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ANALYZING SME PARTICIPATION IN PUBLIC PROCUREMENT USING A RESOURCE-BASED MODEL OF TENDERING

MASTER THESIS

At the Chair for Information Systems and Information Management
(Westfälische Wilhelms-Universität, Münster)

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Date of Submission:	02/06/2020

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Master's thesis presented for the Master's program in Public Sector Innovation and e-Governance (PIONEER) for the universities of KU Leuven, University of Münster, and TalTech as a requirement to obtain the title of Master of Science in Public Sector Innovation and e-Governance.

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LEUVEN

2020

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ABSTRACT: Small and Medium-Sized Enterprises (SMEs) are the backbone of most national economies worldwide. Many governments have recognized the importance of smaller firms to create innovation within the public administration. In this scenario, studies often addressed that public procurement processes place smaller firms at a disadvantage. In contrast, other scholars isolated the variables that can potentially enhance SME participation. Overall, these studies focused on the entrepreneur's perception, rather on what the company's assets are and how they relate to the performance of SMEs in public tenders. This research strives to analyze how business resources can impact the involvement of smaller companies in procurement processes. By constructing a resource-based model of tendering, hypotheses are created and checked if they are supported or not through structured interviews and self-administrated surveys. Overall, it is possible to identify the influence of resources with the firm's engagement in public procurement.

KEY-WORDS: Public procurement; SMEs; public sector innovation; enterprise development; public procurement; tendering participation; public procurement of innovation.

RESUMO: As Pequenas e Médias Empresas (PMEs) são a espinha dorsal da maioria das economias nacionais. Muitos governos reconheceram a importância de empresas menores para criar inovações na administração pública. Nesse cenário, os estudos frequentemente abordam que os processos de compras públicas colocam as empresas menores em desvantagem. Por outro lado, outros estudiosos isolaram as variáveis que podem potencialmente aumentar a participação das PMEs nas licitações. No geral, esses estudos se concentraram na percepção do empreendedor, e não no que são os ativos da empresa e como eles se reportam ao desempenho das PMEs em licitações públicas. Esta tese analisa como os recursos empresariais podem impactar o envolvimento de empresas menores nos processos de licitações. Ao construir um modelo de envolvimento em licitações baseado em recursos, hipóteses são criadas e verificadas se são suportadas ou não por meio de entrevistas estruturadas e pesquisas autoadministradas. No geral, é possível identificar a influência de recursos na participação de PMEs em compras públicas.

PALAVRAS-CHAVE: Licitações públicas; PMEs; inovação no setor público; desenvolvimento empresarial; procuração pública; participação em licitações; contratos públicos de inovação.

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IV. ABBREVIATIONS

SME	Small and Medium-Sized Enterprise
EU	European Union
VS.	Versus
UK	United Kingdom
IT	Information Technology
UK	United Kingdom
US	United STATES
SiR	Startup in Residence
MO	Market Orientation
CEO	Chief Executive Officer
CTO	Chief Technology Officer
EDI	Electronic Data Interchange
TED	EU Tenders Electronic Daily
GDP	Gross Domestic Product
ICT	Information and Communications Technology
RFP	Request for Proposal
RBV	Resource-based view
HR	Human Resources
MR	Critical Path Method
XP	eXtreme Programming
NPS	Net Promoter Score
PA	Public Administration
PP	Public Procurement

V. SYMBOLS

ρ	Pearson's correlation coefficient
H0	Null hypothesis

CHAPTER 1: INTRODUCTION & PROBLEM STATEMENT

To most small businesses and startups founders, the idea of selling solutions to governments is puzzling. For most of these companies, it is hard to know where to begin when dealing with the public sector. Every so often, people that work in startups care about the opposite of a life of working in public service: potential for growth versus (vs.) job security, independence and autonomy vs. procedural processes and safety. For some companies, the government seems impenetrable, with bureaucratic hassles, constricted budgets, and large contracts. Nonetheless, this situation has been changing in the past years. Entrepreneurs are now seeing the government as a vast business opportunity, ready to be engaged[1]. According to PUBLIC, a startup network in the United Kingdom (UK), there are more than 2.000 startups across Europe seeking out to disrupt old-style models to deliver public services. This market is estimated to be evaluated in U$26 billion by 2025, with a global valuation of U$400 billion[2]. Moreover, public administrations around the world recognize that acquiring costly and lengthy Information Technology (IT) contracts from large companies is not the most excellent method to deliver efficient services to citizens. The absence of small companies in public procurement creates the need to bring more flexibility in tendering processes[3].

With this scenario in mind, many small and medium-sized enterprises (SMEs) started to walk on "thin ice" and invest in solutions for the public sector. Now, since many startups are focusing their services for governments, they have received a new terminology known today as GovTechs. GovTechs are startups or SMEs that deliver IT related products and services to the public sector. Many of these companies still offer simple technologies to support public processes. Nevertheless, some of them can employ brand-new and raw types of technologies that enable a more significant risk vs. reward situation, like applying blockchain for public services[4]. For the public administration to be more productive and accountable, the flourishing GovTech ecosystem needs to be thoroughly planned and built[5]. Naturally, for these companies to thrive, the country needs to have an excellent environment that fosters innovation and entrepreneurship. Even though they are indispensable, many scholars still point out that individual entrepreneurs face many challenges when dealing with public procurement[6].

The amount of procedures to bide with tenders requires considerable investments from these small businesses. Moreover, entrepreneurs often consider that they possess a minor chance of closing a contract with the public sector. The Chief Technology Officer (CTO) of Sirus – a company that provides IoE & Cloud platforms for smart cities – has stated the following: *"We normally do not bid on government contracts. Just reading through the tender documents often already takes a couple of days. As a small company, we do not have those resources"*[7]. As governments are trying to resolve this issue, for

[1] Mesnard and Ravallion, "The Wealth Effect on New Business Startups in a Developing Economy."
[2] Hugill, "The European 150the Startups Driving Europe's Govtech Revolution."
[3] Thai, "Public Procurement Re-Examined."
[4] Alketbi, Nasir, and Talib, "Blockchain for Government Services — Use Cases, Security Benefits and Challenges."
[5] Filer, "Thinking about GovTech A Brief Guide for Policymakers."
[6] Flynn and Davis, "Firms' Experience of SME-Friendly Policy and Their Participation and Success in Public Procurement."
[7] De Coninck, Viaene, and Leysen, "Public Procurement of Innovation Through Increased Startup Participation: The Case of Digipolis."

most administrations, simplifying the procurement process can prove to be a herculean task. The fact is that the activity of procuring is not static. The scope of procuring is defined continuously, in addition to being impacted by the surrounding social, economic, and political trends. Consequently, one of the contemporary paradigms of public procurement is how to disrupt traditional practices of procuring and implement strategies such as modular contracting to ease the onus of bidding for SMEs.

Most scholars agree that the correct integration of GovTechs in public procurement can potentially lead to innovation inside the public sector[8]. For instance, some cities in the Netherlands, like Amsterdam, are forging new dialogues between the private and public sphere with a program called Startup-in-Residence (SiR). This project connects a selection of startups that are responsible to co-develop and co-implement solutions with relevant city departments. For example, the municipality of Amsterdam solved a problem of wrongly parked bikes by co-designing a reward system for cyclists together with one startup. The conversation between the two sides helped to understand what the essential issue of the problem was and what would be an ideal solution under Amsterdam's overall citizenship values[9]. The development of this case could be much more difficult with a larger company. When compared with startups, big firms tend to offer pre-made ICT products and are less likely to co-develop innovative solutions[10]. The gains of SME participation in the public sector market are not one-way, as public sector organizations will also benefit from this relation. Smaller companies can, in some scenarios, offer competitive pricing agreements for their minimum administrative expenses and simplified operations[11].

Given the advantages of assimilating SMEs into public sector organizations, it is reasonable to believe that SMEs have a secured share of public contracts. The reality is very different, as data shows, smaller companies are under-represented when it comes to acting as public sector suppliers[12]. According to the EU Tenders Electronic Daily (TED), the percentage of micro-enterprises amongst winners starts to decline when the value of the contract exceeds 100.000 euros. Small enterprises are mostly present in the range of 30.000 to 300.000 euros. Even when considering the lowest budgets in public contracting, from 2009 to 2011, SMEs still represented an average of 37% of all contracts awarded between 100.000 to 300.000 euros[13]. In other words, SMEs are poorly present, even in minor valued contracts. To mitigate this problem, some administrations are taking measures such as adjusting contract requirements, simplifying tendering processes, and provide smaller tenders by disaggregating large contracts[14].

Projects like the one in the Netherlands are also not perfect, and they still have inherited problems and complications. For instance, even though the overall concept of the program is remarkable, the

[8] Rolfstam, "Public Procurement as an Innovation Policy Tool: The Role of Institutions."
[9] van Winden and Carvalho, "Intermediation in Public Procurement of Innovation: How Amsterdam's Startup-in-Residence Programme Connects Startups to Urban Challenges."
[10] Woldesenbet and Worthington, "Public Procurement and Small Businesses: Estranged or Engaged?"
[11] Flynn and Davis, "Explaining Sme Participation and Success in Public Procurement Using a Capability-Based Model of Tendering."
[12] Thomassen et al., "SMEs' Access to Public Procurement Markets and Aggregation of Demand in the EU."
[13] Thomassen et al.
[14] Loader, "SME Suppliers and the Challenge of Public Procurement: Evidence Revealed by a UK Government Online Feedback Facility."

final number of given contracts is minimal[15]. When exploring potential causes for problems in such policies, many debates focus their attention on the inherited nature of SMEs. Scholars often consider small companies to be at a constant disadvantage when they engage with public procurement[16]. Moreover, a few studies are trying to determine what can aid SMEs when they engage in public procurement[17]. Overall, both approaches often use the entrepreneur's perception to evaluate the outcome of SMEs in public contracting. The influence of SMEs' resources and their relationship with public contracting is, usually, left aside. All in all, to better understand the lack of SME participation in public contracting, it is necessary to consider the firm's resources when they apply for public tenders. Therefore, to make advancements on this research field, the following research question is formulated:

Research Question: How do business resources affect SME participation in public procurement?

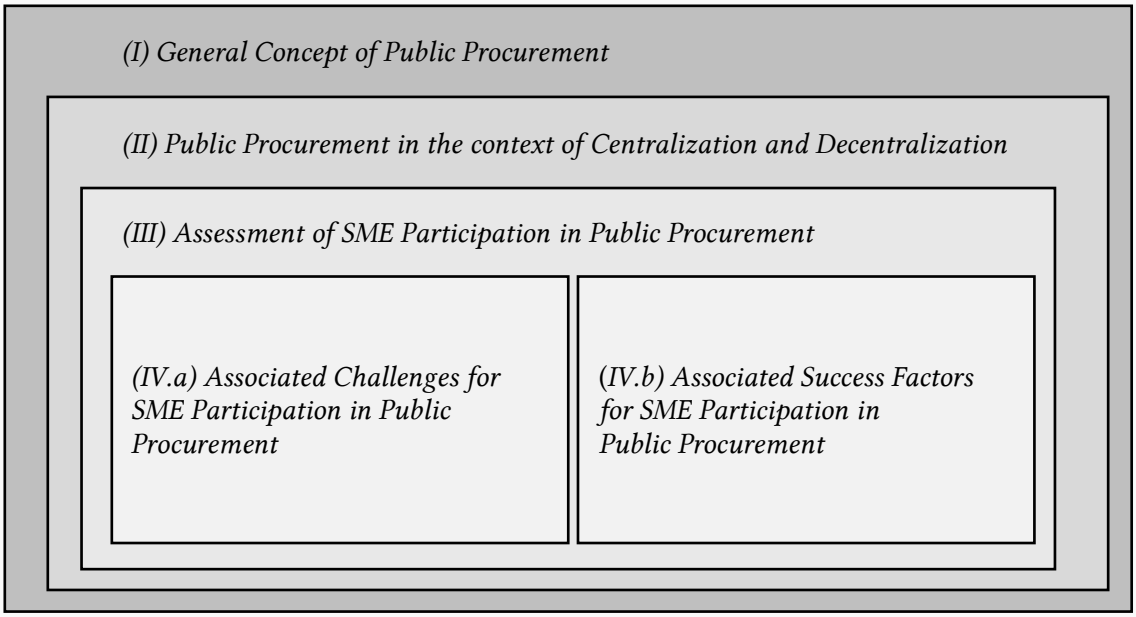
The goal is to discover what the resources that influence SME participation in public contracting are. Since some researches are starting to produce studies on this front, this thesis complements this line of research. Potential findings will explore how these variables are improving business performance when firms engage with public procurement, whether negatively or positively. Governments may find the results useful to create new actions to incorporate more SMEs in their procurement processes. Likewise, entrepreneurs can consider which resources they need when acting as public sector suppliers. The final section sets out the conclusions of the study, also identifying limitations and further research opportunities.

[15] van Winden and Carvalho, "Intermediation in Public Procurement of Innovation: How Amsterdam's Startup-in-Residence Programme Connects Startups to Urban Challenges."
[16] Flynn, McKevitt, and Davis, "The Impact of Size on Small and Medium-Sized Enterprise Public Sector Tendering."
[17] Flynn and Davis, "Explaining Sme Participation and Success in Public Procurement Using a Capability-Based Model of Tendering."

CHAPTER 2: LITERATURE REVIEW

Many theories have explained what stimulates or discourages SME participation in public procurement. Although the literature contains a wide variety of such theories, this review will focus on five major themes that repeatedly emerge throughout the literature. These themes are (1) the concept of public procurement, (2) public procurement in the context of centralization and decentralization, (3) assessment of SME participation in public procurement, (4) associated challenges, and (5) success factors for SME participation in procurement. Although the literature presents these subjects in a variety of settings, this thesis will primarily focus on their application as an entrance factor to the public sector market.

Figure I – Included Concepts in the Literature Review



2.1 THE CONCEPT OF PUBLIC PROCUREMENT

Within our society, the term "Public Procurement" has a long and ancient history. One of the earliest procurements was written on a red claystone found in Syria, with an estimated date between 2400 and 2800 BC. Interestingly, the order in the tablet was for "50 jars of fragrant, smooth oil in exchange for 600 small weight in grain". Other historians claim that some evidence of procuring can be related to the trade of goods between a Greek Colony and China in 800 BC[18]. These statements help our society understand that the acquisition of assets for public bodies occurs since a long time ago. Indeed, although it is possible to find procurement actions in our past, the central concept of public procurement has suffered minor modifications throughout time. Currently, it is possible to find different viewpoints on how to conceptualize public procurement, the general idea, however, remains constant across these views. In summary, scholars define public procurement as the act of purchasing

[18] Ronchi, *E-Democracy.*

goods or services by public organizations for public consumption[19]. It is a process that must bind with laws and regulations that are imposed by legislative authorities[20]. Public procurement is an essential economic activity[21] , and it is indispensable to carry out public services nowadays. In developing countries, procuring is a fundamental process for administrations, accounting for 15% to 20% of the total Gross Domestic Product (GDP)[22].

In addition, public procurement differs from private procurement since the public sector has different strategic objectives when compared with businesses. This difference is justifiable when looking at companies' goals, which are, in general, focused on profit enlargement. In contrast, the government ought to consider economic factors together with other variables such as democratic, ethical, and social characteristics in their procurement processes. Undeniably, these extra layers of variables may over-complicate how administrations execute procuring, as the process demands more knowledge from all the parties involved. As a result, public procurement is considered by many a complex and puzzling practice. This intricacy is one of the main reasons that most public managers struggle to provide efficient solutions with minimal resources for taxpayers. It is also the cause of many barriers to why SMEs cannot approach public procurement effortlessly[23]. Finally, before leaping to the present situation of companies and their relationship with governmental procurement, it is necessary to understand why procurement has such a dense nature. In this case, it is essential to bring to light the architecture of procurements, which is possible to divide into centralized or decentralized approaches, respectively. These designs have permeated many administrations throughout history, and they deeply influence how governments implement their procurement processes and how well succeeded they are with smaller companies[24]. The next sub-chapters will unwrap the aspects of these architectures.

2.2 CENTRALIZED VERSUS DECENTRALIZED ARCHITECTURE OF PUBLIC PROCUREMENT

In developed economies, most governments distribute the responsibility of procuring to regional or municipal authorities. An active debate surrounding the costs and benefits of decentralization of public procurement exists in these nations. However, most discussions base their findings on theoretical arguments rather than on empirical data. Some authors claim that decentralization might hinder the ability of municipalities to achieve satisfactory procurement performances due to the lack of procurement specialists and negotiation power. On the other hand, the creation of centralized agencies can increase bureaucracy and *red tapes*. This extra bureaucracy may result in a loss of flexibility in tendering processes and creating more difficulties for SMEs to access public markets[25]. The differences in the architecture of public procurement are imperative to acknowledge the reasons

[19] Weiss, "Public Procurement in European Community Law."
[20] Keränen, "Dynamics of the Transition Process towards Partnership Thinking in Centralized Public Procurement."
[21] Brown and Potoski, "Contract-Management Capacity in Municipal and County Governments."
[22] Chiappinelli, "Decentralization and Public Procurement Performance: New Evidence from Italy."
[23] Keränen, "Roles for Developing Public–Private Partnerships in Centralized Public Procurement."
[24] Glas and Eßig, "Factors That Influence the Success of Small and Medium-Sized Suppliers in Public Procurement: Evidence from a Centralized Agency in Germany."
[25] Gori, Lattarulo, and Mariani, "Understanding the Procurement Performance of Local Governments: A Duration Analysis of Public Works."

why, in some countries, the participation of smaller companies in governmental procurement is more complicated than in others[26]. These two types of structural design are also widely referenced in the literature that attempts to explain the associated barriers and success factors of SME involvement in public procurement.

2.2.1 CENTRALIZED APPROACH

Over the last 70 years, massive structural changes in political thinking, economy, and technology changed the context in which public procurements exists. Digitalization advancements made evolutionary modifications in the way that governments operate. In this sense, a crucial decision to administrations is whether to approach procurements centrally or de-centrally. Centralization of public procurement is when the government appoints a centralized agency with a wide range of roles and responsibilities. Frequently, this agency incorporates responsibilities from different departments and other governmental bureaus. Additionally, public procurement centralization may also imply the application of an integrated framework or legal agreement between various public sector organizations. It may also mean the consolidation of separate requirements from a variety of agencies into a single contract. Such consolidation implies that regional bureaus no longer need to plan, write, and distribute their procurement documents. Usually, the responsibility of such contracts lies with the centralized unit. While regional units may have the liberty of managing specific points of the document[27]. Concentrating on different functions from separate organizations into a single agency can potentially lead to a rationalization of public spending, which is one of the main benefits of a centralized approach[28].

Centralized procurement may similarly characterize a process in which a centralized location controls all procurement procedures. Typically, scholars tend to agree on two aspects of this approach. Firstly, the process must be carried out by a centralized agency of the government, usually at the state or federal level. Secondly, centralized procurement should aim to reduce the costs of procuring. In many countries, centralized agencies are specialized only in procuring for other governmental bodies. This specialization helps the administration to rationalize spending and increase overall efficiency, as well as to improve control and accountability. Many nations often choose a centralized approach due to its many inherent advantages: low purchase costs, support policy objectives, administrative efficiency, ease of procedures, better administrative transactions, and more confidence in the legal system of procurement[29]. It is possible to find centralized approaches, for example, in the history of the United States. Governmental purchase at the municipal sphere predates that of state or federal governments in the US. During the time of the colonies, printing was one of the services contracted by the administration. At that period, there were no public officials all the goods and services that the

[26] Tammi, Saastamoinen, and Reijonen, "Market Orientation and Smes' Activity in Public Sector Procurement Participation."
[27] Keränen, "Roles for Developing Public–Private Partnerships in Centralized Public Procurement."
[28] Aboelazm and Afandy, "Centralization and Decentralization of Public Procurement."
[29] Aboelazm and Afandy.

government required had to be supplied by commissioners, these people then received a financial grant every time they brought supplements for administrative units.

