contracts are structurally categorized (e.g., strategic, operational, tactical). Actions and follow-up per category are aligned with the contract's impact	Contract management is integrated and strategically aligned with policy goals and risk management. Contract performance and compliance are continuously monitored and evaluated
	Systems	Contracts are not or only partially digitally registered	Contracts are digitally registered and centrally visible, but the system is mainly used for storage. There is no system support for monitoring or analysis.	The system has basic settings for notifications and alerts, but advanced data analysis is lacking. KPIs are established but not yet actively used	KPIs and dashboards monitor performance. The system provides insight into supplier performance and supports data-driven decision-making	Integrated systems collaborate with key suppliers for continuous optimization. AI supports contract analysis, risk detection, and performance monitoring. Relevant data is automatically processed
	Organization, Employees & Collaboration	No capacity allocated for contract management	Capacity is available for contract management, but it does not yet match the number of contracts and their classification	Capacity is aligned with contract classification. Required competencies are defined and assigned, but there is still limited attention to training and collaboration	Contract managers possess the appropriate competencies and undergo training	Continuous collaboration between employees and stakeholders in innovative solutions and value creation
	Supplier Performance	No insight into supplier performance	Supplier performance is mapped. Control over supplier performance occurs only reactively in case of major deviations or complaints	Proactive control through periodic evaluations, based on internal developments and performance indicators	Performance control occurs in close collaboration with suppliers	Continuous focus on collaboration, external developments (beyond the contract), and performance improvement through innovation

Optimization

Appendix B: Questionnaire expert survey

Maturity Model Evaluation

Q1.1 Dear participant, Thank you for your willingness to participate in this maturity model evaluation. Your expertise and feedback are important to further refine the current Coppa effective procurement (CDI) model with a view to the future and make it more practically applicable within the industry. Completing this questionnaire will take about 10-15 minutes. The questionnaire starts with some general questions, followed by an assessment of the entire model. The final section focuses on a detailed evaluation for each dimension, depending on your expertise. Your answers will be used for research purposes only. If you have any questions about this research, please contact me at [k.g.roza@student.utwente.nl]. Thank you in advance, Krysta Roza

General questions

Q2.1 What is your name?

Q2.2 What is your job title?

Part 1

Q3.1 The current Coppa effective procurement model is shown above. The following terms are used in the model: Maturity levels (Adhoc, Basic, Standardised or Integration) Dimensions (Policy, informed decisions, Organisation & property, etc.) Processes and practices are described for each dimension at each specific maturity level. How would you rate the following characteristics about the maturity model?

	Strongly disagree (1)	Disagree(2)	Neutral (3)	Agree (4)	Strongly agree (5)
The maturity levels are sufficient to represent all stages within contract management and P2P (Sufficiency) (1)	○	○	○	○	○
There is no overlap between the descriptions of maturity levels (Accuracy) (2)	○	○	○	○	○
The structure of the maturity levels is consistent and matches a natural progression in maturity (Logical structure) (3)	○	○	○	○	○
The processes and practices are relevant to all dimensions (Relevance) (4)	○	○	○	○	○
The processes and practices cover all aspects that impact the dimension (Comprehensiveness) (5)	○	○	○	○	○
The processes and practices are clearly distinguishable (Mutual Exclusion) (6)	○	○	○	○	○
The processes and practices are correctly assigned to the appropriate maturity levels (Accuracy) (7)	○	○	○	○	○
The maturity levels are understandable (Understandability) (8)	○	○	○	○	○
The scoring system is easy to use (Ease of use) (9)	○	○	○	○	○
The maturity levels are useful when conducting assessments (Usefulness) (10)	○	○	○	○	○
The model is practically applicable within the industry (Practicality) (11)	○	○	○	○	○

Q3.2 Do you have any further comments or remarks about the model or any of the statements?

Part 2

Q4.1 Currently, the model contains four elaborated maturity levels. Are the four elaborated levels in the model sufficient, or is expansion to five levels desirable?
o Yes, four levels are sufficient. (1)
o No, a fifth level is desired (2)

Q4.2 Can you explain why the preference of 5 levels was chosen?

Q4.3 Do you have any suggestions for further optimising the model?

Q4.4 What is your expertise?
o P2P (1)
o Contract management (2)
o Both P2P and contract management (3)

Part 3 P2P when selected P2P Expertise
Q5.1 This section focuses on a detailed assessment of each dimension. Can you answer the following four questions for each dimension? 1. Are you missing a maturity level within this dimension? 2. If yes, where is a level missing (e.g., between Basic & Standardized or after Integration)? 3. What associated processes and practices (description) would you add to this level? 4. Do you have any other additions or suggestions for this dimension? Please also consider new trends and technologies that can be integrated into the model.

Q5.2 The first dimension of General is Policy. 1. Are you missing a maturity level within this dimension? 2. If yes, where is a level missing (e.g. between Basic & Standardized or after Integration)? 3. What associated processes and practices (description) would you add to this level? 4. Do you have any other additions or suggestions for this dimension?

Q5.3 The second dimension of General is Well-considered Decisions. 1. Are you missing a maturity level within this dimension? 2. If yes, where is a level missing (e.g. between Basic & Standardized or after Integration)? 3. What associated processes and practices (description) would you add to this level? 4. Do you have any other additions or suggestions for this dimension?

Q5.4 The first dimension of Orders is Organization & Accountability. 1. Are you missing a maturity level within this dimension? 2. If yes, where is a level missing (e.g., between Basic & Standardized or after Integration)? 3. What associated processes and practices (description) would you add to this level? 4. Do you have any other additions or suggestions for this dimension? Please also consider n

Q5.5 The second dimension of Orders is Systems & Monitoring. 1. Are you missing a maturity level within this dimension? 2. If yes, where is a level missing (e.g. between Basic & Standardized or after Integration)? 3. What associated processes and practices (description) would you add to this level? 4. Do you have any other additions or suggestions for this dimension?

Q5.6 The third dimension of Orders is Process & supplier engagement/relationships. 1. Are you missing a maturity level within this dimension? 2. If yes, where is a level missing (e.g. between Basic & Standardized or after Integration)? 3. What associated processes and practices (description) would you add to this level? 4. Do you have any other additions or suggestions for this dimension?

Q5.7 The fourth dimension of Orders is Performance Measurement & Satisfaction. 1. Are you missing a maturity level within this dimension? 2. If yes, where is a level missing (e.g. between Basic & Standardized or after Integration)? 3. What associated processes and practices (description) would you add to this level? 4. Do you have any other additions or suggestions for this dimension?

Part 3 Contract Management when selected Contract Management Expertise

Q6.1 This section focuses on a detailed assessment of each dimension. Can you answer the following four questions for each dimension? 1. Are you missing a maturity level within this dimension? 2. If yes, where is a level missing (e.g., between Basic & Standardized or after Integration)? 3. What associated processes and practices (description) would you add to this level? 4. Do you have any other additions or suggestions for this dimension? Please also consider new trends and technologies that can be integrated into the model

Q6.2 The first dimension of General is Policy. 1. Are you missing a maturity level within this dimension? 2. If yes, where is a level missing (e.g. between Basic & Standardized or after Integration)? 3. What associated processes and practices (description) would you add to this level? 4. Do you have any other additions or suggestions for this dimension?

Q6.3 The second dimension of General is Well-considered Decisions. 1. Are you missing a maturity level within this dimension? 2. If yes, where is a level missing (e.g. between Basic & Standardized or after Integration)? 3. What associated processes and practices (description) would you add to this level? 4. Do you have any other additions or suggestions for this dimension?

Q6.4 The first dimension of Contracts is Process. 1. Are you missing a maturity level within this dimension? 2. If yes, where is a level missing (e.g., between Basic & Standardized or after Integration)? 3. What associated processes and practices (description) would you add to this level? 4. Do you have any other additions or suggestions for this dimension?

Q6.5 The second dimension of Contracts is Systems. 1. Are you missing a maturity level within this dimension? 2. If yes, where is a level missing (e.g. between Basic & Standardized or after Integration)? 3. What associated processes and practices (description) would you add to this level? 4. Do you have any other additions or suggestions for this dimension?

Q6.6 The third dimension of Contracts is Organization employees & collaboration. 1. Are you missing a maturity level within this dimension? 2. If yes, where is a level missing (e.g. between Basic & Standardized or after Integration)? 3. What associated processes and practices (description) would you add to this level? 4. Do you have any other additions or suggestions for this dimension?

Q6.7 The fourth dimension of Contracts is Supplier Performance. 1. Are you missing a maturity level within this dimension? 2. If yes, where is a level missing (e.g. between Basic & Standardized or after Integration)? 3. What associated processes and practices (description) would you add to this level? 4. Do you have any other additions or suggestions for this dimension?

Part 3 When selected both expertises

All Dimensions questions

Q8.1 Do you have any additional suggestions for improving the model that are not evident during the above questions?

End of the survey

Appendix C: Codebook Expert Survey

Theme	Code	Explanation/Quote
Theme 1. Need for an additional starting level	Entry level missing (13)	I actually miss the fact that an organization has no policy.
Theme 2. Unclear transition between levels	Mandate arrangement partially applied as intermediate level (1)	Some rules have been agreed upon for when approval is necessary (mandate arrangement).
	Incorrect level description (2)	The description of the level 'integration' fits more with 'Standardized'.
	Illogical transition (4)	Between ad hoc and basic, it's actually that there is a system, and you only process invoices in it. That seems to me a bit of a strange transition.
	Overlapping levels (4)	I find standardized and integration very similar to each other.
	Complete revision of dimension structure (4)	It's about (1) is it clear what the contracts are for and how payments can be made under them, (2) are the agreements/conditions clear, (3) are suppliers involved/integrated in the process, (4) how does the quantitative reporting go (there is contract insight into, for example, order status, whether delivery has occurred, whether the delivery has been accepted, etc.). In my opinion, that should be reflected in the levels.
Theme 3. Too much focus on structure, too little on application	Policy and decision-making insufficiently applied (3)	That the policy is actually applied/integrated into the organization
	Centralized/decentralized is not a maturity criterion (3)	Whether something is organized centrally or decentrally is not relevant for maturity. That really needs to be taken out, in my opinion.
	Insufficient attention to completeness and monitoring (1)	What you want to know is whether the right contracts have been inventoried (completely), whether it is all in one place, or whether people are keeping shadow administrations.
	P2P responsibilities insufficiently elaborated (1)	"The tasks and responsibilities within the P2P process are clearly defined."
	Structural assurance of compliance is lacking (2)	It is clear where and how to purchase. This is actually enforced across the entire organization.
	System usage insufficiently functionally designed (2)	There is a lot of vagueness in what is meant by 'systems', such as 'contracts are registered' and 'KPIs'.
	System application is lacking (2)	As soon as a system is present, it does not automatically mean that it is being used correctly/optimally.
Theme 4. Shortcomings in formulation and terminology	Unclear or faulty wording (5)	The description at Standardized is not a proper sentence
	Subjective wording (1)	Furthermore, try to avoid terms like 'generally speaking'.
Theme 5. No consideration for differentiation or scale	Differentiation in contract classification is lacking (1)	Also consider what you do for which contracts; link this to the classification.
	Quantitative capacity is not generated (1)	The focus is only on the number of available FTEs, not on 'quantitative capacity'.
	Distinction between contracts is lacking (1)	A method for categorizing contracts is important, classifying is also an essential part.
Theme 6. Lack of substantive element	Contract structure is lacking (3)	Another point: which contracts are we targeting here?
	Evaluation or steering is lacking (4)	The decision is not evaluated afterwards.
	Core policy is lacking (2)	I miss matters such as objectives, vision.
	Link to contract objectives is lacking (1)	In addition to securing the contract agreements, it is clear who in the organization monitors or controls the contract owner.
	Monitoring and reporting are lacking (3)	Performance is, e.g., reporting from the supplier, performance overview. Also: are these aspects discussed and evaluated?

Appendix D: Codebook Focus Groups

Thema	**Code**	**Explanation/Quote**
Theme 1. Shortcomings in wording and language use	Too subjective or normative wording (4)	So the options are well known, but they are still chosen intuitively
	Unclear wording (5)	Maybe it's in the tools, which in your opinion don't belong here, but to me it's again about the wording
	Redundant wording (5)	So then remove the word "whereby"
Theme 2. Illogical transition between levels	Lack of gradual development (4)	And shouldn't you also make the distinction that in the first one there is standardization of contract management and only in the next step you get management?
	Unclarity in monitoring/evaluation at highest level (1)	I only understand the last one. Because contract performance and compliance are continuously monitored and evaluated
	Too big a step between levels (3)	I also wonder, because I think the step from standardized to integrated is very large
	Shift of evaluation to highest level (1)	Frequently evaluated and adjusted towards integrated
Theme 3. Shift in focus towards application	Elaboration and degree of implementation (1)	But then you get okay, that policy must also meet a number of criteria. Next steps are only allowed when all criteria are met, when it is implemented organization-wide, and finally, when it is an integral part of the organization.
	Gap between theory and application (3)	So you get a very strange situation where you often end up scoring 'integrated' in all those rows
	Monitoring as a steering instrument (2)	Or you have to apply again that monitoring is done at different levels
	System use as a core criterion (1)	How do you use your system? Yes, that's what it's about.
	Skewed focus capacity vs. cooperation (1)	He is very focused on the capacity and its availability.
	Broadening evaluation to suppliers (1)	If you're going to evaluate all contracts, then you also need to question the organization about how your suppliers view you. I think that's a step behind what you say.
	Nuancing around centralisation/decentralisation (4)	Decentralized and centralized should have been really left out
Theme 4. Need for clearer definition of terms	Use of consistent term (9)	Just keep it relevant
	Unclarity about procurement and P2P concepts (3)	I don't understand why suddenly we're talking about procurement processes
	Unclarity about term 'relationship and management' (1)	Yes, you're talking about relationship and involvement
	Unclarity about contract management (highest level) (1)	I think it's strange that you start integrated with the word contract management

Appendix E: Comparison of CEP Maturity Model versions

This appendix presents a comparative overview of the original and improved versions of the CEP maturity model, structured per dimension and maturity level. The table highlights how each level has been reformulated or expanded in the 2025 version, based on findings from both the survey (Section 4.1) and the focus group (Section 4.2).

The most notable structural change is the addition of the new 'Foundational' level, which allows the model to better reflect organizations that are in the early stages of development and lack any formal structure (see improvement 1 in Section 4.3). Additionally, across dimensions, more emphasis has been placed on actual implementation and monitoring (improvement 4), conceptual clarity (improvement 5), and forward-looking themes such as CSR and automation (improvement 6).

Color-coding in the table helps visualize the origin of each description:

- Red indicates a major revision compared to the previous version
- Orange signifies that the description builds upon the previous version but includes additional elements or clarifications.
- Green shows areas that remain largely unchanged from the previous version.

	Ad Hoc	**Foundational**	**Organized**	**Standardized**	**Integrated**
Policy	New	Mainly Old Ad Hoc	Objectives, CSR guidelines, contract classification, structures and responsibilities added	Responsibilities reassigned, info integrity + organizatiopwide implementation	More emphasis on stakeholder collaboration and innovation
Well-considered decisions	New	Mainly Old Ad Hoc	Stronger focus on application of decision-making	Further on application	Mainly same as previous integration level
Organization & Ownership	New	Decentralization /centralization removed; focus on roles/responsibilities	Build on new foundation level	Build on new foundation level	Builds on new foundational level
Systems& Monitoring	New	Expanded to support the full P2P process	Builds on new foundational level	Builds on new foundational level	Emphasis on usage and active monitoring
Process & Supplier involvement/Relationship	New	Increased focus on performance measurement	More emphasis on applying performance measurement	Same as organized, broader implementation	Focus on collaboration and development
Process	New	Old Ad Hoc + additions on contract usage	Old Basic + categorization and compliance	Detailed planning incl. actions + implementation	Strategic evaluation + management aligned with goals
Systems	New	Focus on contract management tasks via systems	System componenets support the process	+ Data-driven decision-making	+ Automation
Organization, Employees & Collaboration	New	Clearer role distinctions introduced	Continued focus on role division	Continued focus on role division	Mainly same as previous integration level
Supplier Performance	New	Mainly Old Ad Hoc	More on periodic monitoring and evaluations	Stronger alignment with internal goals	+ focus on external developments and innovation

Appendix F: Survey Municipalities 2025

How mature is the procurement process within your municipality?