Even though a centralized approach can bring efficiency gains in the management of procurements, transferring the rights of procuring to an individual public agency also has its shortcomings. The establishment of a centralized method might result in monopolistic practices at governmental operations and lead to a restricted number of companies to dominate markets completely. In other words, a centralized approach might leave minimal opportunities for small firms to participate in the bidding procedure. Centralizing all the operations in a single agency increases the number of requests and regulations that come from the other public branches. As a result, the size of the final process is immense, with more documents to evaluate, affecting the access of small and medium-sized enterprises[30]. Qualifying for many different criteria and fulfilling all the legal requirements are significant obstacles for SMEs to join tenders, both in technical and financial terms[31]. Moreover, the size of the procurement process is one of the most glaring reasons for SME participation in procurements. The scope of the process is directly related to the capacity of these companies to allocate sufficient resources to cope with the process size[32]. Naturally, the recurring problems of a central approach motivate the debate on how much centralized public procurement should be. Scientific literature examines the subject of centralization by mainly arguing for and against its advantages or disadvantages. The conception of decentralization of public procurement is, however, more uncommon in literature when compared with the centralized one.

2.2.2 DECENTRALIZED APPROACH

A decentralized approach for public procurement is when the public sector delegates to local and municipal departments the decision-making power in terms of how to make the procurement and what to purchase[33]. Decentralizing public procurement is to examine if central governments should manage purchase themselves or designate it to sublevels of authorities[34]. In other words, each department in a public agency is responsible for meeting the needs and requirements according to its procurement strategy[35]. The advantages of decentralized procurement are attempts to avoid the adverse side effects of a centralized system. Scholars argue that a decentralized procurement strategy can reduce costs and risks with storage and transportation. Local governments tend to focus on suppliers that are geographically close to the procurement entity, making storing commodities and other goods more economical. Besides, the fees of transferring items from the central agency to the local ones are not necessary for this approach, since the regional bureaus can have the products or services offered directly to them. Likewise, the local agency can set up their requirements, which will frequently lead to a quicker and smaller procedure, demanding fewer steps to finalize the whole

[30] Aboelazm and Afandy.
[31] OECD SIGMA, "Central Purchasing Bodies."
[32] Aboelazm and Afandy, "Centralization and Decentralization of Public Procurement."
[33] Šerpytis, Vengrauskas, and Gineitienė, "Evaluation of Financial Effects of Public Procurement Centralisation."
[34] Chiappinelli, "Decentralization and Public Procurement Performance: New Evidence from Italy."
[35] Aboelazm and Afandy, "Centralization and Decentralization of Public Procurement."

process. For example, without the need to plan for extra storage and transportation, it is possible to execute the contract faster[36]. More importantly, this approach can potentially increase the opportunities for SMEs to bid. Given that the criteria are not complicated and the process itself is simple, this facilitates small companies to enter a tendering process and increase their chances of securing a public contract[37]. Thus, regionalizing procurement can be a great mechanism to promote and develop SMEs in the region of the municipality[38].

Nevertheless, while a regionalized policy might encourage the development of SMEs and inspire entrepreneurs to negotiate with the local administration, it may also result in adverse effects that public managers ought to consider. For instance, not all regional departments have the necessary knowledge to write efficient procurement requirements, which can be exceedingly dangerous in large financial projects. Without a central agency to support procuring, the local departments need to allocate public servants with the necessary skills to manage the procurement process. Moreover, when more than one department makes a procurement for the same product or service, then the price for that item will likely increase in the area[39]. For the most part, the centralization vs. decentralization debate is not a black and white issue. It is possible to avoid the unfavorable impacts of both methods by combining them into a "semi-centralized" or a mixed-method approach. In practice, the finest form of executing procurements depends on the country's culture, economy, and market development.

2.3 ASSESSMENT OF SME PARTICIPATION IN PUBLIC PROCUREMENT

Inside the European Union (EU), member states have a row of tactics to utilize, and in recent years, a consensus has emerged supporting the decentralization of public procurement. Central and Eastern European countries have a story of centralizing procurement and then gradually decentralizing it over a specified period. What is possible to observe is that financial control and more annual audits of private sector suppliers have increased together with the liberalization of procurements. Equally, member states are progressively investing in the training of procurement experts, as the economic importance of good procurement practices is, today, easily recognizable by administrations[40]. By simplifying tendering procedures and having as many suppliers as possible, public sector organizations can gain the advantages of having more competition in the market. Therefore, this gradual shift from high-bureaucratic procedures for a more decentralized system is a trend within the EU[41]. However, not all these tendencies are present in Central and Eastern European countries. These states received pressure to quickly decentralize their procurement systems when compared to other nations in the EU. The systems in Central and Eastern Europe were completely centralized under the Soviet regime. Most are now encouraged to open their markets to smaller organizations by adopting severely decentralized systems and by training as many individuals to excel at procuring. In other

[36] Aboelazm and Afandy.
[37] OECD, "Centralised and Decentralised Public Procurement."
[38] Aboelazm and Afandy, "Centralization and Decentralization of Public Procurement."
[39] Aboelazm and Afandy.
[40] OECD, "Centralised and Decentralised Public Procurement."
[41] OECD.

words, developing models to enhance public administration management has pushed the public sector to work with more lean procurement processes. This pressure also culminated in the public administration to form more partnerships with the private sector[42].

The niche of Public procurement within all the Member States amounts to two trillion euros per year, corresponding to 14% of the EU total GDP[43]. At the same time, SMEs are the backbone of the EU economy; most companies (99%) are small to medium-sized businesses[44]. The turnover that is generated by these companies inside the EU private sector is over 65%[45]. Likewise, the public sector in the United Kingdom spends approximately 175 billion pounds per year with procuring, accounting for 13% of the UK's total GDP. Around 4.7 million SMEs exist in the UK, which constitutes 99,9% of their operating businesses[46]. In other developed countries, public procurement represents an average of 12,8% of the total GDP and 29% of all governmental expenditure[47]. Still, despite the high representation of SMEs in these economies, their participation within public procurements is relatively small. In the EU, the share of public contracts won directly by small companies is less than 25%[48]. In the UK, only 10,5% of direct expenditure went to SMEs, which is less than half of the added contribution that these companies have in the national economy[49].

2.3.1 BENEFITS OF SME PARTICIPATION IN PUBLIC PROCUREMENT

The under-representation of SMEs is a spotlight of research attention since both the public sector and companies could be gaining more benefits in tangible and intangible ways. First, by considering the governmental point of view: smaller companies are, in general, more present in economies than larger ones. Consequently, having more SMEs applying for tenders can potentially intensify competition and provide buyers with a more considerable amount of options to supply[50]. Small firms are also known for being more versatile and customer oriented when they work as public sector suppliers[51]. Some studies have demonstrated that startups can be, in some situations, more proactive, innovative[52] , and more susceptible to take risks. SMEs might also be, in some cases, more inclined to take public sector opportunities and transform them into real businesses[53]. Using small and geographically near suppliers can potentially minimize process complexity and the environmental footprint by cutting extra steps on supply chains. Investing in local suppliers can also contribute to the economic and social growth of companies in the region[54]. Between the late 80s until today, SMEs were also the main reason for job growth and job creation in Europe[55]. As for the companies themselves, engaging with the

[42] OECD.
[43] Commission, "European Code of Best Practices Facilitating Access by SMEs to Public Procurement Contracts."
[44] Flynn, "Investigating the Implementation of SME-Friendly Policy in Public Procurement."
[45] Maréchal and Morand, "Small Business Participation Procurement Policy: Subcontracting vs Allotment."
[46] Treasury, "Accelerating the SME Economic Engine: Through Transparent, Simple and Strategic Procurement."
[47] Flynn, "Investigating the Implementation of SME-Friendly Policy in Public Procurement."
[48] Maréchal and Morand, "Small Business Participation Procurement Policy: Subcontracting vs Allotment."
[49] Cabinet Office, "Making Government Business More Accessible to SMEs: Two Years On."
[50] Ram and Smallbone, "Supplier Diversity Initiatives and the Diversification of Ethnic Minority Businesses in the UK."
[51] Loader, "The Challenge of Competitive Procurement: Value for Money Versus Small Business Support."
[52] Nicholas and Fruhmann, "Small and Medium-Sized Enterprises Policies in Public Procurement: Time for a Rethink?"
[53] Ram and Smallbone, "Supplier Diversity Initiatives and the Diversification of Ethnic Minority Businesses in the UK."
[54] Walker and Preuss, "Fostering Sustainability through Sourcing from Small Businesses: Public Sector Perspectives."
[55] Fee and Hennigan, "SMEs and Government Purchasing in Northern Ireland : Problems and Opportunities."

public sector can be an advantage since the stability provided by the government can help SMEs secure a growth plan. Becoming a public sector supplier allows firms to invest in new technologies or human capital safely[56]. Most public contracts come with a guarantee of payment, and many SMEs see this as an incentive to provide to the public sector. Indeed, more than 80% of corporations perceive reliable payment as a primary reason to become a public sector supplier[57]. Furthermore, public tenders are recognized as a stimulant to innovate when buyers need technology-oriented products. A study conducted with 800 companies found that in 67% of the cases, public contracts drove firms to innovate[58]. Finally, becoming a public sector supplier can bolster the reputation of SMEs and help them reach additional and more profitable markets[59].

Nevertheless, the access of SMEs over public procurement needs a view that catches a broader context. Even though the participation of smaller companies is relatively minor in public procurement, the previously mentioned economies also recognize SMEs as a pivotal part of their markets. Their potential to stimulate innovation, promote competition, and deliver a faster implementation renders them even more valuable for their governments[60]. The European Commission has stated the importance that SMEs have with employment creation, entrepreneurial activity, production of innovation, and economic growth. Considering these benefits, the scarce participation of SMEs in public procurement is a more prominent source of concern[61]. As a potential remedy, most developed countries have policies that promote and involve SMEs in the public sphere. After the historical progress of centralized procurement and its bureaucratic facets, these initiatives are a direct response to the under-representation of SMEs as partners of public sector organizations.

2.3.2 THE DOWNSIDE OF SME PARTICIPATION IN PUBLIC PROCUREMENT

Even though the European Commission has recognized the importance of SMEs to national economies[62], certain downsides may occur when governments open their markets to smaller companies. For example, there are instances that SMEs owners do not understand the benefits of engaging with the public procurement market. Small business owners may not adequately consider the advantages of taking action, such as management, training, and development programs. The lack of proper business management can hinder SMEs to have higher efficiency in public procurement[63]. A study done with 16.339 SMEs across different EU countries has shown some of the downsides of working with smaller companies. The main issues shadowing SMEs are their limited purchasing power, inadequate legal regulations, deficiency of workforce, high working employee costs, lack of infrastructure, and problems to implement new technological structures[64].

[56] Flynn and Davis, "Explaining Sme Participation and Success in Public Procurement Using a Capability-Based Model of Tendering."
[57] Loader, "Supporting SMEs through Government Purchasing Activity."
[58] Edler and Georghiou, "Public Procurement and Innovation-Resurrecting the Demand Side."
[59] Ram and Smallbone, "Supplier Diversity Initiatives and the Diversification of Ethnic Minority Businesses in the UK."
[60] Loader, "SME Suppliers and the Challenge of Public Procurement: Evidence Revealed by a UK Government Online Feedback Facility."
[61] Commission, "European Code of Best Practices Facilitating Access by SMEs to Public Procurement Contracts."
[62] European Commission, "Communication from the Commission - Public Procurement in the European Union."
[63] Storey, "Six Steps to Heaven: Evaluating the Impact of Public Policies to Support Small Businesses in Developed Economies."
[64] Stefanović, Milošević, and Miletić, "Significance and Development Problems of SMEs in Contemporary Market Economy."

Governments also use public procurement to achieve a broad range of goals, such as regional development, diversity, and sustainability. The integration of SMEs is an additional layer in this situation, turning the activity of procurement even more complicated[65]. This multi-goal turns the act of procuring more difficult for public officers[66]. Public procurement practitioners may also prioritize the achievement of productivity and value for money more than broader goals such as sustainability. With a smaller infrastructure, SMEs may not have enough capabilities of delivering the same cost-benefit and lower prices as larger firms[67]. Studies also support that SMEs might not have explicit strategies, organized processes, and information. The lack of professionalism in the SME business environment can make larger enterprises seem safer to work with[68]. Governments must also hire more contract managers to support a more diverse supply chain of companies and handle a more significant number of contracts[69].

2.3.3 FRIENDLY POLICIES

The involvement of SMEs in public contracting constitutes a growing line of research inquiry. Within the EU, SME-friendly policies have started to appear at a national and international level. According to a recent assessment from the OECD, 29 out of the 32 surveyed countries have already introduced public policies or changes in specific legislation to support SME engagement with public procurement. The Commission of the European Communities drafted a code of best practices to facilitate the access by SMEs to public contracts. The guidance is that the Member States should simplify and facilitate their national procurement processes to increase the participation of SMEs. Simply put, governments need to reduce contract size, ensure access to relevant information, establish reasonable requirements, alleviate administrative burdens, emphasize cost-benefit, and allow sufficient time to draw up tenders[70].

Furthermore, the Directive 2014/24/EU bounds all the Member States. This policy aims to level the playing field for SMEs, leading to a more inclusive marketplace. It also proposes to monitor centralized procurement strategies to avoid excessive concentration of purchasing power and to preserve transparency and competition[71]. As the drafted guideline made by the Commission of European Communities, this Directive aims to remove the main barriers that inhibit SMEs from competing for public contracts in the first place. In comparison, other countries like the US tend to utilize a mixture of friendly policies along with constricting programs for their SMEs. Therefore, in addition to designing policies for SME participation, these countries also have restrictive policies were SMEs have a guaranteed share of public contracts[72]. For instance, the UK coalition government defined a goal for

[65] Telgen, Harland, and Knight, "Public Procurement in Perspective."
[66] Loader and Norton, "SME Access to Public Procurement: An Analysis of the Experiences of SMEs Supplying the Publicly Funded UK Heritage Sector."
[67] Harland et al., "24 Challenges Facing Public Procurement."
[68] Tammi, Saastamoinen, and Reijonen, "Market Orientation and Smes' Activity in Public Sector Procurement Participation."
[69] Migiro and Ambe, "Evaluation of the Implementation of Public Sector Supply Chain Management and Challenges: A Case Study of the Central District Municipality, North West Province, South Africa."
[70] Flynn and Davis, "The Rhetoric and Reality of SME-Friendly Procurement."
[71] Krivins, "Legislative Framework of In-House Procurement."
[72] Flynn and Davis, "Firms' Experience of SME-Friendly Policy and Their Participation and Success in Public Procurement."

the central government in 2014 to purchase 25% of value-added goods and services from SMEs[73]. Despite this policy, the participation rate of SMEs in public procurement remains underrepresented in the UK, highlighting the gap between policy creation and policy implementation[74]. The fact that public administrations feel obliged to develop preferential policies is a recognition that SMEs are facing continuous difficulties when applying for public contracts. These facts further show how necessary it is to facilitate the access of these companies to procurements and bidding procedures.

2.4 CHALLENGES FOR SMES TO PARTICIPATE IN PUBLIC PROCUREMENT

Over the past two decades, scholars from different fields have examined the experiences, motives, and perceptions of SMEs that are interested in competing for public sector contracts[75]. In the UK, during 1997, SMEs won 14,31% of the available amount for procurements. In 2007 (ten years after), this number went up only to 16%. The under-representation of SMEs on public procurement made scholars produce a plethora of investigations that isolated the reasons why smaller companies have difficulties when applying for tenders. More than 23 types of barriers have been identified and categorized by different scholars[76]. Hence, governmental reforms that aim to increase economic growth will require administrations to understand the complex nature of public procurement and acknowledge the difficulties surrounding SMEs. Recognizing these obstacles will allow administrations to address issues of accountability, transparency, and justice that could lead to greater participation of SMEs in the future[77]. Based on the present literature, this chapter will clarify the main problems that SMEs face when interacting with public procurement.

2.4.1 PUBLIC SERVANTS THAT LACK PROPER PROCURING KNOWLEDGE

The first well-known barrier that is possible to find in researches is the lack of competence by public procurers[78]. When a centralized agency is responsible for procuring, it is usually the case that specialized people write the requirements of the document, which is essential to hire a suitable supplier. Moreover, according to a research conducted in Northern Ireland, administrations with a decentralized procurement often conduct the process with people who have little to no knowledge on how to make an efficient purchase. The absence of qualified public servants that can procure satisfactorily is one of the major complaints that SMEs have. The procurement staff tends to concentrate excessively on the price and ignores the details of the solution. Public servants have no interest in the reliability of the product and do not account for prolonged, life-long costs[79]. In this situation, companies need to lower their prices while trying to maintain the same level of quality on their services, which can sometimes make entrepreneurs withdraw from public tenders[80]. Also, at all levels of governments, it is possible to find inconsistencies regarding the practical use of procurement.

[73] Loader, "Small- and Medium-Sized Enterprises and Public Procurement: A Review of the UK Coalition Government's Policies and Their Impact."
[74] Flynn and Davis, "Firms' Experience of SME-Friendly Policy and Their Participation and Success in Public Procurement."
[75] Flynn and Davis, "Explaining Sme Participation and Success in Public Procurement Using a Capability-Based Model of Tendering."
[76] Loader, "Is Public Procurement a Successful Small Business Support Policy? A Review of the Evidence."
[77] McCue, Prier, and Swanson, "Five Dilemmas in Public Procurement."
[78] De Coninck, Viaene, and Leysen, "Public Procurement of Innovation Through Increased Startup Participation: The Case of Digipolis."
[79] Loader, "SME Suppliers and the Challenge of Public Procurement: Evidence Revealed by a UK Government Online Feedback Facility."
[80] Fee and Hennigan, "SMEs and Government Purchasing in Northern Ireland : Problems and Opportunities."

Processes can range from mundane orders to sophisticated and complex analyses of governmental expenditure[81]. In some cases, it is not possible to find the procurement function within the organizational pyramid. No formal method or documented procedure exists to follow within the public sector bureau[82], leading to another set of problems. For instance, without a proper or legitimate process, it can be challenging to know who is the public servant that firms must contact when extra information is required[83].

2.4.2 BUREAUCRATIC NATURE OF THE PUBLIC SECTOR

Additional problems perceived by startups during tenders are the red tape and the bureaucratic nature of the public sector. Companies need to fulfill and follow an overabundance of laws and regulations to be able to apply for tenders. Some Chief Executive Officers (CEOs) and directors from different businesses even argue that this is done on purpose, to eliminate the chance of awarding contracts to smaller companies[84]. A qualitative research made in the Leicester City Council and funded by the European Regional Development Fund identified that entrepreneurs understand the procurement process as very bureaucratic and complicated to break in. Entrepreneurs perceive the public sector as highly institutionalized and not accessible by small companies. For business owners, the tendering process is complex, and the participation of SMEs is minimal. According to these interviews, some of the companies were not interested in negotiating with the public sector, as most of the entrepreneurs reported that the public procurement process is "tortuous," "arduous" and "onerous." Even so, entrepreneurs accept a trade-off: face the bureaucracy to obtain the associated advantages for working with governments, such as the guarantee of payment or continuity of work[85]. Nevertheless, even when accounting for the benefits of the partnership between SMEs and the public sector, small companies usually decide not to partake in such rigid processes. As demonstrated by Woldesenbet & Worthington (2019), administrations often prefer to close long-term contracts and have a high dependency on the supplier. Consequently, this reduces the chances of new and smaller entrants who have no previous experience of working with the government to compete for tenders[86].