Take part in our national study and receive a confidential benchmarking report with valuable insights for further professionalisation.

Introduction
The University of Twente and Coppa invite you to participate in a study on the maturity level of municipal procurement processes. We aim to map the current state of affairs, explore development needs, and analyse factors that contribute to further professionalisation. Participation is voluntary and completely anonymous.

Purpose of the study
• Determine the current and desired maturity level of procurement processes.
• Identify factors that contribute to further development.

About the questionnaire
• Duration: approx. 30 minutes, depending on your answers.
• You will see your progress at the top of the screen.
• Answer the questions based on your knowledge.

Confidentiality
• Answers will be processed anonymously.
• Results will be shared at regional or national level.
• You can stop at any time or continue later.

Benefits of participation
• Insight into the P2P and contract management maturity model.
• Factors for further development within your municipality.
• A confidential benchmarking report compared to the national average.

Consent question
V1. Do you give permission to participate in this study after reading the information above?
○ Yes
○ No

By selecting "Yes," you confirm that you have read and understood this information and voluntarily consent to participate in the questionnaire. If you do not wish to participate, please select "No" and close the questionnaire.

This questionnaire works best on a laptop, computer, or tablet.

<u>Part 1: General Questions</u>
Below are several general questions.

Q2 In which province is the municipality where you work located?
- o Groningen
- o Friesland
- o Drenthe
- o Overijssel
- o Flevoland
- o Gelderland

- Utrecht
- Noord-Brabant
- Zuid-Holland
- Limburg
- Noord-Holland
- Zeeland

Q3. Do you collaborate on procurement with other municipalities?
- ○ Yes, if you wish, you can indicate below which municipality you collaborate with
- ○ No

Q4 What is your current position within the municipality? *(Open-ended question)*

Part 2: General Questions About the Purchasing Process

The first part of the survey focuses on the policy and any decisions that need to be made within the purchasing organization.

General - Policy

To what extent does the following statement apply to your organization?

Q5 Within the municipality, there is a policy in which the purchasing process is described and its importance to the organization are acknowledged.
(The purchasing process refers to the six steps: specification, selection, contracting, ordering, expediting, and follow-up).

- Strongly agree
- Agree -----→ Q6
- Somewhat agree
- Disagree
- Strongly disagree -----→ Q9

Q6 The policy, in addition to describing the purchasing process, includes objectives, CSR guidelines, contract classifications, and responsibilities.
- Strongly agree
- Agree -----→ Q7
- Somewhat agree
- Disagree
- Strongly disagree -----→ Q9

Q7 The policy is implemented and supported across the organization. It is also aimed at safeguarding the integrity of information.
- Strongly agree
- Agree -----→ Q8
- Somewhat agree
- Disagree
- Strongly disagree -----→ Q11

Q8 The policy is frequently evaluated and updated. The policy encourages continuous optimisation, innovation, and collaboration with both internal and external stakeholders.

- Strongly agree
- Agree
- Somewhat agree
- Disagree
- Strongly disagree

General - Well-considered decisions for

Imagine the following scenario:
A new need arises within the municipality where you work. For this, a new product or service must be purchased. Several decisions need to be considered for the acquisition.
The following questions address the following decisions:

- The decision between outsourcing or insourcing a service (insourcing refers to internally producing the product or performing the service within the organization).
- The decision between using a contract or making a one-time purchase.
- The decision to make a supplier selection.

To what extent do the following statements apply to your organization (on average across the three decisions mentioned above)?

Q9 For making the three decisions, there is awareness of the available options.
- Strongly agree
- Agree -----→ Q10
- Somewhat agree
- Disagree
- Strongly disagree -----→ Q13

Q10 For making the three decisions, an objective standard approach has been developed for choosing between options.
- Strongly agree
- Agree -----→ Q11
- Somewhat agree
- Disagree
- Strongly disagree -----→ Q13

Q11 . For making the three decisions, the standardised and objectified approach is applied in nearly all cases.
- Strongly agree
- Agree -----→ Q12
- Somewhat agree
- Disagree
- Strongly disagree -----→ Q13

Q12 For making the three decisions, the standard approach is periodically evaluated and optimized. In addition, the decisions taken are assessed based on internal and external factors.
- Strongly agree
- Agree
- Somewhat agree
- Disagree
- Strongly disagree

Part 3: Questions Regarding the Purchasing of Individual Orders (orders)
You are now 1/4 of the way through the survey.

The following questions focus on the purchasing of individual orders. To what extent does the following statement apply to your organization?

Q13 There are basic agreements regarding responsibilities and authorities within the purchase-to-pay (p2p) process.
(p2p refers to the purchasing request to invoice payment).

- Strongly agree
- Agree -----→ Q14
- Somewhat agree
- Disagree
- Strongly disagree -----→ Q17

Q14 The agreements on responsibilities and authorities are clearly and consistently documented. These are also followed in most cases.

- Strongly agree
- Agree -----→ Q15
- Somewhat agree
- Disagree
- Strongly disagree -----→ Q17

Q15 The agreements on responsibilities and authorities are consistently applied and followed throughout the organization.

- Strongly agree
- Agree -----→ Q16
- Somewhat agree
- Disagree
- Strongly disagree -----→ Q17

Q16 The agreements on responsibilities and authorities are regularly evaluated and optimized.

- Strongly agree
- Agree
- Somewhat agree
- Disagree
- Strongly disagree

Orders - Systems/Monitoring
To what extent does the following statement apply to your organization?

Q17 Within your organization, various systems support the purchase-to-pay process.

- Strongly agree
- Agree -----→ Q18
- Somewhat agree
- Disagree
- Strongly disagree -----→ Q21

Q18 There is one system that supports the purchase-to-pay process. Monitoring of the purchase-to-pay process takes place based on data.

- Strongly agree

- Agree -----→ Q19
- Somewhat agree
- Disagree
- Strongly disagree -----→ Q21

Q19 The system is used consistently, and actions are actively taken based on the monitored data.

- Strongly agree
- Agree -----→ Q20
- Somewhat agree
- Disagree
- Strongly disagree -----→ Q21

Q20 The system is fully integrated with supplier systems. The functioning of the process and the monitoring are continuously evaluated and optimized.

- Strongly agree
- Agree
- Somewhat agree
- Disagree
- Strongly disagree

Q21 Which system or systems are used within your procurement organization to support this process?

Orders - Process & Supplier involvement/relation

Q22 For almost all procurement needs in our municipality, contracts and/or agreements with suppliers are in place.

- Strongly agree
- Agree -----→ Q23
- Somewhat agree
- Disagree
- Strongly disagree -----→ Q26

Q23 The existing contracts and/or agreements with suppliers are known within the organization and are followed.

- Strongly agree
- Agree -----→ Q24
- Somewhat agree
- Disagree
- Strongly disagree -----→ Q26

Q24 There is cooperation with relevant suppliers at the operational and tactical level. There is regular coordination on execution, delivery, and agreements.

- Strongly agree
- Agree -----→ Q25
- Somewhat agree
- Disagree
- Strongly disagree -----→ Q26

Q25 Our municipality collaborates with relevant suppliers at the strategic level. There is room for co-innovation and quality improvement.

- Strongly agree
- Agree
- Somewhat agree
- Disagree
- Strongly disagree

Orders - Performance measurement and satisfaction

Q26 Performance measurement takes place sporadically.

- Strongly agree
- Agree -----→ Q27
- Somewhat agree
- Disagree
- Strongly disagree -----→ Q30

Q27 Performance is measured based on standard indicators from the internal system.

- Strongly agree
- Agree -----→ Q28
- Somewhat agree
- Disagree
- Strongly disagree -----→ Q30

Q28 Performance is measured based on reports from both the internal system and from suppliers. The results are periodically discussed with suppliers.

- Strongly agree
- Agree -----→ Q29
- Somewhat agree
- Disagree
- Strongly disagree -----→ Q30

Q29 Reports and feedback are structurally discussed internally (within the organization) and externally (with suppliers). Suppliers also provide feedback.

- Strongly agree
- Agree
- Somewhat agree
- Disagree
- Strongly disagree

Part 4: Questions About Contracts

You are now halfway through the survey.

The following questions concern ongoing procurement contracts within your municipality (contract management). To what extent do the following statements apply to your organization?

Contracts – Process

Q30. All contracts have been inventoried. The contract characteristics are known, and contracts are managed reactively.

- Strongly agree
- Agree → Q31

- Somewhat agree
- Disagree
- Strongly disagree → Q34

Q31. Contracts are categorized by relevance, with follow-up actions appropriate to the impact of the contract.

- Strongly agree
- Agree → Q32
- Somewhat agree
- Disagree
- Strongly disagree → Q34

Q32. For each contract category, the intensity of contract management to be performed has been determined (including operational and tactical actions). Based on this, an annual plan has been established and is consistently executed.

- Strongly agree
- Agree → Q33
- Somewhat agree
- Disagree
- Strongly disagree → Q34

Q33. Contracts are aligned with organizational goals, policy, and risk management, and are actively managed accordingly.

- Strongly agree
- Agree
- Somewhat agree
- Disagree
- Strongly disagree

Contracts – Systems

To what extent do the following statements apply to your organization?

Q34. Contracts are digitally registered in a system. Basic functionalities of the system, such as the alert function, are used for contract management.

- Strongly agree
- Agree → Q35
- Somewhat agree
- Disagree
- Strongly disagree → Q40

Q35. In which system are the contracts registered?
(Open question)

Q36. Is this the same system in which the orders are registered?

- Yes
- No

Q37. Contracts are organized based on both contract characteristics and contract relevance. The contract file is in order and automatic workflows support the process.

- Strongly agree
- Agree → Q38
- Somewhat agree
- Disagree
- Strongly disagree → Q40

Q38. Contracts are actively monitored via dashboards. The system supports data-driven decision-making.

- Strongly agree
- Agree → Q39
- Somewhat agree
- Disagree
- Strongly disagree → Q40

Q39. The system is integrated with supplier systems and supports automation and continuous optimization.

- Strongly agree
- Agree
- Somewhat agree
- Disagree
- Strongly disagree

Contracts – Organization, Employees & Collaboration
To what extent do the following statements apply to your organization?

Q40. The essential roles within the contract management process are assigned.

- Strongly agree
- Agree → Q41
- Somewhat agree
- Disagree
- Strongly disagree → Q44

Q41. The essential roles are assigned and internal stakeholders are defined within the contract management process. Capacity is available for these roles and required competencies are defined.

- Strongly agree
- Agree → Q42
- Somewhat agree
- Disagree
- Strongly disagree → Q44

Q42. The staff fulfilling these essential roles possess the appropriate competencies. Investment is made in training. Internal stakeholders from relevant disciplines work closely together.

- Strongly agree
- Agree → Q43
- Somewhat agree
- Disagree
- Strongly disagree → Q44

Q43. Within the organization, there is continuous collaboration between essential roles and internal stakeholders aimed at innovative solutions and value creation.

- Strongly agree
- Agree
- Somewhat agree
- Disagree
- Strongly disagree

Contracts – Supplier Performance
To what extent do the following statements apply to your organization?

Q44. Steering on supplier performance occurs reactively in case of major deviations or complaints.

- Strongly agree
- Agree → Q45
- Somewhat agree
- Disagree
- Strongly disagree → Q48

Q45. Steering on supplier performance takes place through periodic monitoring and evaluations.

- Strongly agree
- Agree → Q46
- Somewhat agree
- Disagree
- Strongly disagree → Q48

Q46. Performance management occurs in close collaboration with suppliers and is aligned with internal developments and objectives.

- Strongly agree
- Agree → Q47
- Somewhat agree
- Disagree
- Strongly disagree → Q48

Q47. There is continuous collaboration with suppliers focused on external developments, innovation, and performance improvement.

- Strongly agree
- Agree
- Somewhat agree
- Disagree
- Strongly disagree

Part 5: Verifying previous answers

You are 3/4 of the way through the questionnaire

To increase the reliability of this study, the dimensions of the maturity model are shown below. Can you please indicate for each dimension:

- Which of the indicated levels currently best fits the purchasing organization you work for?
- Which level do you aim to achieve within 5 years?

Q48. Below you see a maturity dimension related to purchasing policy. Please fill in:

	Ad hoc	Foundational	Organized	Standardized	Integrated
Policy	Purchasing processes are not documented in the policy	There is a policy in which purchasing processes are described, and the importance is acknowledged	The policy not only describes the purchasing process but also includes objectives, CSR guidelines, contract classification structures, and responsibilities	The policy is implemented and supported organization-wide. In addition, it aims to ensure the integrity of information	The policy is frequently evaluated and adjusted. The policy encourages continuous optimization, innovation, and collaboration between internal and external stakeholders

	Level 1: Ad hoc	Level 2: Foundational	Level 3: Organised	Level 4: Standardized	Level 5: Ingegrated
Current situation	○	○	○	○	○
Desired situation **in 5 years?**	○	○	○	○	○

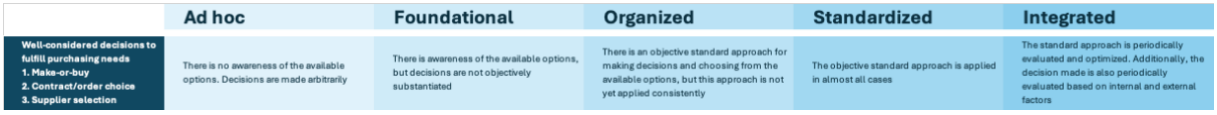
Q49. Once again, imagine the following scenario:

A new need arises within the municipality where you work. To meet this need, a new product or service must be procured. Several decisions may need to be considered as part of this procurement process. The following decisions are:

- The decision between outsourcing or insourcing a service (insourcing refers to internally producing the product or performing the service within the organization).

- The decision between using a contract or making a one-time purchase.
- The decision to make a supplier selection.

Below you see a maturity dimension related to informed decision-making. Please fill in:



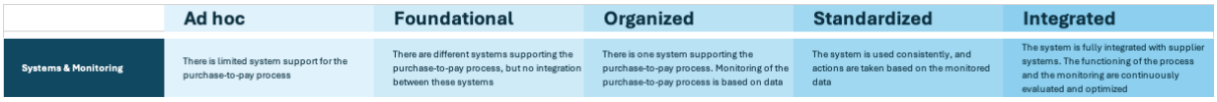
Insourcing refers to the internal production of the product or the delivery of the service by the organization itself.

	Level 1: Ad hoc	Level 2: Foundational	Level 3: Organised	Level 4: Standardized	Level 5: Ingegrated
Current situation	○	○	○	○	○
Desired situation **in 5 years?**	○	○	○	○	○

Q50. Below you see a maturity dimension related to organization and ownership in the P2P process. Please fill in:

	Level 1: Ad hoc	Level 2: Foundational	Level 3: Organised	Level 4: Standardized	Level 5: Ingegrated
Current situation	○	○	○	○	○
Desired situation **in 5 years?**	○	○	○	○	○

Q51. Below you see a maturity dimension related to system support for the P2P process. Please fill in:

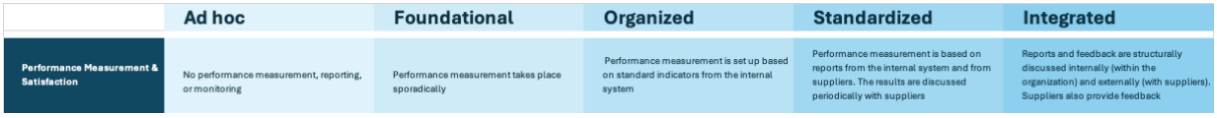


	Level 1: Ad hoc	Level 2: Foundational	Level 3: Organised	Level 4: Standardized	Level 5: Ingegrated
Current situation	○	○	○	○	○
Desired situation **in 5 years?**	○	○	○	○	○