2.4.3 MEETING COMPLEX STANDARDS & INERTIA TO INNOVATION

Another analysis was completed via focus groups and quantitative surveys with 206 small manufacturing companies in the US. The goal was to understand what small companies perceive as crucial to secure a public bid. The perception of companies is that following the Request for Proposal (RFP) and meeting public contract specifications are essential matters to address during tenders[87]. Entrepreneurs also believe that they need prior success in the private sector, obtain external advice on public procurement, and meet financial standards in their business before achieving a deal with

[81] Prier and McCue, "The Implications of a Muddled Definition of Public Procurement."
[82] Flynn and Davis, "Explaining Sme Participation and Success in Public Procurement Using a Capability-Based Model of Tendering."
[83] Loader, "SME Suppliers and the Challenge of Public Procurement: Evidence Revealed by a UK Government Online Feedback Facility."
[84] Woldesenbet and Worthington, "Public Procurement and Small Businesses: Estranged or Engaged?"
[85] Peck and Cabras, "The Impact of Local Authority Procurement on Local Economies: The Case of Cumbria, North West England."
[86] Woldesenbet and Worthington, "Public Procurement and Small Businesses: Estranged or Engaged?"
[87] Withey, "Small Manufacturing Businesses: Their Interest in Securing Contracts from Public Agencies."

the government[88]. Companies also criticize the fact that public buyers have an inertia problem. Public managers are risk-averse, reluctant to accept innovation, and not willing to look beyond their initial demands. In some cases, the selection criteria will focus on history and not on the actual ability that the companies have to develop a solution. Entrepreneurs are concerned that only enterprises with a trackable and robust portfolio will have a chance of bidding successfully[89]. Besides, some national policies provide detailed guidelines that encourage public sector organizations to aggregate contract requirements for greater scalability within each acquisition. A more extensive list of conditions can have the effect of excluding SMEs from the competition, diminishing the number of total suppliers, and making innovations less likely to occur[90].

2.4.4 E-PROCUREMENT SYSTEMS

The systems and framework of public tendering structures are also a target of constant criticism. Firms need to identify opportunities, meet burdensome criteria, and wait a long time before receiving their first payment[91]. Naturally, the total budget of a public contract also haves a significant impact on why SMEs may access or not public tenders. E-procurement initiatives had some achievement in confronting the barriers that SMEs face when dealing with public procurement. With an electronic system, SMEs have more access to contract opportunities and allows more involvement due to a streamlined online process[92]. Even so, e-procurement has not helped to revert the predominant SME participation scenario. Studies found that small firms are still only half as likely as large firms to access tenders online or engage with public sector organizations virtually[93]. Moreover, even though some governments are making better policies and implementing procurement processes online, not all the mentioned problems are institutional or systemic. Most SMEs have limited human, capital, administrative, legal, and technical resources. That is simply just the nature of smaller companies. Even when providing user-friendly e-procurement systems, some companies do not have enough capabilities to negotiate online. Reduced assets and skills are extra eminent in micro-enterprises (>9 employees), which in the EU accounts for about 90% of firms[94].

2.4.5 ASSOCIATED BARRIERS: CONCLUSION

Aside from the common issues that appear in the studies surrounding SMEs and public procurement, a few authors have debated different problems that are not as frequent. For example, it is possible to link poor public marketing strategies with governments that fail to promote their opportunities to smaller companies[95]. Other studies focused on the perception of the entrepreneurs as a hindrance. A research made by Karjalainen & Kemppainen (2008) indicated that the awareness regarding resources, such as legal or administrative, might influence the involvement of companies with public

[88] Withey.
[89] Loader, "Supporting SMEs through Government Purchasing Activity."
[90] McCue, Prier, and Swanson, "Five Dilemmas in Public Procurement."
[91] Cabras, "Mapping the Spatial Patterns of Public Procurement A Case Study from a Peripheral Local Authority."
[92] Ancarani et al., "A Comparative Analysis of SME Friendly Public Procurement: Results from Canada, Hungary and Italy."
[93] Flynn and Davis, "Firms' Experience of SME-Friendly Policy and Their Participation and Success in Public Procurement."
[94] Flynn and Davis, "Explaining Sme Participation and Success in Public Procurement Using a Capability-Based Model of Tendering."
[95] McKevitt and Davis, "Microenterprises: How They Interact with Public Procurement Processes."

procurement. The study implies that SMEs who consider their judicial or managerial resources as "not sufficient" are less likely to be involved in public procurement[96]. To summarize, the barriers and hindrances of SME participation in public procurement are well known and explored in the literature. Scholars like Loader (2013) have done extensive literature reviews to capture all the problems identified in recent years and organized them cohesively. It is possible to visualize the known difficulties of SME participation in Table I.

Table I - Associated Challenges for SME participation in Public Procurement

Category	Associated Barriers	Sources
Public Sector Policies	(1) Policies that encourage public bureaus to aggregate contract requirements; (2) Lack of clear objectives in the procurement; (3) Rationalization of SMEs	(McCue, Prier, and Swanson 2015); Loader (2007); Loader (2011); Preuss (2011); Glover (2008)
Public Sector Culture	(4) Risk-averse attitudes; (5) Inclination towards big suppliers; (6) Excessive focus on supplier's price; (7) High-dependency on the supplier; (8) Preference to long-term contracts; (9) Lack of a market-oriented view; (10) Preference for companies with prior experience with the public sector; (11) Excessive bureaucracy;	(Fee and Hennigan 2002); (Woldesenbet and Worthington 2019); (Loader 2005); Walker and Preuss (2008) Loader (2007)
Organization	(12) Centralized agencies with large contracts, (13) Inconsistencies regarding practical usage of public procurement; (14) No formal documented procedure for procurement; (15) Poor marketing strategies;	(Prier and McCue 2009); (Flynn and Davis 2017); (Woldesenbet and Worthington 2019); (McKevitt and Davis 2013)
Procurement Process	(16) An overabundance of laws and regulations; (17) Selection criteria that focus on history and not on ability; (18) Entrepreneurs need to look pro-actively for open tenders; (19) Numerous qualifications requirements for small valued contracts; (20) Slow payments; (21) Difficulty to get listed as a potential public supplier; (22) Absence of feedback from buyers;	(Loader 2005); (Cabras 2015); (Loader 2015)
Skills	(23) Lack of competence of public procurers; (24) Tenders and bids that are incomplete;	(De Coninck, Viaene, and Leysen 2018); Loader (2007)
Perception of Entrepreneurs	(25) Meeting public contract specifications as an essential matter; (26) Demonstrate prior success in the private sector; (27) Need to obtain legal advice on governmental contracting; (28) Achieve financial standards; (28) Contracts that are too extensive to be solved; (29) Perception on the lack of legal or administrative resources; (30) Reluctant to engage in a process that is perceived to be biased to a specific firm.	(Withey 2011); (Thomassen et al. 2014); (Karjalainen and Kemppainen 2008); Loader (2007)

Created based upon Loader (2013)[97].

[96] Karjalainen and Kemppainen, "The Involvement of Small- and Medium-Sized Enterprises in Public Procurement: Impact of Resource Perceptions, Electronic Systems and Enterprise Size."
[97] Loader, "Is Public Procurement a Successful Small Business Support Policy? A Review of the Evidence."

2.5 FACTORS THAT PROMOTE SME SUCCESS IN PUBLIC PROCUREMENT

While the literature that tackles the challenges faced by SMEs is quite extensive, the same is not valid for the factors that facilitate their participation and performance in public procurement. More information is available on what inhibits small and medium-sized businesses than what allows them to participate and win contracts with public sector organizations[98]. The reasons why some smaller companies may purchase public sector contracts remain predominantly unknown. However, some researchers try to fill this gap by associating the involvement of SMEs in public procurement with variables such as the companies' available resources, entrepreneurship orientation, market theories, and models for obtaining public contracts[99]. This chapter will unfold the factors and variables that positively influence the success ratio of SMEs in public procurement.

2.5.1 MARKET ORIENTATION AND MARKET INTELLIGENCE

The first concept that is relevant to SMEs' success in public tendering is market positioning. Theories enveloping market-oriented companies have often englobed two pillars. The first one is to be customer-focused; this requires companies to implement consumer research to obtain information on customer's needs and preferences. The second pillar is coordinated marketing, a principle in the literature that recognizes that the marketing department is not solely responsible for marketing. All departments in the organization must be attentive to the customer's needs. Conventionally, the Market Orientation theory (MO) is a conjunction of these two pillars. However, what does it mean, operationally, to be market-oriented? A literal view of a market-oriented firm entails that: (1) departments engage with activities that efforts to understand customer's needs along with the factors that might affect such needs (2) departments must share knowledge and; (3) departments must use this interoperability and work together to meet their customer's requests[100]. Simply put, market orientation refers to the competence of companies to have market intelligence. Companies must be data-driven and use accurate information for customer analysis. These are the key elements to enable an efficient customer orientation strategy[101].

With MO, small-sized enterprises can overcome the nature of their limited resources and compete effectively with large organizations. A market-oriented mindset often leads managers to seek vital knowledge when selecting the right resources to meet consumer needs. Additionally, studies also suggest that MO may benefit SMEs more than larger firms. Indeed, smaller companies may be superior at identifying their strengths and communicating those clearly to their clients[102]. Naturally, scholars were able to identify a positive relationship between market-oriented SMEs and public procurement. Outcomes indicate that MO can impact on how actively SMEs are searching for information on available tenders and on how involved they are during bidding competitions. Companies that are

Flynn and Davis, "Firms' Experience of SME-Friendly Policy and Their Participation and Success in Public Procurement."
[99] Karjalainen and Kemppainen, "The Involvement of Small- and Medium-Sized Enterprises in Public Procurement: Impact of Resource Perceptions, Electronic Systems and Enterprise Size."
[100] Kohli and Jaworski, "Market Orientation: The Construct, Research Propositions, and Managerial Implications."
[101] Waltinger et al., "Market Intelligence: Linked Data-Driven Entity Resolution for Customer and Competitor Analysis."
[102] Raju, Lonial, and Crum, "Market Orientation in the Context of SMEs: A Conceptual Framework."

committed to their clients and regularly work to achieve customer satisfaction are more likely to seek and bid on public proposals[103]. Additional studies surrounding MO confirmed that SMEs can significantly benefit from doing market analysis (e.g., gather data from competitors or clients) and use the results strategically. When analyzing the market, the company can use the data to create a sustainable competitive advantage, a capability that competitors cannot easily replicate. A business that possesses multiple sustainable advantages over its competitors has, frequently, overall superior performance in public procurement[104].

2.5.2 USAGE OF ELECTRONIC INVOICE AND ORDERING SYSTEMS

Another line of research explored if the usage of electronic order and invoicing systems by SMEs can influence the firm's success when bidding. As administrations show their growing interest in the adoption of new technologies, public organizations are improving their procuring procedures by lowering costs via different electronic tools. In this context, it is possible to characterize e-procurement as a systematic method in which governments use IT systems in their procurement processes[105]. Online procurement portals are being built together with other technologies to digitalize public procurement. Alongside improvements inside the public sector, governments also request that companies use electronic ordering and invoicing systems[106]. This demand comes with no surprise, as these two activities are the most common interactions between government and firms during a procurement process. The incorporation of IT in public procurement is assumed to help governments to conserve capital and provide more transparent and more reliable methods to manage contracts. As public services become digital, companies must also digitalize their processes to be able to integrate their procedures with the public administration seamlessly. Thus, to engage with e-procurement, companies regularly need to utilize software[107]. Intuitively, studies have tried to ascertain if companies that use IT in ordering and invoicing can potentially affect their engagement in public procurement. As these electronic tools are often requested to enter bidding procedures, they might pose an extra impediment or progress for SMEs.

Initially, findings indicate that SMEs are not capable of following the digitalization of governments and are seemingly left out of electronic bids. When it comes to integrating IT systems into their internal operations, SMEs are doing worse than large corporations. The reason is that small firms lack human and financial resources, which prevents them from adopting new technological solutions necessary to improve their overall performance[108]. Smaller companies also rarely have enough assets to train their staff or employ new technologies, and they mostly concentrate on short-term goals rather than long-term IT projects[109]. SMEs also tend to use IT to perform basic administrative tasks.

[103] Flynn and Davis, "Explaining Sme Participation and Success in Public Procurement Using a Capability-Based Model of Tendering."
[104] Narver and Slater, "The Effect of a Market Orientation on Business Profitability."
[105] Moon, "E-Procurement Management in State Governments: Diffusion of e-Procurement Practices and Its Determinants."
[106] Harland et al., "Barriers to Supply Chain Information Integration: SMEs Adrift of ELands."
[107] Karjalainen and Kemppainen, "The Involvement of Small- and Medium-Sized Enterprises in Public Procurement: Impact of Resource Perceptions, Electronic Systems and Enterprise Size."
[108] Grando and Belvedere, "District's Manufacturing Performances: A Comparison among Large, Small-to-Medium-Sized and District Enterprises."
[109] Larson, Carr, and Dhariwal, "SCM Involving Small versus Large Suppliers: Relational Exchange and Electronic Communication Media."

Most companies do not own advanced communication systems such as electronic data interchange (EDI), nor do they have the necessary knowledge to implement such tools[110]. Likewise, SMEs fail to perceive the benefits of incorporating IT systems inside their businesses, leading to many companies that neglect investments in technology. Finally, phone and fax are still the primary methods of communication between SMEs and their customers. When firms employ new technologies to improve customer interaction, it is frequently not fully explored. For example, companies have standalone websites, albeit, for institutional purposes only, webpages offer no support systems with transactional benefits for their customers[111].

In contrast, when well exploited, technology can offer great opportunities for small and medium-sized companies. Firms can benefit from information and communication technologies (ICTs) in an accessible and affordable manner. While implementing IT systems might be challenging for small corporations, some technologies can enable businesses to provide to governments professionally and potentially reach new clients[112]. Indeed, at first glance, the installation of e-procurement may seem like an extra step that might hinder SME participation. Nevertheless, investigations discovered that SMEs that can implement electronic ordering and invoicing systems are more likely to act as public sector suppliers. Namely, SMEs will partake more in procuring if they can implement proper IT and if governments apply e-procurement procedures simultaneously. The implementation of IT systems is the responsibility of SMEs themselves, and it is a concern that executives need to consider if they intend to participate in e-procurement. Likewise, the public administration also needs to actively aid these companies by providing expertise on how to integrate the necessary IT systems into their daily operations. All in all, the combination of proper public policies and integration of IT systems (such as for ordering and invoicing) inside the companies will enable more participation of SMEs in public tenders[113].

2.5.3 PERCEPTION OF LEGAL, ADMINISTRATIVE RESOURCES

As previously mentioned, findings linked the perception of entrepreneurs over their resources and participation with public procurement. One of the main hindrances is that executives believe their companies lack legal, administrative, and IT resources. This perception was confirmed to influence the likelihood of a company to tender. On the other hand, companies that perceive that they have adequate resources to engage with the public sector are more likely to attempt to bid. The same study found that the entrepreneurs' perception over their assets is related to the company size. Micro enterprises are more likely to feel that they do not have administrative resources and supply capabilities to engage with central procurement units[114]. Moreover, companies must know their potential public sector customers and their needs. When it comes to resource perception, firms need

[110] Stefansson, "Business-to-Business Data Sharing: A Source for Integration of Supply Chains."
[111] Zheng et al., "Small Firms and E-Business: Cautiousness, Contingency and Cost-Benefit."
[112] Zheng et al.
[113] Karjalainen and Kemppainen, "The Involvement of Small- and Medium-Sized Enterprises in Public Procurement: Impact of Resource Perceptions, Electronic Systems and Enterprise Size."
[114] Karjalainen and Kemppainen.

to acknowledge if their capabilities are enough to meet the requirements stipulated by the public sector. Businesses that can evaluate their assets and know whether their resources are adequate to deal with governments are more likely to be involved with tendering[115].

2.5.4 COMPETITIVENESS AND CONTRACT SIZE

A quantitative analysis made in Germany isolated another success factor that impacts the achievement of a public contract. The number of competitors in a procurement process can influence SME participation while tendering. From an empirical point of view, when more companies participate in a bid, the higher the chances of an SME securing the contract. A competitive environment is suitable for SMEs, as it makes it easier for them to flash out their natural advantages, such as being more flexible and innovation-driven[116]. Alongside a competitive environment, academics assumed that short-term and simple contracts could also boost SMEs' success ratio. The reason is that smaller companies simply do not have the means to manage extensive documents[117]. With this belief, administrations often divide their tenders into smaller portions, making it possible to bid for separate parts of the contract. Naturally, one may think that splitting the document and making it smaller would have a positive effect and help SMEs approach public procurements. Surprisingly, the quantitative study conducted by Gkas & Eßig (2018) seems to suggest differently. While many claims are supporting that dividing contracts can indeed help SMEs win public contracts, the literature has a shortage of quantifiable data sustaining these allegations[118]. The data of their research indicates that splitting a contract into more parts does not significantly increase the chances of an SME's bidding success. In summary, a clear gap exists between law and public policies. The division of contracts, as required by law, is unlikely to increase the chances of SME success in bids, as proposed by policies[119].

2.5.5 ASSOCIATED SUCCESS FACTORS: CONCLUSION

Government procurement is undoubtedly a demanding activity for small and medium-sized enterprises. Consequently, it is not alarming that academics have concentrated on the obstacles that affect the participation of these companies in public tenders. Nonetheless, it is just as essential to comprehend the components and procedures that might facilitate the involvement of smaller enterprises in public tendering. In recent years, more studies are progressing towards a better understanding of what variables can affect SME involvement in public procurement. Table II is a summary of the elements that the current literature explores with empirical data. Unfortunately, most of the studies neglect to acknowledge what resources had, in fact, actual influence on the company's involvement with the procurement process. When these scholars apply both quantitative and qualitative methods of research, they mostly focus on the entrepreneur's perception rather than what

[115] Tammi, Saastamoinen, and Reijonen, "Market Orientation and Smes' Activity in Public Sector Procurement Participation."
[116] Glas and Eßig, "Factors That Influence the Success of Small and Medium-Sized Suppliers in Public Procurement: Evidence from a Centralized Agency in Germany."
[117] Loader, "Supporting SMEs through Government Purchasing Activity"; Fee and Hennigan, "SMEs and Government Purchasing in Northern Ireland: Problems and Opportunities."
[118] Nicholas and Fruhmann, "Small and Medium-Sized Enterprises Policies in Public Procurement: Time for a Rethink?"
[119] Glas and Eßig, "Factors That Influence the Success of Small and Medium-Sized Suppliers in Public Procurement: Evidence from a Centralized Agency in Germany."

the company possesses in terms of resources and other capabilities. For example, researchers investigate whether executives consider themselves capable of promoting goods and services to the public sector. In this case, almost no consideration exists of whether companies have robust marketing strategies or capable staff to promote to governments accurately. Delimiting studies to beliefs and perceptions is not a problem per se, as academics have already proven the value and impact of the executives' perception around the result of procurements[120]. However, the companies' IT infrastructure, human resources, management endeavors, and the impact of these variables on the business's involvement in public procurement remains mostly untouched. In the next chapter, a framework is developed to investigate the unexplored resources and their influence over SMEs in tenders.

Table II - Associated Success Factors for SME participation in Public

Category	Associated Success Factors	Sources
Public Sector Policies	(1) Greater amount of companies participating in bids; (2) More competition during the award procedure;	Glas and Eßig (2018); Loader (2005); Nicholas and Fruhmann (2014)
Organization	(3) Be market-oriented; (4) Analyse market data to create competitive advantage; (5) Understand the public sector preferences; (6) Analyse the Competition; (7) Integrate different skills and share market information inside the organization; (8) Incorporation of electronic ordering and invoicing systems;	Zheng et al. (2004); Loader (2013); Flynn and Davis (2016); Flynn and Davis (2017); Karjalainen and Kemppainen (2008); Waltinger et al. (2013); Raju, Lonial, and Crum (2011); Tammi, Saastamoinen, and Reijonen (2018)
Perception of Entrepreneurs	(9) Ability to predict and evaluate own resources to meet customer's need; (10) Perceive administrative, legal and IT resources as enough to engage with tenders.	Karjalainen and Kemppainen (2008); Tammi, Saastamoinen, and Reijonen (2014)

[120] Karjalainen and Kemppainen, "The Involvement of Small- and Medium-Sized Enterprises in Public Procurement: Impact of Resource Perceptions, Electronic Systems and Enterprise Size."