Q52. Below you see a maturity dimension related to supplier relationships and involvement in the P2P process. Please fill in:

	Level 1: Ad hoc	Level 2: Foundational	Level 3: Organised	Level 4: Standardized	Level 5: Ingegrated
Current situation	○	○	○	○	○
Desired situation **in 5 years?**	○	○	○	○	○

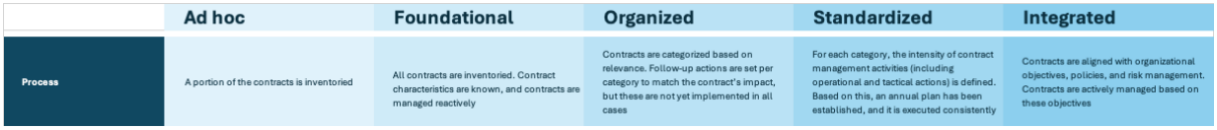
Q53. Below you see a maturity dimension related to supplier performance in the P2P process. Please fill in:



	Ad hoc	Foundational	Organized	Standardized	Integrated
Performance Measurement & Satisfaction	No performance measurement, reporting, or monitoring	Performance measurement takes place sporadically	Performance measurement is set up based on standard indicators from the internal system	Performance measurement is based on reports from the internal system and from suppliers. The results are discussed periodically with suppliers	Reports and feedback are structurally discussed internally (within the organization) and externally (with suppliers). Suppliers also provide feedback

	Level 1: Ad hoc	Level 2: Foundational	Level 3: Organised	Level 4: Standardized	Level 5: Ingegrated
Current situation	○	○	○	○	○
Desired situation **in 5 years?**	○	○	○	○	○

Q54. Below you see a maturity dimension related to the contract management process. Please fill in:



	Ad hoc	Foundational	Organized	Standardized	Integrated
Process	A portion of the contracts is inventoried	All contracts are inventoried. Contract characteristics are known, and contracts are managed reactively	Contracts are categorized based on relevance. Follow-up actions are set per category to match the contract's impact, but these are not yet implemented in all cases	For each category, the intensity of contract management activities (including operational and tactical actions) is defined. Based on this, an annual plan has been established, and it is executed consistently	Contracts are aligned with organizational objectives, policies, and risk management. Contracts are actively managed based on these objectives

	Level 1: Ad hoc	Level 2: Foundational	Level 3: Organised	Level 4: Standardized	Level 5: Ingegrated
Current situation	○	○	○	○	○
Desired situation **in 5 years?**	○	○	○	○	○

Q55. Below you see a maturity dimension related to systems supporting the contract management process. Please fill in:

	Ad hoc	Foundational	Organized	Standardized	Integrated
Systems	Contracts are not or only partially digitally registered	Contracts are digitally registered in a system. Contract management is supported by basic functionalities of the system, such as alert functions	Contracts are organized based on both contract characteristics and relevance. The contract file is complete, and automatic workflows support the process	Contracts are actively monitored via dashboards. The system supports data-driven decision-making	The system is integrated with supplier systems and supports automation and continuous optimization

	Level 1: Ad hoc	Level 2: Foundational	Level 3: Organised	Level 4: Standardized	Level 5: Ingegrated
Current situation	○	○	○	○	○
Desired situation **in 5 years?**	○	○	○	○	○

Q56. Below you see a maturity dimension related to organization, employees & collaboration in the contract management process. Please fill in:

	Ad hoc	Foundational	Organized	Standardized	Integrated
Organization, Employees & Collaboration	The essential roles (contract owner, manager, and administrator) within the contract management process are not clearly defined. No specific capacity for contract management is available	The essential roles within the contract management process are defined	The essential roles are defined, and internal stakeholders are identified within the contract management process. Capacity for the essential roles is available, and the required competencies are defined	The employees fulfilling the essential roles have the appropriate competencies. Investments are made in training. Internal stakeholders from the involved disciplines collaborate intensively	Continuous collaboration between essential roles and internal stakeholders on innovative solutions and value creation

	Level 1: Ad hoc	Level 2: Foundational	Level 3: Organised	Level 4: Standardized	Level 5: Ingegrated
Current situation	○	○	○	○	○
Desired situation **in 5 years?**	○	○	○	○	○

Q57. Below you see a maturity dimension related to supplier performance within contract management. Please fill in:

	Ad hoc	Foundational	Organized	Standardized	Integrated
Supplier Performance	There is no insight into supplier performance	Supplier performance is managed reactively, mainly when major deviations or complaints occur	Supplier performance management is carried out through periodic monitoring and evaluations	Performance management takes place in close collaboration with suppliers and is aligned with internal developments and objectives	There is continuous collaboration with suppliers, focusing on external developments, innovation, and performance improvement

	Level 1: Ad hoc	Level 2: Foundational	Level 3: Organised	Level 4: Standardized	Level 5: Ingegrated
Current situation	○	○	○	○	○
Desired situation **in 5 years?**	○	○	○	○	○

Part 6: Questions About Organizational Size, Culture, and Available Resources (Knowledge, Time, and Budget)

Q58. What is the size of your municipality based on the number of inhabitants?

- ○ Small (up to 50,000 inhabitants)
- ○ Medium sized (50,000 – 100,000 inhabitants)
- ○ Large (more than 100,000 inhabitants)

Q59. Which of the following statements best describes the organization within the municipality where you work?

- ○ The organization has a very personal character. It resembles a large family, and people seem to have a lot in common
- ○ The organization is very dynamic, with a strong entrepreneurial spirit. People are willing to take risks and step out of their comfort zone
- ○ The organization is tightly managed and structured. Formal processes generally dictate what people do
- ○ The organization is strongly results-oriented. Getting the job done is the primary concern. People are highly competitive and focused on achieving results

Q60. In our municipality, there is sufficient knowledge available to support progression along the maturity scale of the purchasing process, particularly in the areas of P2P and contract management.

- ○ Strongly agree
- ○ Agree
- ○ Somewhat agree
- ○ Disagree
- ○ Strongly disagree

Q61. In our municipality, employees have sufficient time to support progression along the maturity scale of the purchasing process, particularly in the areas of P2P and contract management.

- ○ Strongly agree
- ○ Agree
- ○ Somewhat agree
- ○ Disagree
- ○ Strongly disagree

Q62. In our municipality, there is sufficient budget available to enable employees to support progression along the maturity scale of the purchasing process, particularly in the areas of P2P and contract management.

- ○ Strongly agree
- ○ Agree
- ○ Somewhat agree
- ○ Disagree
- ○ Strongly disagree

Q63. Are there challenges present for progression along the maturity scale of the purchasing process, particularly in the areas of contract management and the P2P process? If yes, what are they? *(Open-ended question)*

Ending questions

Q64. I had sufficient knowledge to complete this questionnaire.

- Strongly agree
- Agree
- Somewhat agree
- Disagree
- Strongly disagree

Q65. Thank you very much for completing this questionnaire. Would you like to receive the results of this research? If yes, please leave your email address here: *(Open-ended)*

Q66. A similar study was conducted in 2020. If your municipality participated at the time, we ask your permission to compare the maturity score from this questionnaire with the score from 2020. All data will be processed anonymously. Do you give permission for this comparison?

- Yes
- No

End of Survey
Thank you for participating

Appendix G: Assessment of Non-Response Bias

To assess potential non-response bias, early respondents (first 25%) were compared with late respondents (last 25%) based on two variables: procurement maturity score and municipality size. An independent samples t-test revealed no significant difference in maturity scores between early (M = 1.83, SD = 0.51) and late respondents (M = 1.93, SD = 0.65), t(42) = -0.576, p = .568. A small effect size was observed (Cohen's d = -0.17).

Independent Samples T-Test

	t	df	p	Cohen's d	SE Cohen's d
Maturity_Score	−0.576	42	0.568	−0.174	0.303

Note. Student's t-test.

Assumption Checks ▼

Test of Normality (Shapiro-Wilk) ▼

		W	p
Maturity_Score	early	0.966	0.628
	late	0.923	0.090

Note. Significant results suggest a deviation from normality.