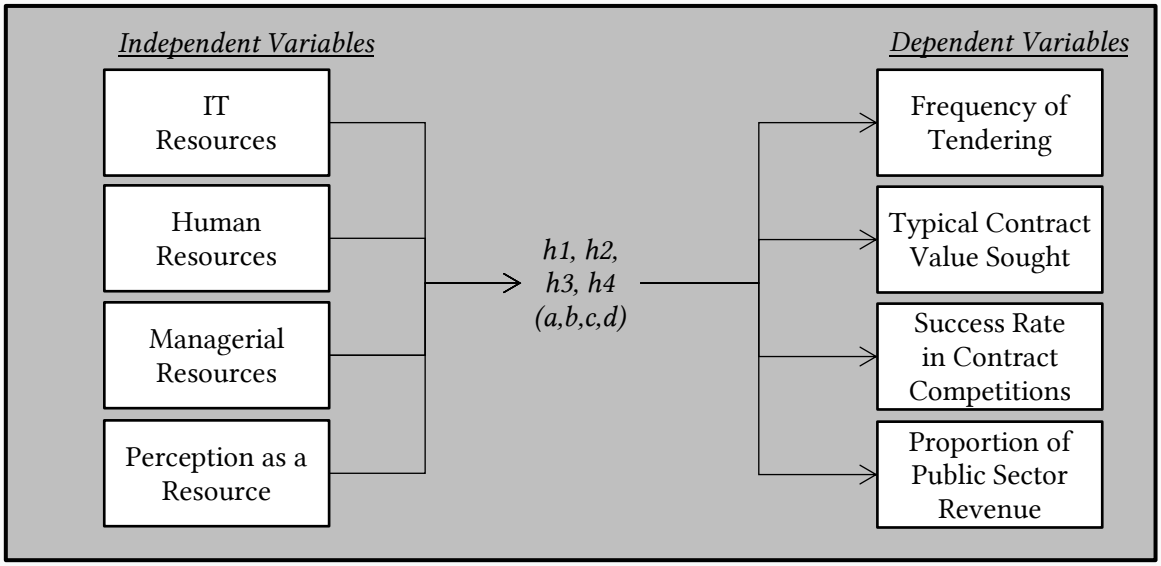
CHAPTER 3: CONCEPTUAL FRAMEWORK DEVELOPMENT

Theories are developed by researchers to explain phenomena, draw connections, and possibly, make predictions. This chapter will explain key concepts, variables, and hypotheses that will steer the research design of this thesis. The elements that are present in the model will also assist in answering how business resources affect SME participation in public procurement. This framework also provides a basis for interpreting the significance and applicability of potential findings. As clarified during the literature review, the resources that SMEs own, and how these assets impact the firm's success in public procurement, are still reasonably unexplored. Therefore, the framework draws on a resource-based view (RBV), along with its relationship with public procurement while also explaining the elements that describe what SME success in governmental contracting is. Referring to previous RBV studies, resources may ultimately decide any firm's ability to survive and succeed in its chosen marketplace[121]. Resources are the basis on which a company builds and executes its business strategies. This notion works the same everywhere, including the public sector market, since the pool of resources that a firm has at its disposal will also condition its tendering activities[122]. This framework then conceives that IT, human, managerial, and perception-based resources can influence tendering activity and tendering performance. The division of resources into these four categories derives from characteristics that many authors contemplate in the main areas of the field of strategic management.

These resources, such as physical (technologies and equipment), human capital (intelligence), and organizational (formal and informal planning), allow companies to create and implement value-creating strategies[123]. Along with these three types of resources, the model also considers the executives' perceptions surrounding their capabilities. This inclusion was necessary since it is already proven to impact the involvement of smaller companies in governmental contracting[124]. This framework then hypothesizes how each of these four resource categories influences the involvement of SMEs in public procurement. Some elements are borrowed and expanded upon already existing theoretical models such as the *IT Business Value Model*[125] and the *Capability-based Model of Tendering*[126]. The next sub-chapters will unfold each variable present in the framework while presenting the proposed hypotheses to solve the research question of this thesis. The explanation of methods, data extraction, and data analyses are described in the next Chapter 4: Research Methodology.

[121] Makadok, "Toward a Synthesis of the Resource-Based and Dynamic-Capability Views of Rent Creation."
[122] Barney, "Firm Resources and Sustained Competitive Advantage."
[123] Barney.
[124] Karjalainen and Kemppainen, "The Involvement of Small- and Medium-Sized Enterprises in Public Procurement: Impact of Resource Perceptions, Electronic Systems and Enterprise Size."
[125] Melville, Kraemer, and Gurbaxani, "Review: Information Technology and Organizational Performance: An Integrative Model of IT Business Value," 2004.
[126] Flynn and Davis, "Explaining Sme Participation and Success in Public Procurement Using a Capability-Based Model of Tendering."

Figure II - A Resource-based Model of Tendering



3.1 CONCEPTUALIZATION OF RESOURCES

When looking at the respective literature, many theories have already developed the concept of a *resource*. Birger Wernerfelt (1984) conceptualizes the most known theory, together with Jay Barney (1991), the resource-based view (RBV) of the firm. According to them, resources are anything that brings strengths or weaknesses to a business; they are assets (tangible or intangible) that can be tied semi-permanently to a company. Most daily services require several resources to operate, and it is possible to determine the minimum amount of necessary resources to execute each business process[127]. Resources are business-specific, hard to replicate, and valuable to improve operational efficiency[128]. The business' IT infrastructure, coupled with how managers apply ICTs, can lead to improvements in existing processes or enable the creation of new ones. Indeed, the precise application of IT can eventually enhance organizational performance[129] and, in general, resources can impact the firm's capability to deliver better results and profit more[130]. Businesses with outstanding resources are more likely to create innovation and to be financially compensated for their efforts. In this scenario, smaller companies are at a disadvantage as they have less available resources when compared with large corporations[131]. In the context of public procurement, SMEs can indeed actively participate and apply for public tenders. However, in most of the cases, small companies do not have the necessary assets to bid for contracts effectively[132]. Therefore, how is it possible that some SMEs, even with limited resources, can enter a highly competitive environment and secure contracts with the public sector? Do these SMEs share any resource in common? Are they used in any way to increase their business

[127] Wernerfelt, "A Resource-Based View of the Firm."
[128] Teece, Pisano, and Shuen, "Dynamic Capabilities and Strategic Management."
[129] Brynjolfsson and Hitt, "Beyond Computation: Information Technology, Organizational Transformation and Business Performance."
[130] Wernerfelt, "A Resource-Based View of the Firm."
[131] Flynn and Davis, "Explaining Sme Participation and Success in Public Procurement Using a Capability-Based Model of Tendering."
[132] Flynn, McKevitt, and Davis, "The Impact of Size on Small and Medium-Sized Enterprise Public Sector Tendering."

performance? To what extent can these resources influence SMEs' participation in public tenders? The RBV theory is a concept that can help respond the company's involvement and performance in public contracts. Companies are likely to possess a range of different resources for tendering, and these assets may have a significant bearing on the companies' expertise to compete in the public sector marketplace[133].

3.1.1 INFORMATION TECHNOLOGY (IT) RESOURCES

- *H1a: There is a relationship between IT Resources and Frequency of Tendering*
- *H1b: There is a relationship between IT Resources and Typical Contract Value Sought*
- *H1c: There is a relationship between IT Resources and Success Rate in Contract Competitions*
- *H1d: There is a relationship between IT Resources and the Share of Public Sector Revenue*

This class of resources consists of all the physical infrastructure (hardware) and other shared technologies that are present across the organization. Hardware is required to support specific business applications (software), which is necessary to operate many business processes[134]. The division of assets between hardware and software is coherent with how companies recognize their IT resources. Firms interpret these two groups differently, and they take them into account when making investment decisions and setting performance expectations. Recent studies indicate that leading companies are the ones that can isolate and invest in the right IT initiatives to make valuable strategic decisions[135]. IT is today one of the most essential and integrative parts of smaller businesses. Small companies are generally weakly equipped in terms of infrastructure when compared with larger firms. The ability of SMEs to work with limited resources, combined with their rapid and flexible operational capacity, is what causes them to build durable and robust ICT innovations[136]. Indeed, owning specific ICTs and using them correctly has a vast potential for improving business performance[137]. Henceforth, being such a fundamental part of smaller businesses, especially of those in the technology industry, studies must consider the influence of IT resources in SMEs' participation in public procurement.

3.1.2 HUMAN RESOURCES (HR)

- *H2a: There is a relationship between HR and Frequency of Tendering*
- *H2b: There is a relationship between HR and Typical Contract Value Sought*
- *H2c: There is a relationship between HR and Success Rate in Contract Competitions*
- *H2d: There is a relationship between HR and the Share of Public Sector Revenue*

The second category of resources is human capital. It is the expertise and knowledge that are required to execute processes daily[138]. Human resources can englobe the training, motivation, experience,

[133] Flynn, "Re-Thinking SME Disadvantage in Public Procurement."
[134] Melville, Kraemer, and Gurbaxani, "Review: Information Technology and Organizational Performance: An Integrative Model of IT Business Value," 2004.
[135] Weill, Subramani, and Broadbent, "Building IT Infrastructure for: Strategic Agility."
[136] Sunday and Vera, "Examining Information and Communication Technology (ICT) Adoption in SMEs."
[137] Melville, Kraemer, and Gurbaxani, "Review: Information Technology and Organizational Performance: An Integrative Model of IT Business Value," 2004.
[138] Melville, Kraemer, and Gurbaxani.

judgment, intelligence, relationships, networks, insights, and leadership of each employee inside the firm[139]. Thousands of small decisions must be made by all employees of the organization to move the company in the right direction. These decisions are not easy to replicate (if not impossible in some cases), as they are a reflection on the socially complex qualities of teamwork, trust, and companionship that exist among workers. For instance, a competitor can imitate an IT system from another company. However, it is much more challenging to duplicate another company's culture and method of working.

Alongside not being easy to replicate, the decision-making process and existing knowledge inside a firm dictate the overall performance of organizational processes. For SMEs, the impact of human resources is even more relevant. With a limited number of workers, they need to find tactics, usually containing IT, to create a competitive advantage[140]. SMEs must also often rely on external parties and stakeholders to provide additional human capital and workforce[141]. Smaller companies have very few employees, so they must choose each role and person meticulously. A quantitative study found that micro-firms have, on average, 1,77 workers available to tender, small firms have 3,04; medium enterprises have 4,39; while large ones have 6,89. The larger the firm, the more significant is the company's potential to bid more frequently and to apply for contracts with higher budgets[142]. Nonetheless, this framework considers the number of employees and the roles present in the company. The existence of a position or singular experience inside the enterprise can also affect the company's capability to supply to the public sector[143].

3.1.3 MANAGERIAL RESOURCES (MR)

- *H3a: There is a relationship between MR and Frequency of Tendering*
- *H3b: There is a relationship between MR and Typical Contract Value Sought*
- *H3c: There is a relationship between MR and Success Rate in Contract Competitions*
- *H3d: There is a relationship between MR and the Share of Public Sector Revenue*

Human resources contemplate the technical expertise that encompasses how to operate specific procedures or technologies. Managerial resources include the ability to control projects inside the organization, manage teams, and supervise budget restrictions. Even though human and managerial resources are often interconnected, they are still separate and distinct concepts[144]. Managerial resources emphasis on the manager's ability to orchestrate individual actions to reach significant outcomes. The aptitude of managing resources inside the company enables organizations to fulfill activities at a lower cost and allows them to react to changes with greater flexibility[145]. As human resources, managerial capabilities are also related to the firm's aptitude to control the formal aspects of tendering and public contracting[146]. Frequently, large corporations have outstanding managerial

[139] Barney, "Firm Resources and Sustained Competitive Advantage."
[140] Coder, Peake, and Spiller, "Do High Performance Work Systems Pay for Small Firms? An Intellectual Capital Building Perspective."
[141] Irwin et al., "Entrepreneurial Orientation (EO) and Human Resources Outsourcing (HRO): A 'HERO' Combination for SME Performance."
[142] Flynn, "Re-Thinking SME Disadvantage in Public Procurement."
[143] Flynn.
[144] Melville, Kraemer, and Gurbaxani, "Review: Information Technology and Organizational Performance: An Integrative Model of IT Business Value," 2004.
[145] Hernández-Linares, Kellermanns, and López-Fernández, "Dynamic Capabilities and SME Performance: The Moderating Effect of Market Orientation."
[146] Flynn and Davis, "Explaining Sme Participation and Success in Public Procurement Using a Capability-Based Model of Tendering."

resources, and this is due to their formalized strategies, planning, and operational discipline[147]. As a result, larger businesses are well prepared to handle the technical aspects of public sector tendering. Then again, small firms cope with less formalized procedures, and they rely on something called "incidental knowledge."[148] Their wisdom is situation-specific and rarely transmitted internally. Consequently, SMEs are limited when it comes to satisfying the procedural aspects of tenders due to their limited managerial resources. For these reasons, SMEs' success in public procurement must contemplate the capability of managing a company properly.

3.1.4 PERCEPTION AS A RESOURCE

- *H4a: There is a relationship between Perception and Frequency of Tendering*
- *H4b: There is a relationship between Perception and Typical Contract Value Sought*
- *H4c: There is a relationship between Perception and Success Rate in Contract Competitions*
- *H4d: There is a relationship between Perception and the Share of Public Sector Revenue*

It is not only the actual presence of the resource that counts towards business performance. As attested by previous researchers, the entrepreneur's vision over its resources matters when engaging with public procurement[149]. Personal experiences and expectations of entrepreneurs can affect the pace and direction of a firm's growth. As the perception of entrepreneurs and the resources of the company are co-developed, so does the company's growth directions[150]. The same is valid for public procurement; the perception of business owners over their resources can influence the firm's involvement in tenders. As empirical data shows, perceptions regarding specific resources such as administrative and legal do indeed influence SME involvement in public bids[151]. This framework contributes to previous findings and builds upon the literature of business perception and public procurement. This framework includes the entrepreneurs' perception over their market activities, customer orientation, integration of departments, and perception over the procurement process.

3.2 INVOLVEMENT FACTORS IN PUBLIC PROCUREMENT

As explained, resources can influence, in different degrees, tendering activity, and tendering performance. The overall involvement of the firm in public procurement can be sub-divided into the following variables: (1) *Frequency of tendering* is one of the leading indicators of activity in public procurement. Many empirical studies have used it to explain tendering success[152], and the RBV theory is likely to influence the frequency of bidding in several respects. It is possible to consider the number of times that companies search for open tenders as a frequency indicator. For instance, staff availability

[147] Chenhall, "Management Control Systems Design within Its Organizational Context: Findings from Contingency-Based Research and Directions for the Future."
[148] Matlay, "Organisational Learning in Small Learning Organisations: An Empirical Overview."
[149] Karjalainen and Kemppainen, "The Involvement of Small- and Medium-Sized Enterprises in Public Procurement: Impact of Resource Perceptions, Electronic Systems and Enterprise Size."
[150] Mahoney and Pandian, "The Resource-Based View within the Conversation of Strategic Management."
[151] Tammi, Saastamoinen, and Reijonen, "Market Orientation and Smes' Activity in Public Sector Procurement Participation"; Karjalainen and Kemppainen, "The Involvement of Small- and Medium-Sized Enterprises in Public Procurement: Impact of Resource Perceptions, Electronic Systems and Enterprise Size."
[152] Tammi, Saastamoinen, and Reijonen, "Market Orientation and Smes' Activity in Public Sector Procurement Participation."

means that businesses will routinely search and compete for public sector contracts more often[153]. (2) The *average value of the contract* that companies look for can be a representation of competitiveness in the public sector marketplace[154]. The value of a public contract has a significant, if not a primary effect, on how SMEs can access public contracts. Some resources can lead SMEs to deal with different ranges of contract values and influence, which budget-limits businesses choose to pursue. Small and medium-sized companies win relatively low-value contracts. The weight of micro-enterprises among the winners starts to decline when the contract value surpasses €100.000[155]. (3) Resources can impact the likelihood of *succeeding in public procurement*. This third variable measures the actual number of contracts that a business has secured. A firm's set of resources will impact the company's competitive advantages, which might increase or decrease the chances of securing a contract during the tendering process[156]. (4) Finally, the *proportion of public sector revenue* is analyzed as public procurement barriers often favor large suppliers. These barriers create a scenario in which larger companies gravitate to public sector opportunities, while smaller firms must restrict their activities to the private sector[157]. Businesses with restricted negotiating instruments will struggle to gain a grip on the public administration market. Therefore, SMEs need to select the appropriate resources to have a stream of revenue that comes from the government[158]. The next chapter explains how the research questions and created hypotheses will be answered.

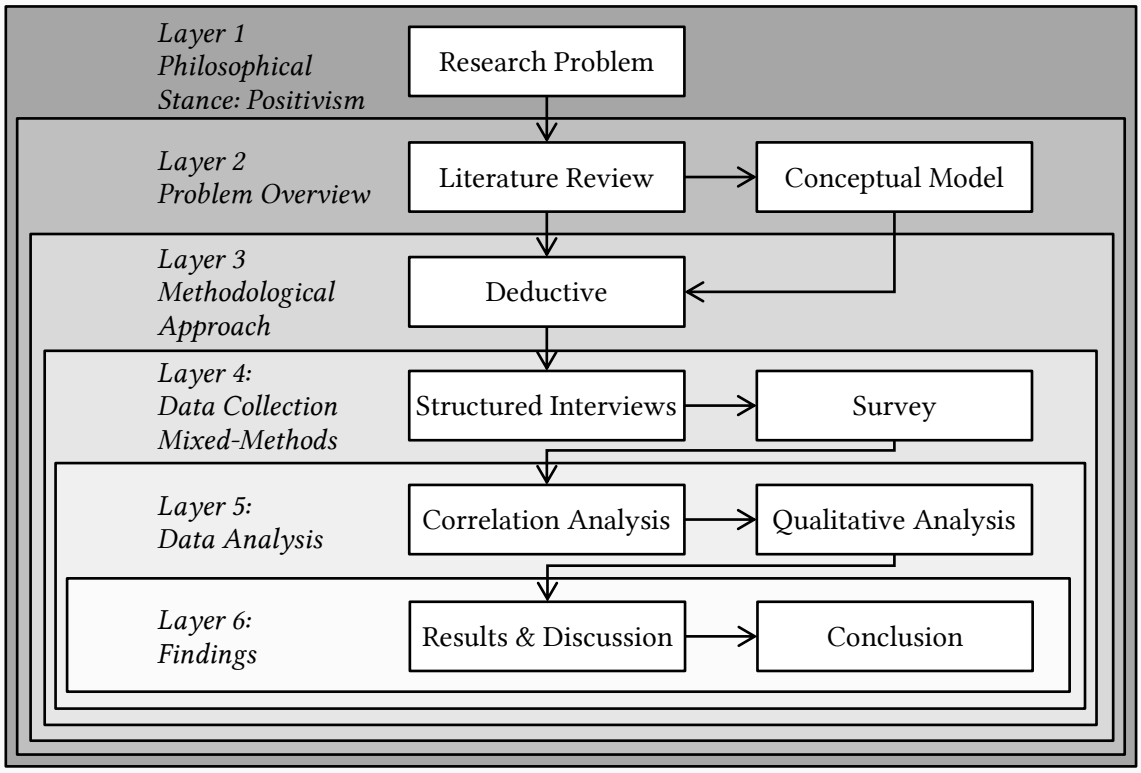
[153] Flynn, "Re-Thinking SME Disadvantage in Public Procurement."
[154] Flynn.
[155] Thomassen et al., "SMEs' Access to Public Procurement Markets and Aggregation of Demand in the EU."
[156] Flynn and Davis, "Explaining Sme Participation and Success in Public Procurement Using a Capability-Based Model of Tendering."
[157] Walker and Preuss, "Fostering Sustainability through Sourcing from Small Businesses: Public Sector Perspectives."
[158] Flynn, "Re-Thinking SME Disadvantage in Public Procurement."

CHAPTER 4: RESEARCH METHODOLOGY

4.1 METHODOLOGICAL APPROACH: DEDUCTIVE REASONING

The hypotheses constructed in the previous chapter were created and derived from the theories that surround SMEs and public procurement. The hypotheses are an outgrowth of qualitative and quantitative findings, mainly found in the literature review. By utilizing deductive means, this thesis uses the hypotheses from the conceptual model and sets out to answer them. By answering these assumptions, it is possible to know how resources are influencing SME involvement in public procurement. This chapter will then explain the research design of this thesis with more detail. It is possible to see the overall research design in the following Figure III.

Figure III – Research Design



A deductive approach is often related to quantitative research, as it is based on positivistic philosophy. Therefore, this research will resort to mathematical language to describe the phenomena and relationships between variables. While deductive reasoning strives to be objective, it can contain many subjective aspects. In order to solve the subjective facets of a hypothetic-deductive approach, this thesis integrates qualitative methods of research. Utilizing qualitative techniques are necessary to uncover more in-depth knowledge of the stated hypotheses and offer a more expansive view of the

associated questions[159]. Deductive reasoning is also a suitable approach for this thesis as the goal is to address a practical problem and to test differences from clear-cut categories of the literature. Furthermore, quantitative research is a standard approach in the field of SME engagement in public procurement. The common usage of quantitative measurements in this field might be due to an easier replication of findings and generation of comparable results. Frequently, authors tend to incorporate previous studies in their analysis, as it is easier to explain the causes and effects of each study.

Additionally, defining specific criteria is necessary to certify this research. The first criterion is the *reliability*, a prevalent principle in the field of quantitative studies. Reliability will ensure that this study is: (1) researcher-independent (knowledge is not dependent on the researcher); (2) time-independent (results remain stable when they replicated over time) and; (3) instrument-independent (reliability is not a property of the measurement instrument itself, it is a property of the data obtained by using that instrument). Methods are also applied consistently to reduce the influence of external variables, and different participants always received the same inputs to evaluate. The second criterion is the *validity* of the study, meaning that propositions and findings will explain the empirical word accurately, free from random and systematic errors[160]. In this research, established theories and empirical data supported the execution of methods. Appropriate sampling is defined as the study is limited to SMEs only (maximum of 250 employees[161]). Lastly, the delimitation of participants occurred before the data collection phase.

This research was also possible with the assistance of Digipolis, the public, not-profit ICT service provider for the various public sector organizations in the City of Antwerp, Belgium. The organization is responsible for executing several procurements for the city, mostly with tenders that are IT related. In 2015, Digipolis understood that it had to drastically change its traditional procurement strategy to keep up with the rapid speed of technological innovation. Instead of slowly shifting to a handful of traditional ICT vendors, Digipolis aimed to recruit SMEs from the IT sector. The organization did an extensive redesign of its procurement plan in collaboration with local suppliers, thereby raising the total number of participating SMEs and increasing the procurement for creative solutions[162]. With a fast and lean procurement process, Digipolis is now notorious for completing a full cycle of procurement in only six weeks[163]. Their vast SME network, allied with their know-how on public procurement, made Digipolis an essential partner for the completion of this study.

4.2 RESEARCH METHODS: MIXED-METHODS

It is possible to recognize mixed-methods studies as the class of research in which a scientist blends techniques, processes, strategies, or principles of quantitative and qualitative research into a single experiment. In summary, this study will integrate both quantitative and qualitative data into its

[159] Newman, "A Conceptualization of Mixed Methods: A Need for Inductive/Deductive Approach to Conducting Research."
[160] Swanborn, "A Common Base for Quality Control Criteria in Quantitative and Qualitative Research."
[161] European Commission, "Commission Recommendation 2003/361/EC."
[162] De Coninck, Viaene, and Leysen, "Public Procurement of Innovation Through Increased Startup Participation: The Case of Digipolis."
[163] Offerman, "' Buy from Startups ' Strategy Pays off for City of Antwerp."

analyses. The drawbacks of each technique and potential data gaps can be filled or anticipated by incorporating both types of techniques[164].

4.2.1 STRUCTURED INTERVIEWS

The conduction of in-depth interviews was necessary to collect primary data and explore the resources that might be required to apply and succeed in public tenders. Together with this analysis, the execution of interviews allowed a comprehensive knowledge surrounding what the most vital resources are for SMEs[165]. The answers were also valuable to understand how SMEs are utilizing these resources. The formulation of questions took into consideration the research problem of this thesis. Likewise, all questions were created based on grounded theories, which are present in the literature review. The questionnaire was also divided into specific categories of resources, as illustrated in the conceptual model in Figure II. The interviews are structured, verbally administrated questionnaires with prearranged questions, and with no variation within their scope. The interviews took place in areas free of distraction and during times that were suitable and comfortable for the participants. The questions are also open-ended, instigating more than a yes/no answer from the respondents. When appropriate, the interviewees needed to provide further clarification[166]. Each interview took approximately one hour, and all the answers were audio-recorded (with consent) and transcribed with the aid of appropriate software.

Managers from Digipolis helped with the selection of entrepreneurs to participate in the interviews. These managers also aided in revising the questions. In total, six interviews were concluded: four CEOs who had previously earned a public contract gave their comprehensions about their resources and management practices. Additionally, two procurement evaluators from Digipolis gave information surrounding the procurement process and evaluation criteria. Concerning the evaluation of the interviews, the analysis of results aimed to find common resources and managerial practices that are indeed impacting the companies' involvement in public tendering. By utilizing speech analysis software, it was possible to draw meaningful relations from the provided answers along with a structural synthesis of the resources that SMEs need when accessing public procurement[167].

4.2.2 SELF-ADMINISTERED SURVEYS

Empirical studies made by Zheng et al. (2006) on SMEs and public procurement revealed that survey research has primarily investigated the buying side of the procurement process. The lack of exploration over the companies' side further stresses the importance of quantitative data on this topic[168]. The questions for this survey were formulated based on the literature review, the resource-based model of tendering, and the qualitative data gathered from interviews. The reason for applying this method is to measure to what extent a resource can influence SME participation in public

[164] Lee and Smith, "Criteria for Quantitative and Qualitative Data Integration."
[165] Jamshed, "Qualitative Research Method-Interviewing and Observation."
[166] Gill et al., "Methods of Data Collection in Qualitative Research: Interviews and Focus Groups."
[167] Fossey et al., "Understanding and Evaluating Qualitative Research."
[168] Zheng, Walker, and Harland, "The Role of SMEs in Public Procurement: A Review of Literature and Research Agenda."

contracting. Questions varied from single-choice, multiple-choice, and Likert-scale. In total, the survey contained 39 questions, and the average time to answer it completely took from five to fifteen minutes. The survey was available on-line on an e-survey platform. The quantitative survey seeks conclusive evidence through statistical analysis[169].

4.2.2.1 Sample

The following formula of sample size calculates the necessary quantity of surveys that must be applied[170]. In the Digipolis case, the total amount of startups that engaged with their tendering process is 689[171]. To also include SMEs that have never been involved in public procurement, an account with LinkedIn Premium was used to reach small technology companies in Antwerp.

Equation 1 – Sample Size Formula

$$n = \frac{p * (1 - p) * Z^2 * N}{\varepsilon^2 * (N - 1) + Z^2 * p * (1 - p)}$$

Z= "z" score (change based on trust rating) .
p = standard deviation
ε = margin of error.
n = sample size
N = population size

4.2.2.2 Response Rate

By the end of the survey period, 151 responses were received. Considering the number of respondents and a confidence level of 95%, the margin of error is approximately 7%. The response rate was 4.56%, an acceptable percentage considering other researches targeted at SMEs. For example, Levenburg (2005)[172], Wymer & Regan (2005)[173], Karjalainen & Kemppainen (2008)[174] , and Fynn & Davis (2017)[175] have all reported response rates below 10% in their studies.

4.3 DATA ANALYSIS MEASUREMENTS

4.3.1 DATA ANALYSIS TECHNIQUES

The central technique used to evaluate the hypotheses is correlation. There are two primary types of correlation coefficients: the Pearson correlation coefficient and the Spearman rank correlation coefficient[176]. The proper use of the type of correlation coefficient depends on the type of variables on the analysis. Pearson's (also called Pearson's R) correlation, is one of the dominant coefficients used in quantitative analysis. Pearson has the preference for scale-types of variables. When data is ordinal or categorical, the analysis uses Spearman's instead. These correlation coefficients can determine how

[169] Pereira, "Pesquisa de Marketing - Semipresencial."
[170] Agranonik and Hirakata, "Sample Size Calculation: Proportions."
[171] Offerman, "' Buy from Startups ' Strategy Pays off for City of Antwerp."
[172] Levenburg, "Does Size Matter? Small Firms' Use of E-Business Tools in the Supply Chain."
[173] Wymer and Regan, "Factors Influencing E-Commerce Adoption and Use by Small and Medium Businesses."
[174] Karjalainen and Kemppainen, "The Involvement of Small- and Medium-Sized Enterprises in Public Procurement: Impact of Resource Perceptions, Electronic Systems and Enterprise Size."
[175] Flynn, "Re-Thinking SME Disadvantage in Public Procurement."
[176] Mukaka, "Statistics Corner: A Guide to Appropriate Use of Correlation Coefficient in Medical Research."

strong the relationship between the data is. They return a value between -1 and 1[177], where the following Table III depicts its overall evaluation.

Table III - Correlation coefficient measurement

Sign of coefficient	Strong	Moderate	Weak	Very weak
+ (positive relationship)	1.0 to 0.5	0.49 to 0.3	0.29 to 0.1	0.01 to 0
- (negative relationship)	-1.0 to 0.5	-0.49 to 0.3	-0.29 to 0.1	-0.01 to 0

Alongside the correlation coefficient, the p-value supports the hypotheses derived from the model in Figure II. Traditionally, the assumption for accepting a null hypothesis (no relation between the variables), is when p is higher than 0.05[178]. Most hypotheses use a p-value to weigh the strength of evidence. A p-value is a number between 0 and 1, and the following Table IV describes its overall evaluation.

Table IV - P-value and evidence for rejecting the H_0 null hypothesis

P-value	P-value %	Evidence for rejecting H_0
More than 0.1	>10%	Very weak to none
Between 0.1 - 0.05	10%-5%	Weak
Between 0.05 - 0.01	5%-1%	Strong
Less than 0.01	<1%	Very strong

For this research, hypotheses are supported when the correlation coefficient is moderate or stronger (ρ >0.3), and the p-value is lower than 0.01 (very strong evidence to reject the null hypothesis).

4.3.2 DEPENDENT VARIABLES

There are four dependent variables on the participation of SMEs and their performance in public procurement. The first variable is the frequency of bidding. It is possible to calculate it with the sum of public sector contracts that a company has applied in the previous 12 months. When asked how many times they applied for tenders, SMEs manually type the number. Moreover, the amount of times that a company looks for an open opportunity also counts toward this first dependent variable. The second dependent variable is the typical value of public sector contracts that companies apply. This question used seven financial intervals. The options in the survey are: <€25.000; €25.000 – €143.999; €144.000 – €249.999; €250.000 – €499.999; €500.000 – €999.999; €1.000.000 – €5.000.000 and >€5.000.000, respectively. The third variable measures the success rate that companies have during contract competition. It is calculated with the number of contracts that an SME has managed to secure in the previous 12 months. When asked how many contracts they managed to win, SMEs could select a

[177] Benesty et al., "Pearson Correlation Coefficient."
[178] Ferreira and Patino, "What Does the p Value Really Mean?"

number ranging from 0 to 100. The fourth and final variable concerns the proportion of revenue that comes from the public sector. This is calculated with the percentage of income that an SME has by providing solutions to the government. This question used five percentual ranges: 0,1 – 19%; 20 – 49%; 50 – 79%; 80 – 99% and 100%.

4.3.3 INDEPENDENT VARIABLES

An independent variable is a variable that is changed or monitored to evaluate the effects on the dependent variable in a statistical experiment. Controlled inputs are independent variables. Dependent variables reflect the resulting outcomes by changing these inputs[179]. The independent variables in this study are the firms' resources. As illustrated by the conceptual model in Figure II, these are IT, human, managerial, and perception-based resources. Many questions were asked to identify the presence of these resources and later relate them to the dependent variables. For instance, in the IT section, companies needed to provide data surrounding: if they have a website, an ordering an invoicing system, and if their portfolio is showcased on their website. Chapter 5 has more information regarding these variables.

4.4 METHODOLOGY LIMITATIONS

It is worth mentioning that, like any other study, this methodology is not flawless and contains a few limitations. For instance, this research does not consider the country's characteristics (Belgium) when analyzing the companies. As explained by Melville et al.'s IT Businesses Value Model, the macro environment is a decisive factor to dictate the firm's performance. According to this model, the macro factors of a country can shape the landscape and profoundly impact the performance of businesses. There are also laws and regulations that the federal administration imposes, and both the municipality and companies must comply when engaging in public procurement. An analysis of the nation's policies, economy, social demographics, technological environment, and legal constraints would be necessary to understand if these variables influence the firm's performance in public procurement. When replicating this study in another country, it can be hard to estimate that the same resources would have the same impacts on SME involvement. Different macro environments will entail different businesses' value generation processes. Hence, the same resources might not have the same degree of influence. In this regard, the replication of this research must consider the different cultures, geographical locations, and the overall country structure before using the findings[180].

Another limitation is that the companies that have participated in this study are from a single industry, the technological sector. Evidence suggests that the sector that companies focus on their activities is also associated with SME involvement in public procurement. As demonstrated by Pickernell et al. (2011), engineering and construction companies are more likely to become involved in public

[179] Carlson, *A Concrete Introduction to Real Analysis, Second Edition*, 186.
[180] Melville, Kraemer, and Gurbaxani, "Review: Information Technology and Organizational Performance: An Integrative Model of IT Business Value," 2004.

tendering[181]. In this case, it would be suitable to measure the firm sector as an additional control variable. McKevitt & Davis (2013) also draw attention that small firms are not a homogeneous group and illustrate that SMEs use divergent strategies when competing for procurement contracts[182]. The umbrella term of "SMEs" can indeed include many types of different companies, even when considering the same sector. Studies should attempt to segregate groups of SMEs to make the sampling more homogeneous. Companies under the category of "SME" might not equally behave when approaching public procurements.

The next chapter presents the research results provided by this research design. The results are then followed by a discussion and then a conclusion.

[181] Pickernell, Packham, and Miller, "Competing Agendas in Public Procurement : An Empirical Analysis of Opportunities and Limits in the UK for SMEs."
[182] McKevitt and Davis, "Microenterprises: How They Interact with Public Procurement Processes."

CHAPTER 5: RESEARCH RESULTS

This chapter uses the respondent's raw data as descriptive statistics. The information is separated into four categories, as depicted by the model in Figure II. First, the companies' socioeconomic profile and their involvement with public procurement are displayed. The next sub-chapters will then show the firms' IT, human, managerial, and perception-based resources.

5.1 SMEs Socioeconomic Profile

Table V – SMEs Descriptive Characteristics

Range of Age Distribution	**Frequency**	**(%)**
0-5 years	57	37,7
6-10 years	32	21,1
11-20 years	38	25,1
21+ years	24	15,8
Range of Employees Distribution	**Frequency**	**(%)**
0-10 Employees	69	45,7
11-50 Employees	56	37,0
51-250 Employees	26	17,2
Range of Sales Turnover (Financial Year)	**Frequency**	**(%)**
Less than €100.000	15	9,9
€100.000 – €199.999	23	15,2
€200.000 – €399.999	17	11,2
€400.000 – €999.999	21	13,9
€1.000.000 – €1.999.999	20	13,2
€2.000.000 – €20.000.000	44	29,1
More than €20.000.000	11	7,28
Working Financial Capital (for three months)	**Frequency**	**(%)**
Yes	135	89,4
No	16	10,6

Note. N=151.

Table V shows the overall business profiles. Most of the companies (37,75%) are young (0 – 5 years), and small (45,70%), with a maximum of 10 employees. 25,16% received a maximum of €199.999 in the last financial year. Moreover, 89,40% of companies have enough working capital for the next three months. In other words, most of the firms have financial health for the short-term. Studies have already demonstrated the importance of working capital to SMEs' profitability[183]. Possessing working capital is imperative for a company's financial condition. Thus, it will be checked with the dependent variables of this research. However, a study conducted with SMEs in the UK demonstrated that there is an optimal level for SMEs regarding working capital. Having too much money stored and not invested might reduce profitability levels and eliminate business opportunities for the company. Thus,

[183] Tauringana and Adjapong Afrifa, "The Relative Importance of Working Capital Management and Its Components to SMEs' Profitability."

it is not only the presence of working capital that matters for an SME. Instead, it is how companies manage their financial reserves that it will aid the company to grow financially and potentially achieve public contracts[184].

5.2 SME INVOLVEMENT WITH PUBLIC PROCUREMENT

Table VI - SMEs Involvement with Public Procurement

Public procurement channels	Frequency	(%)
E-procurement portals	70	28,6
Public Sector Organization Website	27	11,0
Word-of-mouth	61	24,9
Request for tender from buyers	66	26,9
Newspapers	4	1,6
Other	17	6,9
How often looked for contract opportunities (past 12 months)	**Frequency**	**(%)**
Not even once	43	28,5
Daily	10	6,6
Weekly	13	8,6
Fortnightly (every 2 weeks)	11	7,3
Monthly	22	14,6
Seasonally (every 4 months)	42	27,8
Annually	10	6,6
Tender Submission Frequency	**Frequency**	**(%)**
0	55	36,4
1	18	11,9
2	23	15,2
3	19	12,6
4	10	6,6
5	7	4,6
6	7	4,6
7	4	2,7
8	2	1,3
10	1	0,7
15	1	0,7
20	2	1,3
100	2	1,3
Typical Contract Value Sought	**Frequency**	**(%)**
Less than €25.000	11	7,2
€25.000 – €143.999	53	35,1
€144.000 – €249.999	12	7,9
€250.000 – €499.999	18	11,9
€500.000 – €999.999	9	5,9
€1.000.000 – €5.000.000	3	1,9
More than €5.000.000	0	0,0
Not Applicable	45	29,8

[184] Afrifa and Padachi, "Working Capital Level Influence on SME Profitability."