Test of Equality of Variances (Brown-Forsythe)

	F	df_1	df_2	p
Maturity_Score	0.562	1	42	0.458

Descriptives

Group Descriptives

	Group	N	Mean	SD	SE	Coefficient of variation
Maturity_Score	early	22	1.828	0.513	0.109	0.280
	late	22	1.930	0.650	0.139	0.337

Additionally, a chi-squared test was conducted to examine whether the distribution of municipality sizes differed between early and late respondents. The results indicated no significant association between response timing and municipality size, $\chi^2(2, N = 44) = 1.26$, $p = .533$.

Together, these findings suggest that the sample does not show strong signs of non-response bias in terms of maturity level or municipal size, supporting the assumption that the data are sufficiently representative for exploratory and comparative analysis.

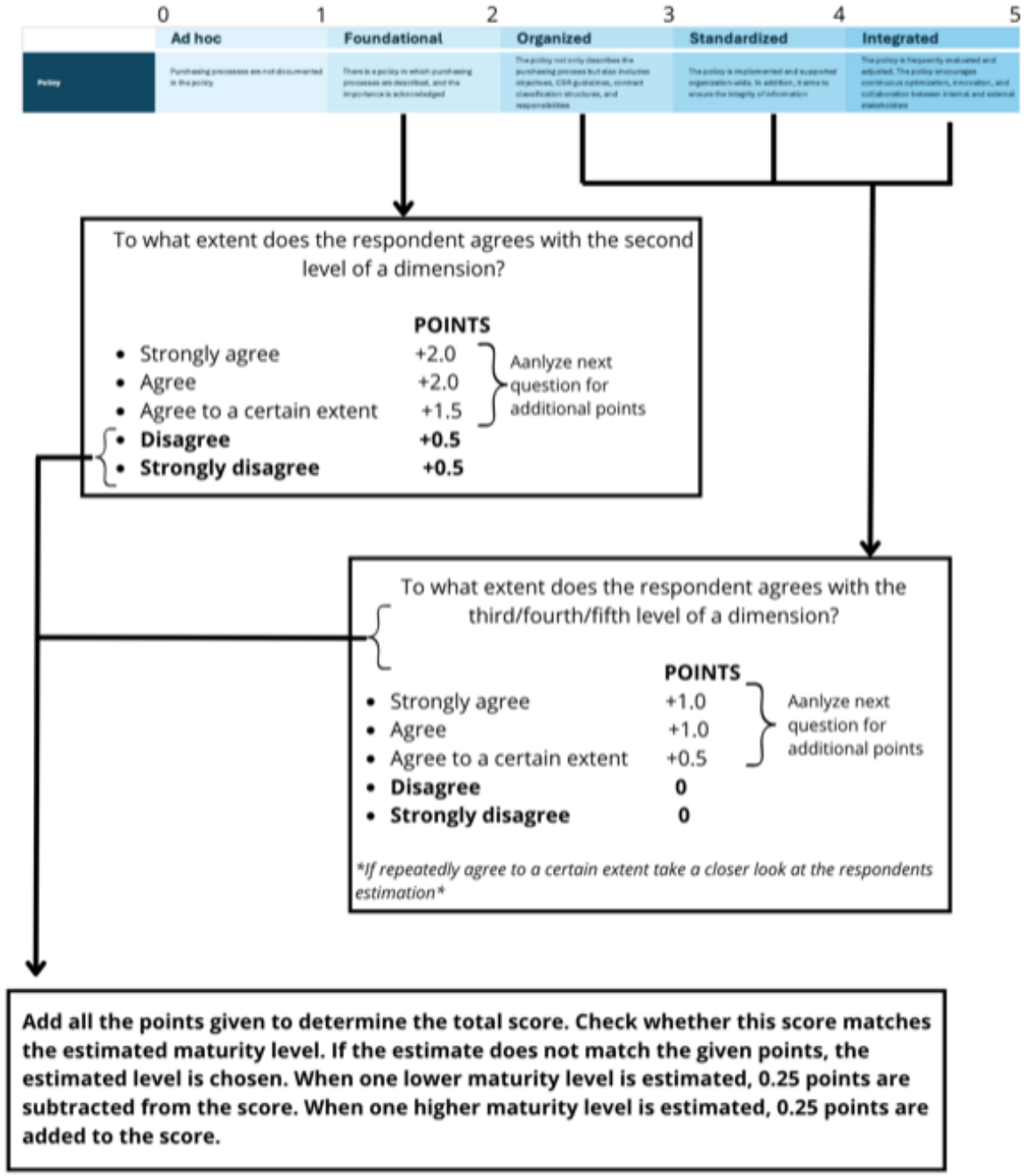
Contingency Tables

	Respnse_Timing		
Municipality_Size	early	late	Total
Small	19	16	35
Medium-sized	2	4	6
Large	1	2	3
Total	22	22	44

Chi-Squared Tests

	Value	df	p
X^2	1.257	2	0.533
N	44		

Appendix H: Scoring System



Appendix I: Normality Check Dependent Variables

This section examines whether the dependent variables are normally distributed, which is an important assumption for various statistical analyses, such as regression and t-tests. Visual inspection via Q-Q plots and statistical testing via the Shapiro-Wilk test were applied to both the current maturity level (Current) and the desired level in five years (Ambition).

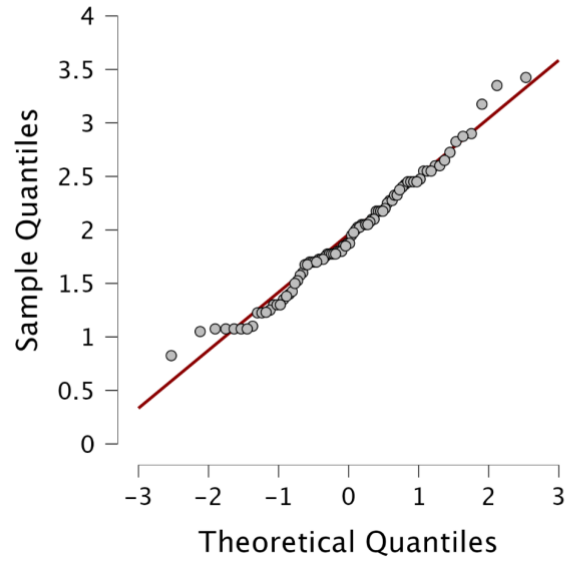
Descriptive Statistics ▼

	Maturity_Current	Ambition_Total
Valid	88	88
Median	1.875	3.700
Mean	1.941	3.633
Std. Deviation	0.554	0.577
Shapiro-Wilk	0.982	0.989
P-value of Shapiro-Wilk	0.244	0.693
Minimum	0.825	1.900
Maximum	3.425	5.000

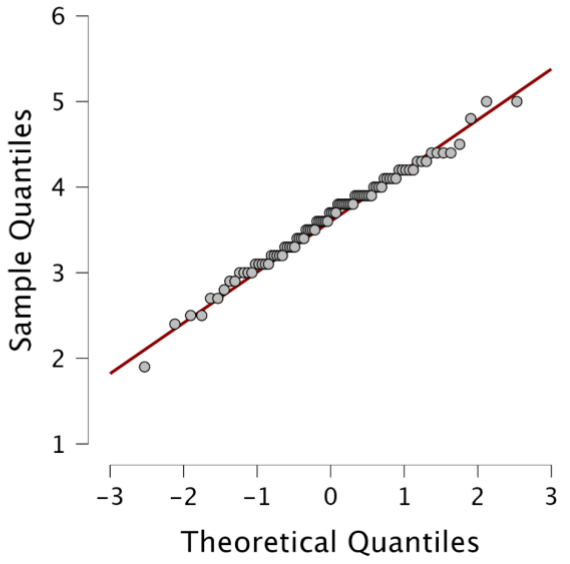
The Q-Q plots below show for each dependent variable (current and ambition maturity level) how the observed values compare to a theoretical normal distribution. Dots that are close to the diagonal indicate normality. This supports the use of analytical methods in the main report.