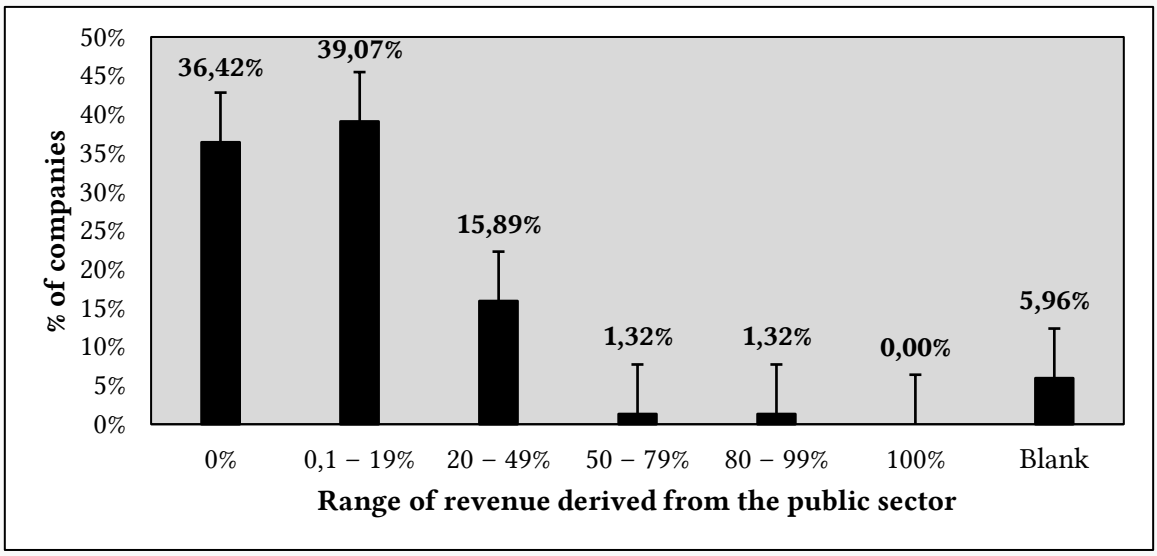
Success Rate in Contract Competitions	Frequency	(%)
0	80	52,9
1	40	26,4
2	12	7,9
3	2	1,3
4	9	5,9
5	2	1,3
6	1	0,6
7	1	0,6
10	1	0,6
18	1	0,6
20	1	0,6
100	1	0,6

Range of Revenue derived from the Public Sector	Frequency	(%)
0%	55	36,4
0,1 – 19%	59	39,0
20 – 49%	24	15,8
50 – 79%	2	1,3
80 – 99%	2	1,3
100%	0	0,
Not Applicable	9	5,96

Note. N=151.

In Table VI, it is possible to see the data used for the dependent variables of this study. First, for the tender search frequency, 36,42% of companies did not look for an opportunity to work with the public sector in the past 12 months. Moreover, most firms tend to look for opportunities in e-procurement portals (26,58%), receive requests from buyers (25,95%), and word-of-mouth (27,22%). The following Figure IV depicts the range of revenue that SMEs have derived from the public sector.

Figure IV- Range of Revenue derived from the Public Sector



It is possible to see how much the government contributes to the SMEs' average revenue. The measurement used is the percentage of an SME's revenue that came from supplying public sector organizations in the preceding 12 months. 36,42% of companies earn no income from the public sector. 39,07% of the companies earn between 0,1 - 19% of their total revenue from the public sector. 15,89% earn between 20 – 49%. 1,32% earn between 50 – 79% and 1,32% earn between 80 – 99%. No company solely derives its income from the government. Finally, 5,96% did not know how to answer this question. As data implies, smaller companies are less likely to profit from public sector markets.

The reduced presence of the government in small businesses' revenue is a topic that has been explored by other scholars. For instance, the data backups previous statements made by Ram & Smallbone (2013). According to them, diversifying operations outside of low-value business niches to more profitable consumer markets (such as the public administration) proves inevitably challenging for small and newly formed companies[185]. Furthermore, the model developed by Flynn & Davis (2017) demonstrates why SMEs are unable to make public contracting a more significant part of their revenue stream. Their study attested that the lack of networking hinders the ability of SMEs to expand their business and include public sector organizations as their potential clients (relational capability). SMEs must improve their ability to manage governmental contracts and reduce their transactional processes while tendering (procedural capability). Table VI also shows how often companies submit a bid for open tenders. According to the mean score, in the past 12 months, companies presented an average of 3,62 bids. Additionally, it is also possible to see that many firms (36,42%) did not try to submit a single bid. Similarly, the table also shows how often SMEs managed to secure a contract with the public sector. In the past 12 months, the average number of contracts that SMEs won is 2,25. 52,98% of the companies did not manage to win a single contract.

5.3 IT Resources

Table VII - Descriptive Statistics on IT Resources

Ordering & Invoicing	Frequency	(%)
Specific software for ordering & invoicing	108	71,5
Write it digitally (MS Word or similar)	38	25,1
Write it manually	1	0,6
Do not manage	4	2,6
Website	**Frequency**	**(%)**
Yes, and we keep it updated regularly	127	84,1
Yes, and there is no need for us to update it regularly	19	12,5
No, we do not have a website	5	3,3
Portfolio showcased on website	**Frequency**	**(%)**
Yes	130	89,0
No	16	10,9

[185] Ram and Smallbone, "Supplier Diversity Initiatives and the Diversification of Ethnic Minority Businesses in the UK."

Present in social media	**Frequency**	**(%)**
Yes	144	95,3
No	7	4,6
Which Social Media?	**Frequency**	**(%)**
LinkedIn	143	31,7
Facebook	105	23,2
Twitter	67	14,8
Instagram	60	13,3
YouTube	46	10,2
WhatsApp	20	4,4
Snapchat	2	0,4
Other	8	1,7
Note. N=151.		

Table VII demonstrates the availability of IT resources. According to the CEOs that are participating in the procurement process at Digipolis, IT resources are, in general, not a barrier for SMEs to enter the public sector market. In terms of software, most companies utilize primary software such as MS Office, Google Drive, and Trello to run their daily operations. For businesses in the tech industry, programs like Visual Basic are also a standard, and they are easy to access. Still, according to the interviews, hardware does not play any significant role in their access to public procurement. Companies often use essential hardware such as computers, to run office tasks. It was evident during the interviews that software or hardware did not contribute extensively for their entrance to public procurement.

However, quantitative studies concluded that SMEs with an electronic ordering and invoicing system are more likely to participate in public procurement at a state level[186]. Because of these findings, the availability of e-ordering and e-invoicing systems was included in the survey. Most companies (71,52%) have special software to manage their purchases, while 25,17% of firms write orders manually in software like MS Word. Aside from these systems, previous research has shown that digital assets such as websites or social media may indeed be beneficial for smaller companies. It allows customers to search for goods and prices more efficiently, enabling companies to reach new potential buyers[187]. Furthermore, recent reports indicate the advent of social media channels, such as Facebook and LinkedIn, which provide low-cost channels for SMEs to communicate professionally[188]. In this regard, the survey includes the companies' presence on the internet. 84% of firms have a website and are updating them regularly. From those that have one, 89% are showcasing their portfolio and past experiences online. Most SMEs (95,36%) are also present in social media. LinkedIn (31,71%) and Facebook (23,28%) are the channels most in use.

[186] Karjalainen and Kemppainen, "The Involvement of Small- and Medium-Sized Enterprises in Public Procurement: Impact of Resource Perceptions, Electronic Systems and Enterprise Size."
[187] Jean and Kim, "Internet and SMEs' Internationalization: The Role of Platform and Website."
[188] Manyika and Lund, "Globalization for the Little Guy."

5.4 HUMAN RESOURCES

Table VIII - Descriptive Statistics on Human Resources

Roles	Frequency	(%)
CEO / Founder	140	21,1
Software Developer / Programmer	81	12,2
Software Testing Engineer (Quality Control)	46	6,9
Graphical Designer	52	7,8
User Interface (UI) Designer / User Experience (UX) Designer	53	7,9
Project Manager	97	14,6
Marketer / Marketing	65	9,8
Sales Development Representative (SDR) / Pre-Sales	70	10,5
Seller / Vendor	33	4,9
Lawyer / Legal Expert	16	2,4
Other	10	1,5
Developers contract type	**Frequency**	**(%)**
Regular (full/part-time)	62	41
Project-based	21	13,9
Regular and Project-based	31	20,5
We do not have any developers in our team (fixed or temporarily)	37	24,5
Testing and quality Control	**Frequency**	**(%)**
Yes, and we do it for every new project/development	84	73,6
Yes, and we do it for some projects/developments	26	22,8
We often do not test nor do quality control of our solutions	4	3,5
Developers acquainted with sales techniques	**Frequency**	**(%)**
Yes, and we feel confident that they can present and sell our solutions	19	16
Yes, although they need support when selling our solutions	24	21
No, we have another specific person to handle sales	71	62,28
Developers´ Experience	**Frequency**	**(%)**
Less than 1 year	1	0,8
1 – 2 years	8	7
3 – 5 years	35	30,7
6 – 10 years	35	30,7
More than 10 years	35	30,7
Employees familiarized with the public sector	**Frequency**	**(%)**
None of our employees have previous familiarity with the public sector	29	19,2
0,1 – 19%	59	39
20 – 49%	28	18,5
50 – 79%	12	7,9
80 – 99%	2	1,3
All our employees have previous familiarity with the public sector	8	5,3
Not applicable	13	8,6
Company hired legal advice on governmental contracting	**Frequency**	**(%)**
Yes, we hired an external law firm / professional to give us legal advice	37	24,5
No, because we have enough expertise among our own staff	30	19,8
No, we never sought help for legal aspects of public procurement	70	46,3

Not applicable	14	9,2
Process to integrate new employees	**Frequency**	**(%)**
Yes	115	76,1
No	36	23,8
How does the company hire new employees	**Frequency**	**(%)**
Demand-base throughout the year	111	44,4
Specific talent programs featured for certain periods	26	10,4
Accepting self-initiative applications	58	23,2
Headhunters	35	14
Other	20	8
Internal training to teach employees about PP or PA	**Frequency**	**(%)**
Yes	23	15,2
No	128	84,7
External training to teach employees about PP or PA	**Frequency**	**(%)**
Yes	11	7,2
No	140	92,7
Note. N=151.		

In Table VIII, it is possible to see many variables depicting the human resources of SMEs. The perception of entrepreneurs over their legal resources can indeed influence the involvement of SMEs[189]. To contrast this situation, only 2,41% of companies have an actual lawyer or legal expert in providing support during tender procedures. In this respect, 24,50% of firms already hired a third-party for consultancy regarding legal aspects of public procurement. 46,36% never looked for external help. Additionally, during the interviews, it was often mentioned the value of having staff with previous experience with the public sector. 19% of the firms have no one in the team with previous experience. In comparison, 66,89% have employees with some degree of experience in working with the government. Most of the SMEs do not provide internal (85%) or external (93%) training about public procurement or public administration.

As this study is carried out with SMEs from the technological sector, there is a greater emphasis on the developers. In line with the interviews conducted with CEOs and managers from Digipolis, the experience and know-how of developers may have a significant impact on the outcome of the firm when securing a public sector contract. 41,06% of developers are full-time employees of these firms. 61,40% of developers have more than six years of experience in software programming. 62,28% of companies do not allocate sales responsibility to developers. Managers from Digipolis also mentioned the importance of having testing and quality control procedures while participating in their procurement process. Most of the companies (73,68%) do test and check the quality of their projects.

[189] Karjalainen and Kemppainen, "The Involvement of Small- and Medium-Sized Enterprises in Public Procurement: Impact of Resource Perceptions, Electronic Systems and Enterprise Size."

5.5 MANAGERIAL RESOURCES

Table IX- Descriptive Statistics on Managerial Resources (Part 1)		
Project Management	**Frequency**	**(%)**
Yes	115	76,1
No	36	23,8
Roles	**Frequency**	**(%)**
SCRUM	76	19,0
Agile	92	23,0
Kanban	56	14,0
Scrumban	13	3,2
Lean	32	8,0
Six Sigma	17	4,2
eXtreme Programming (XP)	6	1,5
Waterfall	26	6,5
PRINCE2	34	8,5
PMI/PMBOK	8	2,0
Critical Path Method (CPM)	17	4,2
Agifall / Hybrid	17	4,2
Other	6	1,5
Portfolio/completed projects with the public sector	**Frequency**	**(%)**
Most projects are from the public sector	11	7,2
Only a fraction of projects is from the public sector	82	54,3
No past projects are from the public sector	52	34,4
Not Applicable	6	3,9
The company possess and maintains a strategic plan	**Frequency**	**(%)**
Yes	114	75,5
No	37	24,5
The company possess a vision, mission, and values statement	**Frequency**	**(%)**
Yes	133	88,0
No	18	11,9
Provide a "demo" of the solution during the procurement procedure	**Frequency**	**(%)**
Yes	85	56,2
No	41	27,1
Not applicable	25	16,5
Note. N=151.		

In Table IX, it is possible to observe management structures present in SMEs. Companies tend to utilize project management methodologies (76,16%), and the three most used methods are Agile (23,00%), SCRUM (19,00%), and Kanban (14,00%). 54,30% of the firms have a minor portion of their project related to the public sector, and 34,44% never completed a service with the government. 75,50% of companies have and maintain a strategic plan, and 84% have an organizational identity (mission, vision, and values). According to the interviews, providing a demo of the solution during tender procedures may impact the outcome for the company. The selection committee tends to be more inclined to award contracts to companies that already come with a preview during pitches. Offering a demo is a sign of

commitment from the firm; it shows that they are ready to develop a solution for the problem in question. In this regard, 56,29% of the firms plan and often provide a demo of the solution during tendering processes.

Table X- Descriptive Statistics on Managerial Resources (Part 2)

Market Orientation	**1 (%)**	**2 (%)**	**3 (%)**	**4 (%)**	**5 (%)**
Monitor the market environment to be aware of possible opportunities or threats	3,9	7,2	13,2	46,3	29,1
Regularly execute marketing research to improve business strategies	11,9	17,8	25,8	29,1	15,2
Utilize digital marketing to advertise the company	7,9	6,6	19,8	32,4	33,1
Competitor Orientation	**1 (%)**	**2 (%)**	**3 (%)**	**4 (%)**	**5 (%)**
Monitor competitors' marketing efforts	7,2	9,2	19,8	51,6	11,9
Collect competitors' marketing data	15,2	26,4	28,4	21,8	7,9
Respond rapidly to competitors' actions	13,9	23,8	39	17,8	5,3
Top managers often discuss competitors' actions	7,2	13,2	35,7	31,7	11,9
Target customers and groups where it is possible to develop a competitive advantage	6,6	3,9	19,2	36,4	33,7
Customer Orientation	**1 (%)**	**2 (%)**	**3 (%)**	**4 (%)**	**5 (%)**
Strong commitment to understand client's preferences	1,3	0	3,3	27,8	67,5
Always planning to create customer value in services	0,6	0,6	3,3	27,1	68,2
Encourage customer comments and complaints because they help us to do a better job	0,6	0,6	6,6	47	45
Business objectives are driven by customer satisfaction	1,3	1,9	11,2	39,7	45,7
Measure customer satisfaction regularly	1,9	13,2	29,1	30,4	25,1
After-sales/ collect customer feedback is an essential part of the business strategy	5,3	7,9	22,5	35,1	29,1
Inter-functional Coordination	**1 (%)**	**2 (%)**	**3 (%)**	**4 (%)**	**5 (%)**
Market information is shared inside the organization	3,9	5,3	28,4	40,4	21,8
Persons in charge of different roles are involved in preparing business plans/ strategies	5,9	6,6	17,8	48,3	21,1
We do a good job integrating the activities inside our organization	3,9	7,9	23,8	47	17,2
We regularly have inter-organizational meetings to discuss market trends and developments	5,9	12,5	26,4	36,4	18,5
We regularly discuss customer needs in our organization	4,6	3,3	17,8	41	33,1

Note. N=151.
1. Strongly disagree; 2. Disagree; 3. Neither agree nor disagree; 4. Agree; 5. Strongly agree

Table X depicts managerial decisions that firms take regarding different categories. The translation of these decisions is made with the usage of a Likert scale. All of these topics are covered and explained in chapter 2.5 - Factors that Promote SME Success In Public Procurement. SMEs that are market-oriented, customer-driven, perform competitor analysis, and exchange information between departments are supposed to be more likely to succeed in public procurement[190].

5.6 PERCEPTION AS A RESOURCE

Table XI- Descriptive Statistics on Resource Perception

Resource Perception	**1 (%)**	**2 (%)**	**3 (%)**	**4 (%)**	**5 (%)**
We have suitable legal expertise required for tendering	18,5	22,5	21,8	23,8	13,2
We have suitable IT systems required for tendering	12,5	13,2	21,1	29,8	23,1
We have suitable administrative resources required for tendering	13,9	17,8	23,8	32,4	11,9
Perception of the Procurement Process	**1 (%)**	**2 (%)**	**3 (%)**	**4 (%)**	**5 (%)**
The competition for bids is not too strong/intense	15,8	29,1	32,4	17,2	5,3
We understand tender evaluation criteria	7,2	13,2	27,8	37,7	13,9
The procurement process is not biased towards one specific company	14,5	22,5	39,7	19,8	3,3
Public contracts are the right size for our company to manage	14,5	18,5	34,4	24,5	7,9
Perception of Capabilities	**1 (%)**	**2 (%)**	**3 (%)**	**4 (%)**	**5 (%)**
Communicate the proposed solution to meet the tender specifications	3,3	8,6	28,4	41,0	18,5
We cannot influence buyer needs during a tender	5,3	11,2	33,1	35,1	15,2
Convince buyers that we have the optimal solution for the tender	2,6	11,2	39,7	33,7	12,5

Note. N=151.

1. Strongly disagree; 2. Disagree; 3. Neither agree nor disagree; 4. Agree; 5. Strongly agree

Table XI shows the perception of businesspeople over their companies' resources and capabilities. Chapter 2.5 englobes the explanation of all these variables. Companies that perceive that they: (1) have suitable IT, legal and administrative resources; (2) believe that the procurement process is manageable and; (3) that they can communicate and convince buyers are more likely to involve their businesses with public procurement. Questions also used a Likert scale to translate the entrepreneurs' perception. The next chapter crosses the data from this and previous sub-chapters with SME involvement in public procurement.

[190] Raju, Lonial, and Crum, "Market Orientation in the Context of SMEs: A Conceptual Framework"; Flynn and Davis, "Explaining Sme Participation and Success in Public Procurement Using a Capability-Based Model of Tendering"; Narver and Slater, "The Effect of a Market Orientation on Business Profitability"; Tammi, Saastamoinen, and Reijonen, "Market Orientation and Smes' Activity in Public Sector Procurement Participation."

CHAPTER 6: RESEARCH DISCUSSION

Early studies in the field of public procurement included the inherent difficulties of becoming a public sector supplier. Many academics were able to recognize the internal-external obstacles that affect smaller businesses (see Table I). Others focused their efforts on finding variables that have the potential to enhance SME participation in public contracts (see Table II). Both research and policy-making practices in recent years encircled the paradigm of "vulnerable small firms" vs. "powerful big enterprises." Such debates, as already argued, are not entirely helpful because they mean that SMEs are consistently at a disadvantage in public procurement[191]. These discussions are also present, not only in the public procurement field but also in other economic sectors[192].

This thesis has taken a more meticulous look at firm resources and participation in public procurement to move beyond this stage. It assimilates its ideas in resource theories by providing a resource-based model of tendering (see Figure II). This chapter explains potential findings that are affecting SME participation within the public procurement sphere based on the firm's resources.

6.1 IT RESOURCES

Table XII – Correlation Matrix for IT Resources

		1	2	3	4	5	6	7	8	9
1,	Ordering & invoicing	1.00								
2.	Website	-.23**	1.00							
3.	Portfolio on website	-.20*	.68**	1.00						
4.	Social Media	-.21**	.38**	.40**	1.00					
5.	Tender search rate	-.06	.12	.13	.04	1.00				
6.	Tender submission rate	-.07	.09	.09	.06	-.15	1.00			
7.	Value of contracts	-.08	-.01	-.05	.02	-.04	.05	1.00		
8.	Success rate in bids	-.04	.07	.06	.04	-.10	.77**	.07	1.00	
9.	Public sector revenue	.08	-.08	-.10	.09	-.05	.15	.02	.29**	1.00

*Note. N=151. **p < 0.1*

According to the CEOs that are participating in the procurement process at Digipolis, IT resources are, in general, not a significant influence when it comes to their involvement with tendering. Correlations show that there are weak relationships between IT Resources and the companies' involvement with public procurement. The levels of IT resources in the entire sample are very high and indicate little variation. Previous findings have stated that electronic ordering and invoicing have a degree of influence on SME involvement[193]. The correlations between ordering and invoicing, are weak (ρ<0.3) when compared with the dependent variables. The reason could be due that these previous studies only apply to state-level procurements and are not supported for tenders at the municipal level[194]. Likewise, the procurements in Antwerp are mostly done to municipal level

[191] Flynn, McKevitt, and Davis, "The Impact of Size on Small and Medium-Sized Enterprise Public Sector Tendering."
[192] Pett, "SME Identity and Homogeneity – Are There Meaningful Differences Between Micro , Small , and Medium-Sized Enterprises ?"
[193] Karjalainen and Kemppainen, "The Involvement of Small- and Medium-Sized Enterprises in Public Procurement: Impact of Resource Perceptions, Electronic Systems and Enterprise Size."
[194] Karjalainen and Kemppainen.

organizations, which could help to explain the hypothesis created in the studies by Karjalainen & Kemppainen (2018). Moreover, according to the interviews, CEOs were clear when saying that their invoicing and ordering processes had not much relevance when approaching open tenders. Most of them had no specific software to handle ordering and invoicing. As public sector suppliers, they had timetables to know when to send their invoices, and the majority used MS word to write their documents. In general, the consensus is that having a system to facilitate this process would not affect their participation in the procurement at all. It is, however, worth mentioning that Digipolis has a streamlined process for gathering invoices, which can explain the lack of correlation between e-ordering systems and SME involvement with procurement.

Managers from Digipolis also never mentioned the relevance of any IT resource during the tender procedure. As not many theories have exploited it, there is an assumption that possessing a website with an online portfolio could potentially lead to closing more public contracts. The importance of having digital assets is an established benefit for smaller companies since it opens advertisement opportunities with less resource usage. Generally, for business practices, better digital resources can lead to better digital marketing results. As real-life social interactions move into the virtual world, consumers tend to look online to build trust with their future suppliers[195]. Because of that, it could be that the selection committee from Digipolis would look and search for the best suppliers by also looking at their website and social media. It might be possible to explain the weak correlations as the people in charge of selecting new suppliers must abide by their decision under precise legal regulations. In other words, they must select companies based on what they show during pitches and standard requested documents, such as the "Request for Tender." Judging new suppliers outside of these boundaries, such as looking at their website or social media, could potentially lead evaluators to be legally punished.

All in all, it is not possible to identify the relative importance of websites or any other IT asset[196]. Generally, neither hardware nor software appears to influence how SMEs approach tenders. Hypotheses number H1a, H1b, H1c, and H1d, are not supported, as no relationship between IT resources and SME involvement is identified.

[195] Manyika and Lund, "Globalization for the Little Guy."
[196] Zhou, Lu, and Wang, "The Relative Importance of Website Design Quality and Service Quality in Determining Consumers' Online Repurchase Behavior."

6.2 HUMAN RESOURCES

Table XIII – Correlation Matrix for Human Resources (Part 1)

		1	2	3	4	5	6	7	8	9	10
1.	Integrating new employees	1.00									
2.	Employees with PA experience	-.20	1.00								
3.	Looked for legal advice	.12	-.17	1.00							
4.	Internal training PP or PA	.19	.01	.09	1.00						
5.	External training PP or PA	.04	.15	-.04	.52	1.00					
6.	Tender search rate	.10	-.10	.08	-.21	-.25	1.00				
7.	Tender submission rate	.12	-.13	.06	.10	-.06	-.15	1.00			
8.	Value of contracts	-.14	.29	-.03	-.01	.01	-.04	.05	1.00		
9.	Success rate in bids	.09	-.07	-.02	-.02	-.05	-.10	.77**	.07	1.00	
10.	Public sector revenue	-.17	.06	.08	-.01	-.04	-.05	.15	.02	.29**	1.00

*Note. N=151. **p < 0.1*

Initially, there is no substantial correlation between human resources and SME involvement with public procurement. According to the Pearson correlation coefficient[197], the correlations are weak (ρ<0.3). As stated from previous studies, hiring legal advice[198] and the entrepreneur's perception over the firm's legal resources[199], are all variables that can influence SME participation during tenders. These beliefs may provide clear indications of the institutionalized nature of public procurement processes. In this regard, the survey explores the number of SMEs that have lawyers or people to provide legal advice. Also, the survey considers whether managers seek legal advice (externally), if there is training on public contracting and the proportion of employees with experience working with the public sector. None of these variables seems to influence SMEs during their participation in public tenders, as correlations are weak.

Furthermore, not only are the correlations frail, in interviews, CEOs also mention that the legal aspects of procurement do not matter when engaging in tenders. Business owners revealed that they do not require legal consultancy nor find that they need to provide training about the public sector to employees. It could be that the more straightforward process provided by Digipolis makes the occurrence of these elements irrelevant. However, some of the companies did find it relevant to have personnel with experience with the public sector. They feel safer in working with employees that have already participated in a public contract. Entrepreneurs often hire people who worked with the government to incorporate their teams. Companies consider that having people with an internal view of how the government operates potentially helps the business to secure a public contract. These statements, nevertheless, could not be proven statistically.

[197] Benesty et al., "Pearson Correlation Coefficient."
[198] Thomassen et al., "SMEs' Access to Public Procurement Markets and Aggregation of Demand in the EU."
[199] Karjalainen and Kemppainen, "The Involvement of Small- and Medium-Sized Enterprises in Public Procurement: Impact of Resource Perceptions, Electronic Systems and Enterprise Size."

Table XIV – Correlation Matrix for Human Resources (Part 2)

		1	2	3	4	5	6	7	8	9	10	11
1.	Company's roles	1.00										
2.	Developers' contract	-.22	1.00									
3.	Developers' skill to sell	.17	-.66	1.00								
4.	Developers' Experience	.32	-.63	.56	1.00							
5.	Quality Control	.27	-.81	.66	.66	1.00						
6.	Process to hire	-.11	.12	.00	.03	.01	1.00					
7.	Tender search rate	-.01	-.09	.00	-.11	-.01	-.01	1.00				
8.	Tender submission rate	-.13	-.06	.05	.06	-.01	-.04	-.15	1.00			
9.	Value of contracts	.03	.00	-.04	-.04	-.16	.03	-.04	.05	1.00		
10	Success rate in bids	-.13	-.03	.01	.11	.01	-.04	-.10	.77**	.07	1.00	
11.	Public sector revenue	-.13	.13	-.10	.04	-.12	.06	-.05	.15	.02	.29**	1.00

*Note. N=151. **p < 0.1*

Regarding the tech industry, there is a great emphasis on the developers. During the interviews, managers from Digipolis often mentioned the importance of the developers' ability to sell ideas during tender procedures. Entrepreneurs also believe that it is imperative to form a team of senior-experienced developers. As most solutions are developed specifically for each client, it can lead to products with many bugs if not managed well. Inconsistencies in the software might also occur after the contract is over. Developers must know how to manage operations and relate well with clients as they need to provide constant support. The selection committee also emphasized the need for excellent quality control to reduce the amounts of errors that these products will have after being delivered. According to the correlation matrix in Table XIV, all these variables have a weak relation with how SMEs engage with public procurement. It might be the case that these are variables that are significant during contract execution and not during the actual bidding procedure. Procurers might not have enough methods or time to analyze how committed are the developers with customer support or how well planned is the companies' quality control. Therefore, these statements are not supported.

Next, the following Table XV depicts the correlation between the firm size and the dependent variables:

Table XV – Correlation Matrix for Human Resources (Part 3)

		1	2	3	4	5	6
1.	Firm Size	1					
2.	Tender search rate	-.04	1				
3.	Tender submission rate	.31**	-.14	1			
4.	Value of contracts	.08	-.03	.04	1		
5.	Success rate in bids	.33**	-.10	.77**	.06	1	
6.	Public sector revenue	.04	-.04	.15	.02	.29**	1

*Note. N=151. **p < 0.1*

Following other researches[200], the firm size does have a mild correlation with how often firms submit tenders (ρ>0.3). Furthermore, data seem to suggest that the total number of employees also impacts the success ratio of SMEs in tenders. The bigger the company, the more likely it is to submit and win

[200] Flynn, "Re-Thinking SME Disadvantage in Public Procurement."

tenders. In summary, the presence of roles, like lawyers or designers on the team, does not seem to affect the capability of SMEs in being a public sector supplier. Similarly, employee experience, quality control, how companies hire, and if new employees are well integrated, all seem not to affect SME involvement with public contracting. Data only seem to suggest that there is a positive correlation between the size of the firm with tender submission and tender success ratio.

In other words, it might be that firms do not have pre-defined tasks for who should look for and apply for open tenders. What it seems is that the more people inside the company, the higher the capability of the firm to apply for public opportunities, regardless of the employees' assigned positions. In this sense, it is possible to say that hypotheses H2b and H2d are not supported. Evidence supports H2a and H2c, although only when considering the firm size, other aspects from human resources cannot be validated.

6.3 MANAGERIAL RESOURCES

Managerial resources divide themselves into management actions, project management methodologies, market orientation, competitor's analysis, customer orientation, and inter-functional coordination. The following Table XVI depicts the overall management activities that occur inside the organizations:

Table XVI – Correlation Matrix for Managerial Resources

		1	2	3	4	5	6	7	8	9	10
1.	Manage Projects	1.00									
2.	Portfolio PA	.24**	1.00								
3.	Strategic Plan	.26**	.16*	1.00							
4.	Organizational Identity	.18*	.05	.50**	1.00						
5.	Provides Demo	.19*	.21**	.22**	.17*	1.00					
6.	Tender search rate	.04	.05	.03	-.07	.00	1.00				
7.	Tender submission	-.05	.16	.10	.06	.16	-.15	1.00			
8.	Value of contracts	-.18*	-.40**	-.12	-.09	-.11	-.04	.05	1.00		
9.	Success rate in bids	.04	.12	.08	.05	.13	-.10	.77**	.07	1.00	
10.	Public sector revenue	.03	.07	-.08	-.03	-.03	-.05	.15	.02	.29**	1.00

*Note. N=151. *p < 0.5 ;**p < 0.1*

According to the correlations, there is a moderate, negative correlation between the average budget that SMEs look for and if they have or not past projects with the public administration. Data seem to imply that companies with more projects are also the ones looking for projects with smaller budgets. Digipolis projects are under the limit of €144 thousand per project. The general idea of the process is to make smaller scaled projects and deliver implementation faster. Entrepreneurs are then able to enter the public sector market by applying for projects that are more manageable in scope. SMEs that desire to tackle bigger budgets need to partake in a more complex and bureaucratic procurement process. What this implies is that companies with a broader portfolio with the public sector are also the ones applying for financially smaller contracts. Companies that apply for larger contracts end up

having fewer total opportunities to work with the government. The next Table XVII and Table XVIII show the correlation with project management methodologies.

Table XVII – Correlation Matrix for Project Management Methods (Part 1)

		1	2	3	4	5	6	7	8	9	10	11
1.	SCRUM	1.00										
2.	Agile	.67**	1.00									
3.	Kanban	.52**	.42**	1.00								
4.	Scrumban	.30**	.25**	.40**	1.00							
5.	Lean	.32**	.32**	.34**	.42**	1.00						
6.	Six Sigma	.23**	.20*	.20*	.26**	.43**	1.00					
7.	Tender search rate	-.03	-.03	-.01	.06	.00	.05	1.00				
8.	Tender submission	-.03	.00	.00	-.03	.09	.12	-.15	1.00			
9.	Value of contracts	-.16*	-.23**	-.08	-.19*	-.03	-.07	-.04	.05			
10.	Success rate in bids	.03	.06	.06	-.03	.16*	.19*	-.10	.77**	.07		
11.	Public sector revenue	-.01	.02	-.01	-.04	.07	.01	-.05	.15	.02	.29**	1.00

*Note. N=151. *p < 0.5 ;**p < 0.1*

Table XVIII – Correlation Matrix for Project Management Methods (Part 2)

		1	2	3	4	5	6	7	8	9	10	11
1.	XP	1.00										
2.	Waterfall	.09	1.00									
3.	PRINCE2	.13	.38**	1.00								
4.	PMBOK	.17*	.28**	.32**	1.00							
5.	Critical Path Method	.10	.21*	.16	.33**	1.00						
6.	Agifall/Hybrid	.14	.28**	.36**	.46**	.38**	1.00					
7.	Tender search rate	-.02	-.12	-.14	-.24**	-.07	-.04	1.00				
8.	Tender submission	.24**	.11	.07	.14	.24**	.15	-.15	1.00			
9.	Value of contracts	.07	-.09	-.15	-.13	.10	-.05	-.04	.05			
10.	Success rate in bids	.36**	.16	.13	.23**	.38**	.20*	-.10	.77**	.07		
11.	Public sector revenue	.12	.04	.08	.18*	.19*	-.04	-.05	.15	.02	.29**	1.00

*Note. N=151. *p < 0.5 ;**p < 0.1*

According to the data, it is possible to recognize a moderate correlation between eXtreme Programming (XP), Critical Path Method (CPM), and the success rate. In other words, SMEs that manage projects with these two methods are more likely to win a contract with the public sector.

eXtreme Programming seems like a reliable method for SMEs that work within the tech industry. The basic concepts of this technique are rapid feedback, incremental change, and quality work. Programmers use a minimum front-end design while focusing on the constant revision of requirements[201]. eXtreme Programming is a methodology included in the agile manifesto. Reports indicate that the potential benefits of agile growth include higher efficiency, a greater variety of tests, understandable, sustainable, and extensible code. Shine Technologies, an Australian IT consultancy, conducted a web survey in 2003 to determine organizations' interest in agile methods. They received 131 responses from around the world, and the majority (84,7%) signaled to know agile growth. The

[201] Ramachandran, "A Process Improvement Framework for XP Based SMEs."

results of this survey show that XP is the most common agile tool, used by 59% of respondents. Most respondents (80%) indicated that agile processes increased team efficiency, application quality, and customer satisfaction. Moreover, about half of the respondents said that costs had decreased with the implementation of XP[202]. The perceived benefits of XP may be one of the reasons why SMEs can win tenders more easily. During the interviews, CEOs that received a public contract mentioned that they do utilize agile methods to run projects inside their companies. They also mention that this can be a decisive factor in securing a public contract.

Critical Path Method (CPM) aids in the preparation, monitoring, and scheduling of complex projects. It has shown to be a powerful method for defining the length of solutions. However, in practice, it is often difficult to obtain clear and precise information on the length of some activities that are unique for each project. Indeed, this can significantly reduce the objectivity and precision of conventional CPM usage. Contrasting with XP, CPM is a traditional method of management, and it has already been the target of many critics due to its lack of efficiency in scheduling tasks[203]. Most studies examine CPM under the usage of more prominent industries, such as construction. However, some frameworks created forms to integrate CPM as a supply management support for SMEs[204]. Overall, none of the interviewed CEOs mentioned the usage of CPM to support their management. A more in-depth analysis and potentially further qualitative analysis would be necessary to examine the competitive advantages for SMEs that manage their tasks with CPM.

Next, the following Table XIX, Table XX, and Table XXII, show the relation between market orientation, competitor analysis, customer-orientation, and inter-functional coordination with SME involvement in public procurement.

Table XIX – Correlation Matrix for Market Orientation

		1	2	3	4	5	6	7	8
1.	Monitor the market environment	1.00							
2.	Execute marketing research	.49**	1.00						
3.	Utilize digital marketing	.40**	.46**	1.00					
4.	Tender search rate	-.09	.04	.00	1.00				
5.	Tender submission	.10	.09	.25**	.11	1.00			
6.	Value of contracts	-.11	-.06	-.10	-.14	-.41**	1.00		
7.	Success rate in bids	.08	.12	.19*	.12	.81**	-.35**	1.00	
8.	Public sector revenue	-.14	-.20*	-.16*	-.09	-.09	.09	-.02	1.00

*Note. N=151. *p < 0.5 ;**p < 0.1*

The table above demonstrates that no relevant correlation exists on market-orientation. These findings contradict previous studies that relied on market orientation theories[205] to explain the participation of smaller companies in public procurement. There is, however, a weak correlation (ρ<0.3) amongst the utilization of digital marketing strategies with the application rate for open

[202] Shine Technologies, "Agile Methodologies Survey Results."
[203] Hu and Liu, "Improved Critical Path Method with Trapezoidal Fuzzy Activity Durations."
[204] Thakkar, Kanda, and Deshmukh, "Supply Chain Management for SMEs: A Research Introduction."
[205] Narver and Slater, "The Effect of a Market Orientation on Business Profitability."

tenders. Nevertheless, this is not enough to sustain market orientation as a decisive factor in SME involvement. Practices such as monitoring the market environment or conducting marketing research have shown no relevant correlation with the overall performance of smaller companies.

Table XX – Correlation Matrix for Competitor Orientation

		1	2	3	4	5	6	7	8	9	10
1.	Monitor competitors	1.00									
2.	Collect competitor's data	.58**	1.00								
3.	Respond to competitors	.48**	.61**	1.00							
4.	Discuss actions	.52**	.46**	.57**	1.00						
5.	Competitive advantages	.44**	.25**	.40**	.36**	1.00					
6.	Tender search rate	-.01	-.02	-.09	-.01	-.06	1.00				
7.	Tender submission	.11	.09	.12	.17*	.18*	.11	1.00			
8.	Value of contracts	-.05	-.04	-.06	-.05	-.02	-.14	-.41**	1.00		
9.	Success rate in bids	.12	.10	.10	.08	.10	.12	.81**	-.35**	1.00	
10.	Public sector revenue	-.22**	-.14	-.10	-.13	-.10	-.09	-.09	.09	-.02	1.00

*Note. N=151. *p < 0.5 ;**p < 0.1*

Similarly, data seems to imply that analyzing the competition has no direct influence on SME performance in public procurement. Previous findings were able to relate how firms can significantly benefit from gathering data from competitors and use these results strategically[206]. Such evidence is not supported in the context of this research as there is no relevant correlation. Monitoring competitors, collecting their data, and building competitive advantage might have inherent benefits for a business. However, they are not directly related to the firm's performance while bidding.

Additionally, in the interviews, CEOs have not shown a high inclination towards monitoring their competitors. Some of them mentioned that they do perform some analysis by looking at their competitors' websites or social media. Overall, companies had no formal procedure to analyze competitors. Furthermore, even though the lack of an organized competitor analysis was apparent, when questioned if that would make a difference when dealing with public procurement, the answers were negative.

Table XXI – Correlation Matrix for Customer Orientation

		1	2	3	4	5	6	7	8	9	10	11
1.	Client's preferences	1.00										
2.	Customer value	.67**	1.00									
3.	Customer feedback	.51**	.53**	1.00								
4.	Satisfaction as goal	.55**	.45**	.52**	1.00							
5.	Measure satisfaction	.36**	.36**	.41**	.61**	1.00						
6.	After-sales	.36**	.42**	.44**	.51**	.74**	1.00					
7.	Tender search rate	.11	.13	.04	.08	.09	.00	1.00				
8.	Tender submission	.14	.09	-.05	.00	-.02	-.05	.11	1.00			
9.	Value of contracts	-.14	-.07	.07	.00	.02	.01	-.14	-.41**	1.00		
10.	Success rate in bids	.10	.07	-.10	-.02	.04	.05	.12	.81**	-.35**	1.00	
11.	Public sector revenue	.02	-.08	.05	.03	-.02	-.01	-.09	-.09	.09	-.02	1.00

*Note. N=151. *p < 0.5 ;**p < 0.1*

[206] Narver and Slater.

No relevant correlation is identifiable within the customer orientation sphere. The lack of evidence is another divergence with previous studies. Scholars have shown that companies that work to achieve customer satisfaction are more likely to seek and bid on public proposals[207]. It is not possible to find the same relation here. Most of the SMEs attested that they are customer-centric businesses (see Table X, customer orientation section). However, this is not a reason for SMEs to have more prominent participation in public procurement. During the interviews, entrepreneurs often added that they are customer-focused and that they tend to listen to what their clients have to say when developing new solutions. Co-developing solutions with Digipolis and costumers is a top priority for these companies.