Q-Q Plots ▼

Maturity_Current ▼



Ambition_Total



Appendix J: Descriptive Statistics Current and Ambition Level

The descriptive statistics below provide insight into the central tendencies and distribution of both current and desired maturity levels. This information helps to quantitatively substantiate differences between the current and desired situations.

Descriptive Statistics

	Maturity_Current	Maturity_General	Maturity_Orders	Maturity_Contracts
Valid	88	88	88	88
Median	1.875	2.500	1.938	1.594
Mean	1.941	2.592	1.857	1.699
Std. Deviation	0.554	0.770	0.661	0.635
Shapiro-Wilk	0.982	0.943	0.983	0.949
P-value of Shapiro-Wilk	0.244	< .001	0.282	0.002
Minimum	0.825	1.125	0.500	0.688
Maximum	3.425	4.750	3.563	4.063

Descriptive Statistics ▼

	Ambition_Total	Ambition_General	Ambition_Orders	Ambition_Contracts
Valid	88	88	88	88
Median	3.700	4.000	3.500	3.500
Mean	3.633	4.017	3.608	3.466
Std. Deviation	0.577	0.680	0.624	0.651
Shapiro-Wilk	0.989	0.909	0.971	0.976
P-value of Shapiro-Wilk	0.693	< .001	0.044	0.105
Minimum	1.900	2.000	2.000	1.750
Maximum	5.000	5.000	5.000	5.000

Appendix K: Descriptive Statistics Dimensions

These tables contain the median and standard deviations for each dimension of the maturity model. This allows for comparison between dimensions, both in terms of current maturity.

Descriptive Statistics ▼

	Policy	Decision Making
Valid	88	88
Median	3.000	2.250
Std. Deviation	0.909	0.887
Minimum	1.000	0.750
Maximum	4.750	5.000

Descriptive Statistics ▼

	Organization & ownership	Systems & monitoring	Process & supplier involvement/relation	Performance measuring & satisfaction
Valid	88	88	88	88
Median	2.500	1.750	1.500	1.500
Std. Deviation	0.987	0.939	1.020	0.772
Minimum	0.500	0.500	0.500	0.500
Maximum	4.750	4.000	4.750	5.000

Descriptive Statistics

	Process	Systems	Organization, employees & collaboration	Supplier performance
Valid	88	88	88	88
Median	1.500	2.000	1.500	2.000
Std. Deviation	0.952	0.779	0.903	0.652
Minimum	0.500	0.500	0.500	0.500
Maximum	4.750	4.000	4.750	5.000

Appendix L: Paired T-test Current and Ambition Level

To test whether there is a significant difference between current and desired maturity levels, a paired t-test was performed. This is relevant for assessing the expected development potential within organizations. The results, shown in the figure below, show that the average desired level is significantly higher than the current level (25,160 (87) = p < 0.001). This suggests that respondents clearly show ambition for higher procurement maturity in five years.

Paired Samples T-Test ▾

Paired Samples T-Test

Measure 1		Measure 2	t	df	p	Cohen's d	SE Cohen's d
Ambition_Total	-	Maturity_avg_current	25.160	87	< .001	2.682	0.255

Note. Student's t-test.

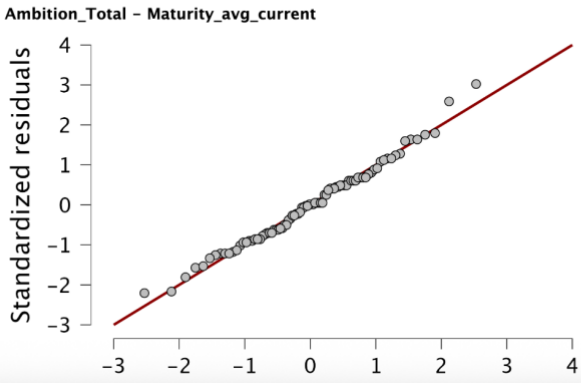
Assumption Checks ▾

Test of Normality (Shapiro-Wilk) ▾

			W	p
Ambition_Total	-	Maturity_avg_current	0.987	0.546

Note. Significant results suggest a deviation from normality.

Q-Q Plots



Appendix M: Correlation Analysis Current and Ambition

To explore whether municipalities with a higher current procurement maturity also report higher levels of ambition, a Pearson correlation analysis was conducted. Prior to the analysis, assumptions of normality were tested using the Shapiro-Wilk test, which showed no significant deviations from normality for either variable ($p > .05$). This justified the use of Pearson's r.

Descriptive Statistics

	Ambition_Total	Maturity_Current
Valid	88	88
Mean	3.633	1.941
Std. Deviation	0.577	0.554
Shapiro-Wilk	0.989	0.982
P-value of Shapiro-Wilk	0.693	0.244
Minimum	1.900	0.825
Maximum	5.000	3.425

The results indicate a statistically significant, moderate positive correlation between current maturity level and ambition level, $r(88) = .379$, $p < .001$. This suggests that municipalities with more mature procurement processes tend to express higher ambitions for further development.

Pearson's Correlations

Variable		Ambition_Total	Maturity_Current
1. Ambition_Total	Pearson's r	—	
	p-value	—	
2. Maturity_Current	Pearson's r	0.379	—
	p-value	< .001	—

Appendix N: Correlation Matrix Current Maturity

The correlation matrix shows how strongly the independent variables are related to the current maturity level and to each other. This is important to assess possible multicollinearity or redundancy in the model prior to regression analysis.

Association Matrix ▼

Correlation ▼

	Maturity_Current	Maturity_General	Maturity_Orders	Maturity_Contracts	Knowledge	Time	Budget
Maturity_Current	1.000	0.688	0.904	0.824	0.365	−0.107	0.153
Maturity_General	0.688	1.000	0.566	0.305	0.273	−0.197	0.010
Maturity_Orders	0.904	0.566	1.000	0.589	0.321	−0.136	0.224
Maturity_Contracts	0.824	0.305	0.589	1.000	0.298	0.028	0.095
Knowledge	0.365	0.273	0.321	0.298	1.000	0.174	0.212
Time	−0.107	−0.197	−0.136	0.028	0.174	1.000	0.455
Budget	0.153	0.010	0.224	0.095	0.212	0.455	1.000

Appendix O: Multiple Regression

In this analysis, a multiple linear regression was performed to determine which independent variables contribute significantly to explaining the current maturity level. Figure X shows the ANOVA table of the regression model, which shows that the model as a whole is significant (p = 0.006).

ANOVA

Model		Sum of Squares	df	Mean Square	F	p
M_1	Regression	5.207	6	0.868	3.267	0.006
	Residual	21.516	81	0.266		
	Total	26.723	87			

Note. M_1 includes Culture, Size_small, Size_large, Knowledge, Time, Budget
Note. The intercept model is omitted, as no meaningful information can be shown.

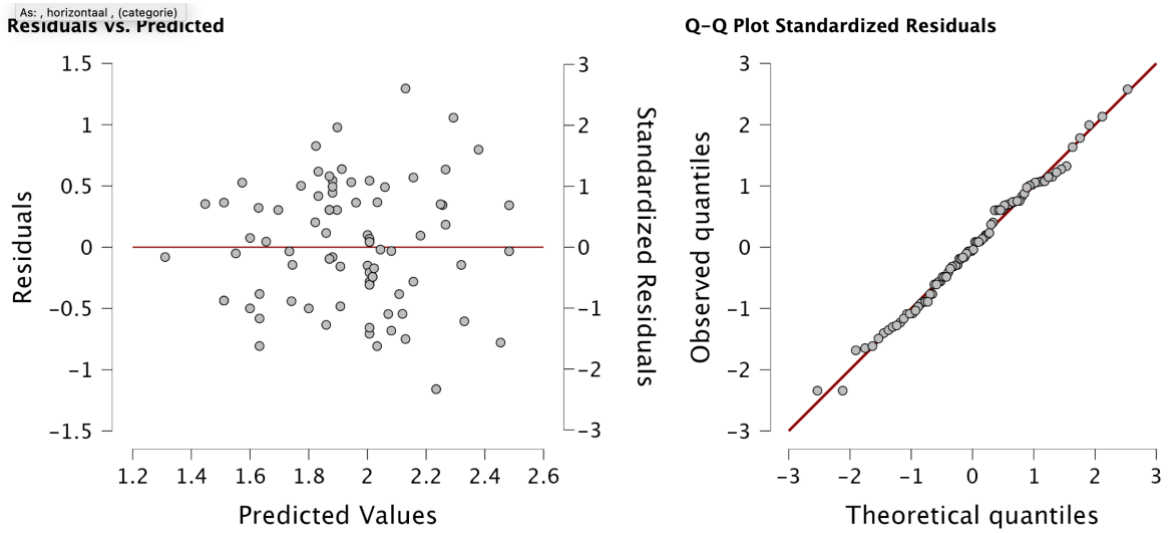
The figure below shows the collinearity diagnostics. The Condition Index remains below the limit of 30, and no combination of variables shows extreme overlap in the Variance Proportions. This indicates that multicollinearity is not a serious problem in this model.

Collinearity Diagnostics

				Variance Proportions						
Model	Dimension	Eigenvalue	Condition Index	(Intercept)	Culture (1)	Size_small (1)	Size_large (1)	Knowledge	Time	Budget
M_1	1	5.107	1.000	0.001	0.010	0.006	0.003	0.002	0.002	0.002
	2	1.033	2.223	0.000	0.024	0.029	0.490	0.000	0.000	0.000
	3	0.503	3.185	0.001	0.820	0.040	0.020	0.002	0.004	0.000
	4	0.237	4.639	0.001	0.016	0.659	0.357	0.015	0.014	0.019
	5	0.062	9.096	0.035	0.001	0.009	0.011	0.339	0.360	0.101
	6	0.039	11.482	0.001	0.124	0.039	0.003	0.020	0.592	0.843
	7	0.019	16.242	0.961	0.005	0.219	0.115	0.622	0.028	0.034

Note. The intercept model is omitted, as no meaningful information can be shown.

The Q-Q plot shows a largely normal distribution of residuals and the scatterplot of residuals versus predicted values shows no pattern, indicating homoscedasticity.



Appendix P: Explorative Analysis

This additional analysis examined a possible indirect effect of Budget on Maturity mediated by Knowledge. Although not included in the theoretical model beforehand, the results provided evidence of an indirect mechanism that may explain the relationship between resources and maturity. The results, Figure ..., show that the direct effect of Budget on Maturity_Current is not significant (β = 0.054, p = 0.435). However, there is a significant positive effect of Budget on Knowledge (β = 0.207, p = 0.042), and a strong significant effect of Knowledge on Maturity_Current (β = 0.244, p < 0.001). The estimated indirect effect of Budget through Knowledge is 0.050 and is significant at the 10% level (p = 0.079). The overall effect of Budget on maturity is thus not significant (β = 0.104, p = 0.147), but does show an indication of an indirect influence. This suggests that a larger available budget does not automatically lead to a higher maturity level, but that the effect only occurs when this budget is used for knowledge enhancement within the organization.

Parameter estimates

Direct effects

							95% Confidence Interval	
			Estimate	Std. Error	z-value	p	Lower	Upper
Budget	→	Maturity_Current	0.054	0.069	0.780	0.435	−0.105	0.207

Note. Delta method standard errors, bias-corrected percentile bootstrap confidence intervals, ML estimator.

Indirect effects

								95% Confidence Interval	
					Estimate	Std. Error	z-value	p	Lower	Upper
Budget	→	Knowledge	→	Maturity_Current	0.050	0.029	1.754	0.079	-2.092×10^{-4}	0.166

Note. Delta method standard errors, bias-corrected percentile bootstrap confidence intervals, ML estimator.

Total effects

							95% Confidence Interval	
			Estimate	Std. Error	z-value	p	Lower	Upper
Budget	→	Maturity_Current	0.104	0.072	1.452	0.147	−0.058	0.245

Note. Delta method standard errors, bias-corrected percentile bootstrap confidence intervals, ML estimator.

Path coefficients

							95% Confidence Interval	
			Estimate	Std. Error	z-value	p	Lower	Upper
Knowledge	→	Maturity_Current	0.244	0.071	3.446	< .001	0.104	0.397
Budget	→	Maturity_Current	0.054	0.069	0.780	0.435	−0.105	0.207
Budget	→	Knowledge	0.207	0.102	2.037	0.042	−0.021	0.455

Note. Delta method standard errors, bias-corrected percentile bootstrap confidence intervals, ML estimator.

Appendix Q: Open Answers Survey Question

Question: Are there challenges present for progression along the maturity scale of the purchasing process, particularly in the areas of contract management and the P2P process? If yes, what are they?

Recognizing the importance of contract management; after a six-year process, we have now been allocated 1 FTE for contract management in business operations. Contract management in the social domain is better organized, but in my view, it gives a different interpretation to contract management.
Recruitment of (permanent) staff.
Staffing and support within the management team and the municipal executive. Recognition of its importance takes too long.
Contract management insufficiently fulfills a strong advisory role.
The organizational culture, in which people mostly operate within their own team and are not always aware of the organization-wide impact. Many new employees and external staff are not well informed about the procurement and contract management policy.
The municipal executive.
Time, money, and people.
It is mainly the willingness of people that is lacking when it comes to improving the procurement process.
A decentralized procurement organization, coordinated by a small central team of procurement advisors.
Many developments are happening simultaneously. You cannot demand too many changes from employees at once.
Budgetary constraints.
Above all, there are simply not enough people to do this work. Most of the roles have not even been assigned within the organization, and there is no budget for them either. So if this work (contract management) is being done, it's only because people are doing it on the side.
Decisions are made solely based on benchmarking with other municipalities, but those municipalities do not have things in order either. This way of thinking is difficult to break.
Conflicting interests between finance and procurement.
Support base.
We have assigned responsibility for compliance and efficiency in a decentralized manner. Centrally: supporting policy and advice.
There is still a certain level of "turnover" of personnel: permanent staff over a longer period are beneficial for building and remembering process agreements.
There is a difference between contract administration and contract management.
Positioning within the organization.
Staff turnover combined with temporarily hired personnel.
Budget cuts
Changes in personnel, managing agreements (guiding people and following procedures).
The available time due to many initiatives.
Contract management is organized decentrally. Contract management can certainly be further professionalized. A dashboard and complete overview are lacking.
"The main question is whether further development is even necessary. Is there, in a (small) municipality, really a business case for improving and formalizing things? It is often 'good enough', and it is also desirable to have flexibility in the process.
The labor market, which means mainly inexperienced purchasers can be attracted.
High workload and a decentralized procurement organization.
Conservative attitude of some employees.
When it comes to P2P, the question is whether we even want it; contract management can and should become bigger and more important.
Sense of urgency.
Procurement is decentralized, which means there is not always visibility over all purchases.

The added value of P2P is not yet recognized by management and by Finance & Control.
Procurement assignments are centrally handled by X. Contract management is assigned within the line organization.
Vision and recognition of the importance.
Small municipality, which means that using a procurement system is not a priority.
So far, there is no or very little support from the Finance department for an established P2P process.
Its added value is (still) not recognized. The importance of contract management is acknowledged, but the realization that the P2P process can contribute to this is (still) lacking.
"Yes. There are no contract management systems that cover all types of contracts. That's why we have built a contracts module into the case management system ourselves. It's not optimal or user-friendly, but it works."
We (X) work for three municipalities. The municipalities' needs are not uniform.
Capacity. Scarcity.
"Procurement of software and ambition/support from the board and civil service organization. (Attitude and behavior)"
Insight into the subject you are going to procure. What is available on the market? How do suppliers differ? What do you want to improve? How do you improve your own process with a new contract?
The current organizational structure promotes more autonomous working. This has pros and cons. A disadvantage is that colleagues who are not buyers still think they know how to do it.
Not enough time. You are expected to do it on the side.
Legislation.
Budget and staffing positions.

Appendix R: Background Characteristics of the Examined Influencing Factors

The figures below summarize the background characteristics of the participating municipalities (N=88) and the distribution of responses related to the five unexamined factors.