Nevertheless, these smaller firms have no structured process to gather customer feedback and implement it to improve the firm's overall performance. They often do not collect their clients' satisfaction by applying, for example, the Net Promoter Score (NPS). These SMEs also did not seem to apply any process for continuous improvement based on their costumers' feedback. Even when considering the lack of a robust strategy to create customer value within these companies, they still identify themselves as being customer-oriented. Hence, that could reflect in the overall results of the quantitative survey.

Table XXII – Correlation Matrix for Inter-functional Coordination

		1	2	3	4	5	6	7	8	9	10
1.	Share information	1.00									
2.	Distinct roles strategize	.64**	1.00								
3.	Integrate activities	.69**	.78**	1.00							
4.	Organizational meetings	.56**	.51**	.59**	1.00						
5.	Discuss customer needs	.57**	.52**	.57**	.52**	1.00					
6.	Tender search rate	.06	.06	.00	.00	.00	1.00				
7.	Tender submission	-.03	.00	.07	-.06	.06	.11	1.00			
8.	Value of contracts	.01	-.06	-.10	.08	-.01	-.14	-.41**	1.00		
9.	Success rate in bids	.03	.01	.08	.01	.07	.12	.81**	-.35**	1.00	
10.	Public sector revenue	.03	-.08	-.10	.10	-.02	-.09	-.09	.09	-.02	1.00

*Note. N=151. **p < 0.1*

For the inter-functional coordination, Raju, Lonial, & Crum (2011) have identified some of the relationships between the excellent coordination among different areas of the company and public procurement[208]. This relation cannot be supported, as the data seems to suggest that there is no present relevant correlation. The fact is that almost half of these companies have less than ten employees (45,70%, see Table V). During the interviews, entrepreneurs mentioned that their companies are not divisible into departments. SMEs usually have to deal with a shortage of personnel in their operations[209]. What this means is that the same person might have to fill the responsibility of many different roles. As a significant number of these companies have no formal separation of departments, teams collaborate without any strict division of sectors. In this sense, people already integrate and

[207] Flynn and Davis, "Explaining Sme Participation and Success in Public Procurement Using a Capability-Based Model of Tendering."
[208] Raju, Lonial, and Crum, "Market Orientation in the Context of SMEs: A Conceptual Framework."
[209] Irwin et al., "Entrepreneurial Orientation (EO) and Human Resources Outsourcing (HRO): A 'HERO' Combination for SME Performance."

share information between themselves, which could explain the lack of correlation between the need for department coordination and involvement with public procurement.

Altogether, what data can support inside the management category is that portfolio management is negatively related to the average budget on public contracts that companies seek. Companies with more public sector clients are also the ones applying for a contract with a smaller financial tier. Supporting this evidence is the fact that Digipolis can finish projects in roughly six weeks[210]. Suppliers in Antwerp have the chance of completing a significant number of projects, albeit with the limit of €144 thousand per contract. Following the resource-based model of tendering, it is possible to confirm H3b (although the relation is negative). Moreover, when analyzing project management methodologies, eXtreme Programming, and the Critical Path Method were the ones that seem to have a degree on influence on the procurement outcome. In this regard, these project management methods can support H3c.

6.4 PERCEPTION-BASED RESOURCES

This sub-chapter will unfold the data related to entrepreneurs and their perception over their companies' resources. This section separates perception over legal, IT, and administrative resources, perception over the procurement process, and the perception over the firm's capabilities. The following Table XXIII depicts the correlation numbers regarding legal, IT, and administrative resource perception.

Table XXIII – Correlation Matrix for Legal, IT and administrative resource perception

		1.	2.	3.	4.	5.	6.	7.	8.
1.	Suitable legal expertise	1.00							
2.	Suitable IT systems	.75**	1.00						
3.	Suitable administrative resources	.71**	.81**	1.00					
4.	Tender search rate	-.10	-.03	-.07	1.00				
5.	Tender submission	.19*	.26**	.27**	.11	1.00			
6.	Value of contracts	-.12	-.16*	-.21*	-.14	-.41**	1.00		
7.	Success rate in bids	.17*	.23**	.29**	.12	.81**	-.35**	1.00	
8.	Public sector revenue	-.09	-.11	.02	-.09	-.09	.09	-.02	1.00

*Note. N=151. *p<0.5; **p < 0.1*

According to the data, there appears to be a correlation between IT, administrative resources, and tender submission and success. Albeit, these correlations are weak (ρ<0.3) and not strong enough to support the evidence found in the studies made by Karjalainen and Kemppainen (2008)[211]. CEOs would also complement during the interviews that they believe that they have enough legal, IT, and administrative resources to bid for open tenders. They also mentioned that, in their view, these variables are not a critical aspect to engage with public procurement.

[210] Offerman, "' Buy from Startups ' Strategy Pays off for City of Antwerp."
[211] Karjalainen and Kemppainen, "The Involvement of Small- and Medium-Sized Enterprises in Public Procurement: Impact of Resource Perceptions, Electronic Systems and Enterprise Size."

Table XXIV – Correlation Matrix for Perception of the Procurement Process

		1.	2.	3.	4.	5.	6.	7.	8.	9.
1.	Competition is not strong	1.00								
2.	Understand evaluation criteria	.37**	1.00							
3.	The process is not biased	.22**	.33**	1.00						
4.	Contracts are the right size	.17*	.38**	.21**	1.00					
5.	Tender search rate	-.05	-.30**	-.09	-.01	1.00				
6.	Tender submission	.08	.28**	-.05	.31**	.11	1.00			
7.	Value of contracts	.08	-.11	.02	-.19*	-.14	-.41**	1.00		
8.	Success rate in bids	.16	.26**	.07	.26**	.12	.81**	-.35**	1.00	
9.	Public sector revenue	.12	.02	.11	-.13	-.09	-.09	.09	-.02	1.00

*Note. N=151. **p < 0.1*

Studies explained that short and straightforward contracts could also boost the success rate for SMEs. The explanation for this is that smaller companies often do not have the resources to handle extensive requirements[212]. The competition aspects within these studies cannot be supported, as the correlation is weak within all the variables of competition (ρ<0.2). However, it is possible to observe a moderate negative correlation amongst the perception over a clear understanding of the evaluation criteria and the search rate. This data may complement the information collected throughout the interviews. Entrepreneurs that worked with a more elaborate procurement process said they were more discouraged from searching and applying for bids again. In other words, the more they knew about the evaluation criteria and other needed requirements, the less inclined they felt to search for new tenders. These claims also support researches done by other scholars such as Loader (2005)[213]. Once they know the process, excessive bureaucracy can deviate smaller firms from looking for open opportunities with the public sector.

Regarding the contract size, there is a shortage of quantifiable data sustaining the allegation of a relationship between the contract size and SME involvement with public procurement[214]. The data in this study suggests that there is indeed a mild correlation between how firms perceive the contract size and their submission rate. It is another fact that can complement information gathered in the interviews. CEOs attested that they enjoy working and submitting bids to Digipolis because the contract size with the requirements its always capped at a maximum of ten pages. Furthermore, previous findings also support that larger contracts might lead to less participation of SMEs in bidding procedures (see Table I). Smaller companies cannot invest as much time to understand and prepare for a procurement process where the contracts are too extensive[215].

[212] Loader, "Supporting SMEs through Government Purchasing Activity"; Fee and Hennigan, "SMEs and Government Purchasing in Northern Ireland: Problems and Opportunities."
[213] Loader, "Supporting SMEs through Government Purchasing Activity."
[214] Nicholas and Fruhmann, "Small and Medium-Sized Enterprises Policies in Public Procurement: Time for a Rethink?"
[215] Woldesenbet and Worthington, "Public Procurement and Small Businesses: Estranged or Engaged?"

Table XXV – Correlation Matrix for Resource Perception and Capabilities

		1.	2.	3.	4.	5.	6.	7.	8.
1.	Communicate the solution effectively	1.00							
2.	Cannot influence buyer needs	.13	1.00						
3.	Can convince buyers of the solution	.56**	.04	1.00					
4.	Tender search rate	.01	.03	-.05	1.00				
5.	Tender submission	.23**	.08	.16	.11	1.00			
6.	Value of contracts	-.16*	-.20*	-.11	-.14	-.41**	1.00		
7.	Success rate in bids	.23**	-.05	.26**	.12	.81**	-.35**	1.00	
8.	Public sector revenue	-.07	.07	-.01	-.09	-.09	.09	-.02	1.00

*Note. N=151. **p < 0.1*

Explained by Flynn (2017)[216], the entrepreneur's perception over their firm's capabilities of networking (relational capability) can indeed affect the company's performance during the procurement process. This claim is identifiable in Table XXV. Digipolis managers cite that SMEs that can demonstrate "vigor and interest" and convince that they possess the ideal solution can rank better during the bidding process. However, when crossing the perception of the entrepreneurs over the ability to convince buyers, it is possible to see that there is a weak correlation with the success ratio in bids. The same applies to the perception of good communication to meet tender specifications and tender submission or success ratio. Again, these correlations are weak, and therefore, are not included as supporting evidence.

In summary, the number of times on how often companies apply for tenders have a relation with two different perceptions. The first one is the perception of evaluation criteria and requirements in the contract. The more entrepreneurs understand these requirements, the less inclined they feel to search for new opportunities. Secondly, this study fills in the gap in the lack of quantifiable data relating to contract size and engagement in public procurement. Data suggest that there is indeed a correlation between the extent of the document and tender submission ratio. All in all, it is possible to say that the perception category of resources supports H1a.

[216] Flynn, "Re-Thinking SME Disadvantage in Public Procurement."

CHAPTER 7: CONCLUSION

Many nations have recognized the importance of SMEs in their economies. In this context, governments are opening their public sector market to smaller firms. Many governments acknowledge the potential benefits of enhancing SME participation in public procurement. Even though they might be considered indispensable, many scholars are still able to show the many challenges that SMEs face in public tenders. Many of these findings show how under-represented SMEs are when it comes to acting as public sector suppliers. Undeniably, this field of study has gathered substantial attention in recent years. A considerable amount of studies directed efforts to isolate the causes that can hinder or aid smaller firms to participate in public procurement processes. The literature review of this thesis clarifies these findings extensively. This research aimed to identify the potential effects that some resources have on SME participation in public procurement. Former studies aid in the development of the resource-based model of tendering, which permeated the extent of this research. By using both qualitative and quantitative analyses, it is possible to conclude that some assets are essential factors to consider when designing and employing strategies in smaller businesses. Similarly, local-level administrations can also garner the data to employ better procurement practices and increase the participation of SMEs in their economies. Finally, scholars can use the data on this document to take a step further from the discussion that SMEs are consistently at a disadvantage when bidding. When causes are clarified, it is possible to understand how business resources affect SME participation in public procurement. The following table summarizes the findings present in this thesis:

Table XXVI – Summary of Findings

Hypotheses	***Supported***
IT Resources	-
H1a: There is a relationship between IT Resources and Frequency of Tendering	*No*
H1b: There is a relationship between IT Resources and Typical Contract Value Sought	*No*
H1c: There is a relationship between IT Resources and Success Rate	*No*
H1d: There is a relationship between IT Resources and the Share of Public Sector Revenue	*No*
Human Resources	-
H2a: There is a relationship between HR and Frequency of Tendering	*Yes*
H2b: There is a relationship between HR and Typical Contract Value Sought	*No*
H2c: There is a relationship between HR and Success Rate	*Yes*
H2d: There is a relationship between HR and the Share of Public Sector Revenue	*No*
Managerial Resources	-
H3a: There is a relationship between MR and Frequency of Tendering	*No*
H3b: There is a relationship between MR and Typical Contract Value Sought	*Yes*
H3c: There is a relationship between MR and Success Rate	*Yes*
H3d: There is a relationship between MR and Share of Public Sector Revenue	*No*
Perspective-based Resources	-
H4a: There is a relationship between Perception and Frequency of Tendering	*Yes*
H4b: There is a relationship between Perception and Typical Contract Value Sought	*No*
H4c: There is a relationship between Perception and Success Rate	*No*
H4d: There is a relationship between Perception and Share of Public Sector Revenue	*No*

As framed in subchapter 4.3, supported hypotheses are the ones that possess a relevant correlation coefficient ($\rho>0.3$) and very strong evidence to reject the null hypothesis (p-value<0.1). For the IT category, it was clear from the interviews that IT does not play a significant role when SMEs

participate in public procurement. Quantitative analysis also supports the small contribution of IT assets on the procurement process. Neither hardware nor software appears to influence how SMEs approach public procurement. Firms in the tech sector need basic software and hardware to operate, which are easy to obtain assets.

As for human resources, data suggests that the total amount of employees in the company is the only variable that has some influence on SME participation. There are positive correlations between the size of the firm with tender submission and tender success ratio. As also demonstrated by Olga & Yakovlev (2012)[217], Pickernell et al. (2011)[218] , and Temponi & Cui (2008)[219], the firm size is essential in understanding public procurement engagement and efficiency[220]. Moreover, Flynn, McKevitt & Davis (2015)[221] and Karjalainen & Kemppainen (2008)[222] found that the firm size correlates to the human capital that SMEs have at their disposal when applying for contracts. It was not possible to identify any relationship with other variables such as the presence of a role, experience with PA, or how firms hire new employees.

Inside the managerial resources, it is possible to identify a negative correlation between the quantity of a company's public sector portfolio and the average budget on public contracts that companies seek. Therefore, businesses with more clients in the public sector often bid for smaller financial contracts. Digipolis can complete projects in about six weeks, which increases the number of potential clients that a company can have. As explained, suppliers in Antwerp can finalize projects much faster considering the streamlined process, all with a limited budget of €144.000. Another finding regarding management concerns the project management methodologies. Employing eXtreme Programming (XP) and the Critical Path Method (CPM) can help SMEs to be more successful when they engage with public procurement. Data suggests that companies who apply these methods in their operations are more likely to win more contracts than others.

There are also some conclusions when analyzing the perception of the entrepreneurs. A negative correlation exists among the understanding of the procurement process and how often firms search for open tenders. When entrepreneurs engage in a more complex procurement process, they have shown a greater dissuasion when looking for new tenders. When SMEs understand how bureaucratic a procurement process can be, they will often withdraw their efforts from searching for new public sector opportunities. Finally, the size of a contract correlates with how often a firm submits bids. Previous studies have lacked the presentation of quantifiable data sustaining this evidence[223]. The data in this thesis do indicate a mild correlation between how entrepreneurs see contract size and the rate

[217] Demidova and Yakovlev, "State-Business Relations and Participation of Firms in Public Procurement in Russia: An Empirical Study."
[218] Pickernell, Packham, and Miller, "Competing Agendas in Public Procurement : An Empirical Analysis of Opportunities and Limits in the UK for SMEs."
[219] Temponi and Cui, "Factors Impacting Participation of Hispanic Small Businesses in Government Contracting in the USA."
[220] Demidova and Yakovlev, "State-Business Relations and Participation of Firms in Public Procurement in Russia: An Empirical Study"; Pickernell, Packham, and Miller, "Competing Agendas in Public Procurement : An Empirical Analysis of Opportunities and Limits in the UK for SMEs"; Temponi and Cui, "Factors Impacting Participation of Hispanic Small Businesses in Government Contracting in the USA."
[221] Flynn, McKevitt, and Davis, "The Impact of Size on Small and Medium-Sized Enterprise Public Sector Tendering."
[222] Karjalainen and Kemppainen, "The Involvement of Small- and Medium-Sized Enterprises in Public Procurement: Impact of Resource Perceptions, Electronic Systems and Enterprise Size."
[223] Nicholas and Fruhmann, "Small and Medium-Sized Enterprises Policies in Public Procurement: Time for a Rethink?"

of submission. During the interviews, CEOs attested that they do enjoy bidding with Digipolis because the contract size is always limited to ten pages.

Altogether, there is reasonable literature discussing resource availability and its importance to business performance. This study emphasizes the importance of resources for SME's perseverance in the context of public procurement. The ability to allocate resources correctly is vital to young firms' survival because of the ambiguity that permeates the public sector envrionment. Companies with robust resources are better able to adapt their routines, thus allowing them to respond better to changes in the environment. Choosing the right resources and managing them appropriately can strengthen the firm's odds of success with the government. Some resources can, indeed, enable smaller firms to enter the public sector market. This research identified the potential resources that will possibly enable smaller firms to take public sector opportunities and transform them into real businesses. Public administrations can benefit from more participation by SMEs, having more supplier options and potentially implementing projects more quickly and at lower costs, as is the case with Digipolis (Antwerp). Finally, as other studies concluded, these proportioned innovations can lead to more governmental efficiency and an overall better local economy.

7.1 LIMITATIONS AND FUTURE RESEARCH

There are some limitations to the methodology of this study. As explained in chapter 4.4, this research does not consider the macro-environment that SMEs are operating. Other industries, aside from technology, are also not considered in the data sampling. Moreover, the data sample studied all companies with less than 250 employees as SMEs. Overall, this leaves data with a very heterogeneous group of firms. Ideally, sampling would use a more homogenous group to indicate resource allocation more precisely. Future research might wish to consider the country's characteristics as a macro environment that shapes how SMEs interact with public procurement. Politics, economics, social settings, environment, and legislation can all affect how firms deal with public procurement[224]. Studies that wish to explain the interaction of SMEs with the public sector must also include different business sectors in the sample. Companies from different sectors may deal with public procurement differently[225]. Within this regard, it is also viable to segregate SMEs into smaller groups, as this umbrella term can englobe many different types of companies. SMEs constitute 99% of the EU[226] and UK economy[227], and academics should strive to make the samplings more homogeneous whenever possible. Besides, it is possible to measure efficiency levels of procuring at different levels of the public sector. For instance, federal governments and local governments may show different outcomes when procuring with the same tools. Ideally, studies will be able to incorporate the level of government in

[224] Melville, Kraemer, and Gurbaxani, "Review: Information Technology and Organizational Performance: An Integrative Model of IT Business Value," 2004.
[225] Pickernell, Packham, and Miller, "Competing Agendas in Public Procurement : An Empirical Analysis of Opportunities and Limits in the UK for SMEs."
[226] Flynn, "Investigating the Implementation of SME-Friendly Policy in Public Procurement."
[227] Treasury, "Accelerating the SME Economic Engine: Through Transparent, Simple and Strategic Procurement."

their case. New relationships (or the lack of existing ones) might be found when considering procurement processes at a federal or municipal level.

Another suggestion is that researchers should focus their efforts on possible variances between different EU countries. EU public procurement law applies equally to all countries, and it would be interesting to see if SME participation in some countries is more developed than others, regardless of supra-national laws or policies. In addition to resources, studies can explore other factors, such as the entrepreneur experience, education, communication style, and general business activity. These are variables that may affect the readiness and capacity of firms to participate in public procurement. Overall, SMEs' management systems are less hierarchical than in large companies, which can contribute to informal planning and different styles of communication[228]. Given the bureaucratic structure of the tendering processes, it would be interesting to check whether the entrepreneur's background has any degree of effect within the business' efficiency when bidding.

Future studies can use the methodology, conceptual model (see Figure II), or results within this document to stem their analysis. A recommendation is to gather the results (see Table XXVI – Summary of Findings) and organize a qualitative analysis with entrepreneurs in a similar setting. A deeper understanding of why and how these variables are relating to SME participation with public procurement has the potential to enhance this field of research. For instance, future studies can explore how eXtreme Programming (XP) or the Critical Path Method (CPM) are helping smaller companies win tender competitions. Furthermore, one of the unfolded findings was that IT resources do not have a great influence on SME participation with tenders. Studies should not discard this class of resources when applying analyses in different settings. As tech companies, they do not need advanced technologies to enter a procurement process, since basic hardware and software will suffice all their needs. However, this might not be the case for businesses in different industries.

[228] Levy, Loebbecke, and Powell, "SMEs, Co-Opetition and Knowledge Sharing: The Role of Information Systems."

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